ABSTRACTS

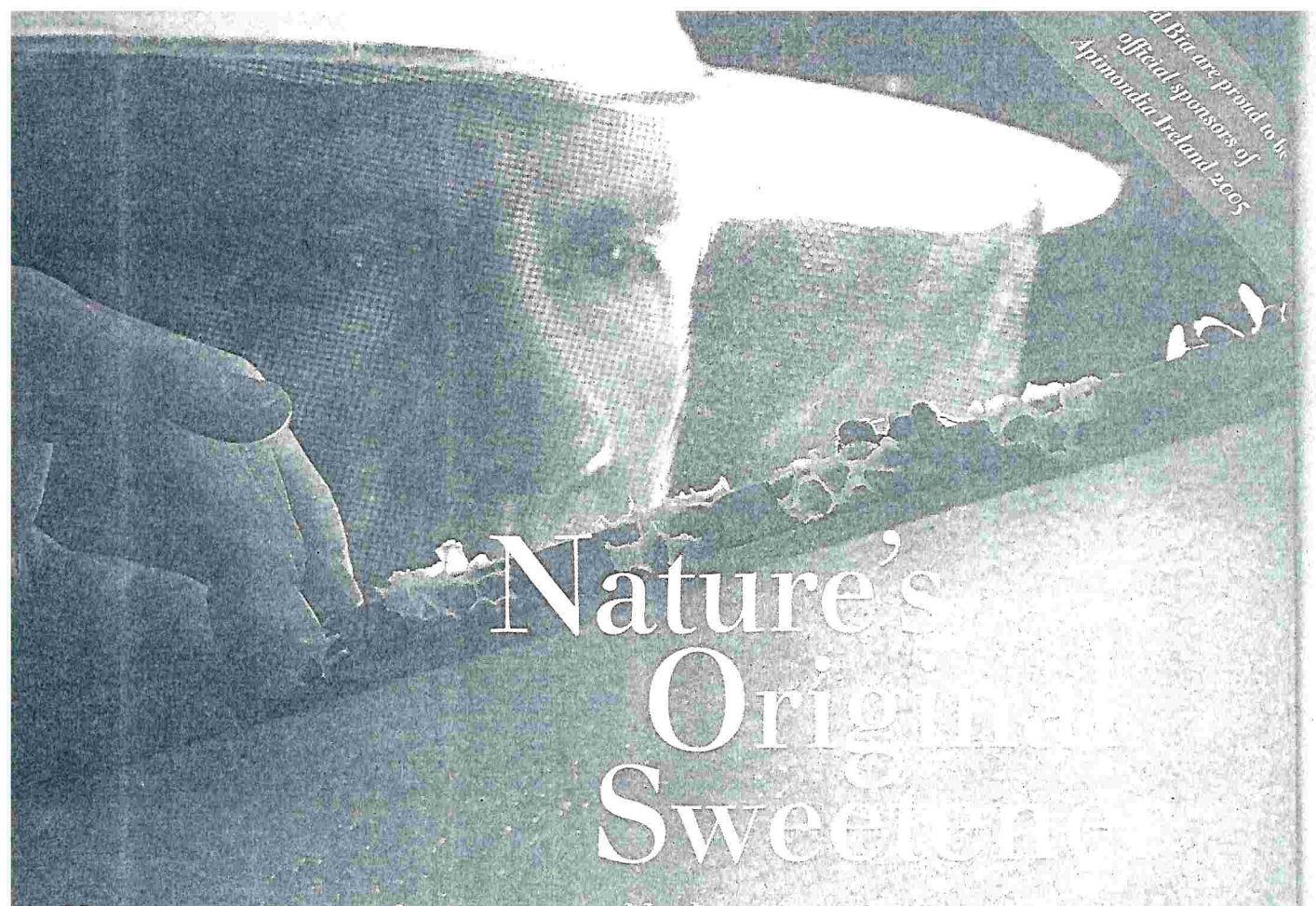
IRELAND 2005

"Five Millennia of Beekeeping on your Doorstep"

August 21st-26th 2005

39th Apimondia International Apicultural Congress
Dublin, Ireland

www.apimondia2005.com



d Bia are proud to be official sponsors of Apinordia Ireland 2005

Nature's Original Sweetener

Honey is a mixture of sugars created by bees from the nectar they collect from their favourite flowers. We know that bees have been producing honey as they do today for at least 150 million years. A teaspoon of honey contains approx 21kcal and 4g carbohydrate.

A QUICK SOURCE OF ENERGY

Honey is fat free, quickly absorbed by the body and often used by sports people as a source of carbohydrate for instant energy. In addition to being a concentrated energy source, honey contains a wide array of vitamins, minerals, antioxidants and amino acids. Honey also contains vitamins, essential minerals and several different amino acids.

A SPOONFUL OF HONEY HELPS!

For over 5,000 years honey has been used as a medicine as well as a food. Its soothing properties can be used to help ease sore throats and clear coughs. It is also thought to help digestive problems and has been used to help heal wounds. Its natural formic acid content and enzymes are believed to contribute to its antiseptic properties.

VARIETIES

Honey varieties fall into three different categories:

- MONOFLORAL - comes mainly from a single plant source
- POLYFLORAL - comes from the nectar of many different flowers.
- BLENDS - A mix of different honeys, blended to a certain colour and flavour

SERVING SUGGESTIONS

Honey can be used in many different recipes, stir-fries, salads and meat dishes. It can also be used in dressings, desserts, breakfast cereals and yoghurts. Alternatively, use it as a throat soother or stir a spoonful of honey into a glass of hot water to create an instant energy drink!

Ireland
THE FOOD ISLAND

For more information and recipes, visit the Bord Bia Stand No. L 50 - International Village or contact:
Bord Bia, Clanwilliam Court,
Lower Mount Street, Dublin 2
Tel: (01) 668 5155 Fax: (01) 668 7521
Web: www.bordbia.ie

Bord Bia
Irish Food Board
www.bordbia.ie

SCIENTIFIC PROGRAMME APIMONDIA IRELAND 2005

Mo

ORAL

Beeke
Presid
Plenar
Develo
Room:

Chair:

08:45 -

09:00 -

09:15 -

09:30 -

09:45 -

10:00-1

10:15 -1

10:30 - 1

DAILY PROGRAMME

Monday 22nd August, 2005

ORAL PRESENTATIONS (AM)

Beekeeping for Rural Development
President: Dr Nicola Bradbear
Plenary Session Name: Beekeeping for Rural Development
Room: Concert Hall

Chair: Nicola Bradbear

08:45 -09.00 **ROLE OF BEEKEEPING IN POVERTY ALLEVIATION: MARKETS AND MARKETING OF BEE PRODUCTS IN TANZANIA (26)**
A MWAKATOBE

09:00 - 09:15 **PARTICIPATORY ACTION RESEARCH AS A BEEKEEPING DEVELOPMENT STRATEGY (27)**
T CARROLL

09:15 - 09:30 **BEEKEEPING IN TANZANIA: WHEN THE BEES GET OUT OF THE WOODS (28)**
P M MPUYA

09:30 - 09:45 **HONEY QUALITY AS AFFECTED BY HANDLING, PROCESSING, CHANNELS OF MARKETING AND OTHER CONSTRAINTS TO BEEKEEPING (29)**
D.R. KUGONZA

09:45 - 10:00 **DEVELOPMENT OF APIS CERANA BEEKEEPING WITH ETHNIC MINORITIES AND SMALL FARMERS IN VIETNAM (30)**
DR N NGUYEN VAN

10:00-10:15 **BEEKEEPING AN ALTERNATIVE LIVELIHOOD OPTION IN THE WESTERN GHATS REGION OF KARNATAKA, INDIA (31)**
DR M S REDDY

10:15 -10:30 **FOREST BEEKEEPING SYSTEMS: KNOWLEDGE AND CHALLENGES TO INDIGENOUS COMMUNITIES IN NILGIRIS (WESTERN GHATS) INDIA (32)**
R LEO

10:30 - 10:45 **RAFTER BEEKEEPING IN CAMBODIA WITH APIS DORSATA (33)**
D JUMP AND C WARING

Break

11:00-11:15 **FAO'S ACTIVITIES FOR PROMOTION OF BEEKEEPING FOR RURAL DEVELOPMENT (34)**
H LEA

11:15-11:30 **GOOD AND BAD EXPERIENCES FROM BEEKEEPING PROJECTS (35)**
O HERTZ

11:30-11:45 **SUSTAINABLE RURAL DEVELOPMENT THROUGH APICULTURE (36)**
M CALALB

11:45-12:00 **A RURAL DEVELOPMENT PROJECT IN A MOUNTAINOUS AREA OF TURKEY (37)**
A INCI AND M SOMUNCU

12:00 – 12:15 **CURRENT STAGE AND PROSPECTS OF BEEKEEPING INDUSTRY OF ARMENIA (38)**
R TSARUKYAN AND N HAKOBYAN

12:15-12:30 **TRADITIONAL HIVES IN IRAN (39)**
M FORSI

12:30 - 12:45 **STUDY ON STEADY STATE OF BEE KEEPER IN IRAN WITH RESPECT TO ALL CAPABILITIES AND INHIBITIONS (40)**
H JOMEHZADEH

12:45 – 13:00 **BEEKEEPING IN THE ANDES: A PROPOSAL FOR QUEEN BEES REARING (41)**
J LLAXACONDOR

Apitherapy
President: Dr Theodore Cherbuliez
Symposium 1: Science and Apitherapy
Room: Clyde 1

Chair: Cristina Mateescu

09:00-09:20 **IMMUNOTHERAPY EFFECT OF APIS MELLIFERA L. VENOM ON GOUTY ARTHRITIS PATIENT IN CENTRAL TAWAIN (1)**
S W IP

09:20-09:40 **ANTIVIRAL & ANTIOXIDANT PROPOLIS (2)**
A HEGAZI

09:40-10:00 **ANTICARCINOGENECITY OF PROPOLIS ANTICARCINOGENICITY OF ARTEPILLIN C IN BRAZILIAN PROPOLIS THROUGH UP-REGULATION OF CIP1/P21 EXPRESSION IN COLON CANCER (3)**
K KANAZAWA

10:00-10:20 **WATER SOLUBLE PROPOLIS: EFFECTS (4)**
N ORSOLIC

Break

10:50-11:10 **COLOMBIA ANALYSIS OF FLAVONOIDS IN PROPOLIS (5)**
G SALAMANCA GROSSO

11:10-11:30 **COMPARISON OF ACTIVITIES OF PROPOLIS** (6)
ACHF SAWAYA

11:30-11:50 **RUSSIA "CLAY" IN THE THERAPIST'S HANDS (7)**
TV RUZANKINA

11:50-12:20 **EVALUATION OF SYNERGISM AND ANTAGONISTIC ANTIBACTERIAL EFFECTS OF HONEY, PROPOLIS AND ROYAL JELLY ON PATHOGENIC BACTERIA (8)**
MR DASTOURI

1220-12:50 **RUSSIA THE "APITOX" PROGRAM FOR NARCOMANIA (9)**
I KRIVOPALOV-MOSKVIN

Biacore Workshop
Room: Clyde 2

11.30 -13.00

RAPID AND RELIABLE DRUG RESIDUE SCREENING IN HONEY USING BIOSENSOR TECHNOLOGY:
- AN INTRODUCTION INTO BIACORE AND THE AND BASIC PRINCIPLES OF THE TECHNOLOGY.
- A CUSTOMER REPORTING ON HIS EXPERIENCES OF USING BIACORE IN HONEY QC
- A PRESENTATION OF NEW PRODUCTS FOR DRUG RESIDUE SCREENING IN HONEY
- A LIVE DEMONSTRATION OF THE BIACORE Q SYSTEM DETECTING DRUG RESIDUES IN HONEY SAMPLES

POSTER PRESENTATIONS

12.30 – 13.30

Bee Biology (Abstract No 203 - 261)
Beekeeping for Rural Development (262 – 277)

ORAL PRESENTATIONS (PM)

Apitherapy
President: Dr Theodore Cherbuliez
Symposium 1: Science and Apitherapy
Room: Dodder 1

Chair: Adolfo Perez-Piñeiro

13:30-13:55 **COMPOSITION/ACTIVITY OF ALGERIAN PROPOLIS (10)**
A EL HADI

13:55-14:20 **THE PSYCHONEUROECOLOGICAL BASIS OF BEE VENOM THERAPY: EVOLUTIONARY CLUES OF PROTEIN-DOPAMINE LANGUAGE FOR CONSCIOUS LEARNING IN HOMO SAPIENS**
J G RODRÌGUEZ PINTO

14:20-14:40 **EAR CONE-CANDLING (12)**
A VAN ALTEN

14:40-15:10 **MANAGEMENT OF ALGETIC SYNDROME DURING BEE VENOM INJECTIONS (13)**
I KRIVOPALOV-MOSKVIN

Break

15:40-16:00 **TREATMENT OF DEAFNESS**
I KHISMATULLINA

16:00-16:20 **HOW TO BUILT AN APITHERAPY SOCIETY (15)**
S STANGACIU

16:20 -16:40 **A PRACTICAL EXPERIMENT USING BEE PRODUCTS ON OPEN LEG WOUNDS TO PROMOTE THE HEALING PROCESS (16)**
BV DALBY

16:40 -17:00 **NEW APITHERAPEUTICS IN ROMANIA (17)**
C MATEESCU

17:00 -17:20 **APITHERAPY IN THE TREATMENT OF INFANTILE CEREBRAL PARALYSIS (18)**
I KRIVOPALOV-MOSKVIN

Bee Pathology
President: Dr Wolfgang Ritter
Plenary Session Name: Bee Pathology
Room: Concert Hall

Chair: Dr Wolfgang Ritter

13:30 – 13:40 **INTRODUCTION**
DR W RITTER

13:40 – 14:10 **WORLD WIDE TRADE: BEES, BEEPRODUCTS AND BEE HEALTH (42)**
M BROWN

14:10-14:30 **SENSE AND NECESSITY OF HARMONISATION OF DIAGNOSTIC METHODS (44)**
T SCHNEIDER

14:30-14:50 **RISK OF INTRODUCTION OF DISEASES IN HONEY BEE PRODUCTS IMPORTED INTO NEW ZEALAND (46)**
HJ PHARO

14:50 - 15:10 **POTENTIAL IMPACT OF DIRECTIVE 2004/28EC ON HONEYBEE DISEASES MANAGEMENT (47)**
F MUTINELLI

Break

15:40-16:00 **DEVELOPING NEW ZEALANDS´S IMPORT CONDITIONS FOR HONEY BEE GENERIC MATERIAL AND HONEY BEE PRODUCTS (48)**
LR BASHER

16:00-16:20 **THE IMPACT OF THE BEEKEEPING INDUSTRY OF A SUSPECT INCURSION OF VARROA DESTRUCTOR IN THE SOUTH ISLAND (49)**
LR BASHER

16:20 – 16:40 **THE SMALL HIVE BEETLE (AETHINA TUMIDA MURRAY): DIAGNOSIS, PREVENTION AND CONTROL OF A NEW HONEYBEE PEST (50)**
P NEUMANN

16:40 – 17:00 **AN ECOLOGICAL EXAMINATION OF THE SMALL HIVE BEETLE(COLEOPTERA: NITIDULIDAE, AETHINA TUMIDA) (51)**
JD ELLIS

17:00 – 17:20 **THE EPIDEMIOLOGY OF SLOW PARALYSIS VIRUS IN HONEY BEE COLONIES INFESTED BY VARROA DESTRUCTOR IN THE UK. (52)**
NL CARRECK

Beekeeping Technology and Equipment
President: Mr Gilles Ratia
Symposium 1: Analysis of Bee Products
Room: Clyde 2

Chair:

13:30-13:50 **VITAMIN E CONTENT IN BRAZILIAN POLLEN PELLETS – PRELIMINARY STUDY (53)**
KCLS OLIVEIRA

13:50-14:10 **10-HDA AS A CHEMICAL MARKER FOR PURE ROYAL JELLY AND ROYAL JELLY PRODUCTS (54)**
LB ALMEIDA-MURADIAN

14:10-14:30 **BELGIUM PROFICIENCY TESTING OF CHARM II TESTS FOR RESIDUE CONTROL OF HONEY (55)**
P BEAUNE

14:30-14:50 **BELGIUM VALIDATION OF THE TETRASENSOR HONEY FOR THE SCREENING OF TETRACYCLINES IN HONEY (56)**
W REYBROECK

14:50-15:10 **PRELIMINARY RESULTS OF CHEMICAL COMPOSITION IN HONEY BY NEAR-INFRARED SPECTROSCOPY (57)**
DR. J.A. RUIZ MARTÍNEZ

Break

15:40-16:00 **PERFIL ANALITICO PARA EL CONTENIDO DE AZUCARES MAYORITARIOS EN MIELES TROPICALES COLOMBIANAS(58)**
G SALAMANCA GROSSO

16:00-16:20 **IMPROVING MASS SPECTROGRAPHIC CONFIRMATION OF ANTIBIOTIC CONTAMINATION IN HONEY USING CHARM HPLC RECEPTORGRAM (59)**
R SALTER

16:20-16:40 **COUPLING OF LIQUID CHROMATOGRAPHY WITH CARBON STABLE ISOTOPE RATIO MASS SPECTROMETRY (LC-IRMS) – A PROMISING NEW TECHNIQUE FOR DETECTION OF SUGAR ADULTERATION OF HONEY (60)**
L ELFLEIN

16:40-17:00 **IDENTIFICATION AND DETERMINATION OF TYLOSIN AND ERYTHROMYCIN AND THEIR METABOLITES IN HONEY USING IONTRAP LC-MS/MS (61)**
KP RAEZKE

17:00-17:20 **MAIN SUGAR COMPOSITION OF BRAZILIAN MELIPONINEA HONEY ; PRELIMINARY STUDY (62)**
AH MATSUDA

Tuesday 23rd August

ORAL PRESENTATIONS (AM)

Bee Biology
President: Dr R Crewe
Plenary Session:The Honeybee Genome: Revolution in Honeybee Genetics
Room: Concert Hall

Chair: Prof Dr Octaaf Van Laere

08:40-09:00 **BEHAVIOR DIVERSITY OF APIS FLOREA AND APIS ANDRENIFORMIS: TEMPERATURE CONTROLS BY FANNING AND RAIN PROOFS BEHAVIOUR (63)**
S WONGSIRI

09:00-09:20 **PIN CHINA BIODIVERSITY OF HONEY BEES (APIS CERANA) IN CHINA (64)**
SHI WEI, ZHANG XIU-LIN, LIU LI

09:20-09:40 **GENETIC STATUS OF HONEYBEES (APIS MELLIFERA L.) IN COLOMBIA TODAY (65)**
C PRADA QUIROGA

09:40-10:00 **ALGERIA ANALYSE DES RÉSULTATS DE RECHERCHE SUR LES CARACTÈRES BIOMÉTRIQUES DE L'ABEILLE TELLIENNE « APIS MELLIFICA INTERMISSA » PEUPLANT LE NORD DE L'ALGÉRIE. (66)**
ML BERKANI

10:00-10:20 **THE INFLUENCE OF SMALL-CELL BROOD COMBS ON THE MORPHOMETRY OF HONEYBEES (APIS MELLIFERA L.) (67)**
JB MCMULLAN AND MJF BROWN

Break

10:50-11:10 **COMPARATIVE STUDIES BETWEEN MORPHOMETRICAL CHARACTERS OF SOME RACES AND HYBRIDS OF HONEYBEE COMIN ASSIUT REGION, UPPER EGYPT (68)**
MH HUSSEIN

11:10-11.30 **BIOMETRICAL STUDIES ON SOME RACES AND HYBRIDS OF HONEYBEE IN ASSIUT REGION, UPPER EGYPT (69)**
MH HUSSEIN

11:30-11.50 **HONEYBEE (APIS MELLIFERA) RACES, ECOYYPES AND THEIR GENERAL CHARECTERISTICS OF TURKEY (70)**
E AKYOL

11:50-12.10 **A STUDY OF COMPARISON OF DIFFRENT BEE GENOTYPES IN THE HATAY REGION WITH RESPECT TO THEIR PHYSIOLOGICAL CHARACTERISTICS (71)**
N SAHINLER

12:10 – 12:30 **COMPARISON OF THE PERFORMANCES OF IMPORTANT HONEY BEE (APIS MELLIFERA L.)RACES AND ECOTYPES IN DIFFERENT REGIONS OF TURKEY (72)**
B YUCEL

12:30 – 12.50 **IMPACT OF TRANSGENE PRODUCTS ON HONEY BEE LARVAE (73)**
D BABENDREIER

Beekeeping Economy
President: Dr Dinh Quyet Tam
Symposium 1
Room: Clyde 2
Chair: Dr Dinh Quyet Tam

09:00-09:20 **BEE BREEDING AND SELECTION IN UKRAINE (74)**
S BUGERA

09:20-09:40 **BEEKEEPING IN URUGUAY: OPPORTUNITES FOR FUTURE DEV. IN THE INTER HONEY MARKET (75)**
Y MANCEBO

09:40-10:00 **BEE PRODUCT QUALITY SAFETY & PRODUCING STANDADIZATION MODE IN CHINA**
C LIHONG (76)

10:00-10:20 **A RESEARCH ON DETERMINATION OF THE TECHNICAL AND STRUCTURAL CHARACTERISTICS OF BEEKEEPING IN TURKEY (77)**
DA CEYLAN

Break

10:50-11:10 **HOW TO INCREASE THE PRODUCTION OF PROPOLIS USING THE TOPBAR HIVES (78)**
M HLUNGWANI

11:10-11.30 **BEEKEEPING IN NORTHEAST OF BRAZIL AND ITS DEVELOPMENT: THE BIG CHALLENGE REPRESENTED BY EXPLOITATION OF THE AMERICAN HONEY BEES (AHB) (79)**
LS GONCLAVES

11.30 - 11.50 **SECOND ATTEMPT FOR A BEE GARDEN MUSEUM IN VENEZUELA (85)**
P VIT

11.50 - 12.10 **POSTER DISCUSSION**

12.10-12.30 **THE STANDARDIZATION BUILDING OF BEEKEEPING INDUSTRY IN CHINA (81)**
Z JING

12:30-12.50 **HONEY BEE PRODUCTS-PRODUCTION, MARKETING, PERSPECTIVE IN REPUBLIC OF MACEDONIA (82)**
I DZIMREVSKA

Beekeeping for Rural Development
President: Dr Nicola Bradbear
Beekeeping for Rural Development Workshop 1
Room: Lansdowne Room

09.00-09.30 **USING TOP BAR HIVES 1**
G SOLOMON (TRINIDAD & TOBAGO)

09.40-10.10 **MAKING TOP-BAR HIVES 1**
J DONAGHUE (IRELAND)

10.20-10.50 **MAKING PINS (FOR BARK HIVES)**
B MALICHI (ZAMBIA)

11.00-11.30 **HOW TO LIGHT A SMOKER**
R RUDD (IRELAND)

11.40-12.10 POLLINATION O HERTZ (DENMARK)

12.20-12.50 **HARVESTING POLLEN**
E MICHAELIS (NETHERLANDS)

Apitherapy
President: Dr Theodore Cherbuliez
Symposium 3
Room: Clyde 2
Chair: Dr Theodore Cherbuliez

09:00-09:20 **COMPARISON ON QUALITY OF PROPOLIS**
I AFROUZAN

09:20-09:40 **COMPARISON OF ACTIVITIES OF PROPOLIS (19)**
ACHF SAWAYA

09:40-10:00 **METHODS TO ANALYSE PROPOLIS (20)**
S SILICI

10:00-10:20 **"APITOX" FOR NORMALIZATION OF ALCOHOL (21)**
I KRIVOPALOV-MOSKVIN

Break

10:50-11:20 **CLASSIFICATION AND STANDARDIZATION OF PROPOLIS (22)**
MC MARCUCCI

11:20-11.50 **NEW NEEDED QUALITY REGULATIONS FOR THE PRODUCTION OF APITHERAPICS (23)**
S STANGACIU

11:50-12:20 **NEW APITHERAPY IN ROMANIA (24)**
C MATEESCU

12:20-12.50 **STANDARDIZATION OF PRODUCTS OF THE HIVE (25)**
R DOMERGO

Bee Pathology
President: Dr Wolfgang Ritter
Symposium 1
Room: Clyde 1

Chair: Brenda Ball

09:00-09:40 **REVIEWING THE DIAGNOSIS OF P.LARVAE ARVAE IN LIGHT OF THE DEVELOPMENT OF NEW TECHNIQUES AND NEW INFORMATION. (86)**
E GENERSCH

09:40-10:00 **OXYTETRACYCLINE SENSITIVITY AND PULSED FIELD GEL ELECTROPHORESIS TYPING OF AFB (87)**
M HORNITZKY

10:00-10:20 **PHENOTYPIC AND GENOTYPIC FEATURES OF P. LARVAE STRAINS (88)**
EM FORSGREN

Break

10:50-11:10 **MONITORING FOR AMERICAN FOULBROOD SPORES FROM HONEY AND BEE SAMPLES IN CANADA (89)**
SF PERNAL

11:10-11.30 **THE DETERMINATION OF TRACHEAL MITE ACARAPIS WOOD; INCIDENCE IN THE REPUBLIC OF TURKEY (90)**
A OZKIRIM

11:30-11.50 **SEARCHING FOR DEFORMED WING VIRUS IN NEW ZEALAND HONEY BEES (91)**
B BALL

11:50-12.10 **INCIDENCE OF THAI SACBROOD VIRUS DISEASE TO ASIAN HONEYBEE APIS CERANA INDICA FAB, IN KERALA, INDIA (92)**
S DEVANESAN

12.10-12.30 **BIOLOGICAL AND MOLECULAR CHARACTERISATION OF DEFORMED WING VIRUS AND KASHMIR BEE VIRUS (93)**
JR DE MIRANDA

12:30-12.50 **GENERIC TECHNOLOGIES FOR THE DETECTION OF BEE PESTS AND DISEASES IN THE FIELD AND THE LABORATORY (94)**
N BOONHAM

POSTER PRESENTATIONS

12.30 – 13.30

Apitherapy (Abstract No 278 - 323)
Beekeeping Economy (329 - 330)

ORAL PRESENTATIONS (PM)

Beekeeping Economy
President: Dr Dinh Quyet Tam
Symposium 1
Room: Clyde 2

Chair: Dr Dinh Quyet Tam

13:30-13:50 **THE HONEY PRODUCTION IN CHINA FROM 2000 TO 2003 (83)**
QY DIAO

13:50-14:10 **SLOVENIA QUALITY OF SLOVENIA HONEY (84)**
V KMECL

Beekeeping for Rural Development
President: Dr Nicola Bradbear
Beekeeping for Rural Development Workshop 1
Room: Lansdowne Room

14.00-14.30 **CANDLE MAKING 1**
D RYAN (IRELAND)

14.40-15.10 **MAKING COSMETICS 1**
J RYAN (IRELAND)

15.20-15.50 **CAPTURING OF APIS CERANA COLONIES BY NILGIRI HILL TRIBES**
R LEO (INDIA)

16.00-16.30 **HONEY LABELLING FOR EU MARKET**
R RUDD IRELAND

16.40-17.10 **ORGANISING A BEEKEEPERS' ASSOCIATION**
A JORGENSEN (DENMARK)

Beekeeping Technology and Equipment
President: Mr Gilles Ratia
Sympoisum 2: Quality of bee products
Room: Clyde 1

Chair: Dr Banu Yucel

13:30-13:50 **THE ANALYSIS OF FLAVANOID COMPONENTS FOR THE PROPOLIS FROM RUSSIA (95)**
KI.ELLER

13:50-14:10 **EFFECTS OF ARTIFICIAL SUGAR FEEDING ON SUGAR COMPOSITION OF ROYAL JELLY (96)**
P ODDO

14:10-14:30 **MICROSCOPIC CHARACTERISTICS OF ROYAL JELLY (97)**
ML PIANA

14:30-14:50 **HUNGARY ORGANIC BEEKEEPING AND PROSPECTS IN HUNGARY (98)**
S SZALA

14:50-15:10 **AN ATTEMPT TO ESTABLISH RELIABLE "BEST BEFORE" DATES FOR HONEYS ORIGINATING IN BOTH CONTINENTAL AND OCEANIC CLIMATES (99)**
M.T. SANCHO

Break

15:40-16:00 **GERMANY IDENTIFICATION OF HONEY ASSOCIATED YEASTS (100)**
G BECHK

16:00-16:20 **HONEY QUALITY PARAMETERS FROM APIS MELLIFERA AND MELIPÓNINAE BEES IN PORTUGUESA STATE, VENEZUELA (101)**
R THIMANN

16:20-16:40 **PHYSICOCHEMICAL PROPERTIES OF TURKISH HONEYDEW HONEY (102)**
B YUCEL

16:40-17:00 **IDENTIFICATION AND MANAGEMENT OF HAZARDS IN THE APIARY'S ACTIVITIES TO GUARANTEE HONEY SAFETY (103)**
G FORMATO

17:00-17:20 **USING BEES AND HIVE PRODUCTS TO ASSESS METAL POLLUTION IN FINLAND (104)**
K FAKHIMZADEH

Pollination and Bee Flora
President: Marinus J. Sommeijer

Plenary S
Conserva
Room: Co

Chair: Ch

13:30-14.

14:10-14:

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16:00-16:2

16:20-16:4

16:40-17:0

17:00-17:2

17:20-17:4

Plenary Session: Pollinator Diversity, Competition and Conservation
Room: Concert Hall

Chair: Chris O'Toole

13:30-14.10 **A REVIEW OF OSMIA SPP. AS MANAGED POLLINATORS - BASIC NESTING BIOLOGY; ANATOMICAL AND BEHAVIOURAL REASONS FOR THEIR SUPERIORITY OVER APIS IN THE POLLINATION OF CERTAIN SELECTED CROPS. (105)**
C O' TOOLE

14:10-14:50 **POLLINATION OF INVASIVE PLANTS BY BUMBLE BEES AND BUMBLE BEE CONSERVATION IN IRELAND (106)**
J STOUT

14:50-15:10 **EXAMINING PATTERNS OF BEE MOVEMENT WITH HARMONIC RADAR (107)**
J OSBORNE

Break

15:40-16:00 **HABITAT PREFERENCES AND FOOD PLANTS OF BUMBLE BEE QUEENS IN AN AGRICULTURAL LANDSCAPE (108)**
E ALANEN FINLAND

16:00-16:20 **THE RELATIONSHIPS AMONG VARIOUS BEE GENERA (APIS MELLIFERA L., BOMBUS SPP., MEGACHILE ROTUNDATA F. AND RHOPHITOIDES CANUS EV.) AS OBSERVED ON FLOWERING ALFALFA (MVETCH CORONILLA VARIA (109)**
V PTACEK

16:20-16:40 **ENHANCING BEE POPULATIONS ON UK FARMLAND USING FORAGE MIXTURES (110)**
N CARRECK

16:40-17:00 **POLLINATOR DECLINE - ASSESSING THE RISKS: ALARM & EPI (111)**
S ROBERTS

17:00-17:20 **DECLINING FLORAL RESOURCES AND PUBLIC LAND POLICY RESTRICTIONS FOR BEEKEEPING IN AUSTRALIA AND PROSPECTS OF PLANTATION FORESTRY (112)**
D SOMERVILLE & M MONCUR

17:20-17:40 **COMPETITION BETWEEN HONEY BEES AND BOMBUS IMPATIENS IN THE US**
E EVANS & M SPIVAK

Wednesday 24th August

ORAL PRESENTATIONS (AM)

Beekeeping Technology and Equipment
President: Mr Gilles Ratia
Plenary: Beekeeping technologies around the world
Room: Concert Hall

Chair: Mr. Gilles Ratia

09:00-09:20 **BENEFITS OF THE FRECUENCY ANALISYS OF THE HUM OF AN APIS MELLIFERA SWARM, APPLIED TO THE HIVE INSPECTION (124)**
A MEZQUIDA

09:20-09:40 **PRODUCTIVITY OF BEEKEEPING DEPENDS ON THE SUNSPOTS ACTIVITY (125)**
I NICOLADZE

09:40-10:00 **METHOD OF PRODUCING OF THE PURE BEE VENOM (126)**
I NICOLADZE

10:00-10:20 **BEEHIVE DRAGOSLAVKA (127)**
DRAGOSLAV ILIC SES

Break

10:50-11:10 **GEOGRAPHIC INFORMATION SYSTEM FOR APIARIES MANAGEMENT (128)**
K SIMÕES

11:10-11.30 **NEW SOFTWARE FOR BEEKEEPING ADMINISTRATION ON TROPICAL COUNTRIES (129)**
G SALAMANCA

11:30-11.50 **INTENSIFICATION OF UTILIZATION OF SPRING HONEY FLOW (130)**
J G RACYS

11:50-12.10 **THE BEEKEEPER'S SOLUTION IN ARCHITECTURE (131)**
RL BRUNS

12.10-12.30 **PRODUCTION OF TOP-BAR HIVE AND FRAMES FROM CHEAP AND LOCALLY AVAILABLE MATERIALS (132)**
N ADGABA

12:30-12.50 **APICULTURE RESEARCH IN UPPER EGYPT AND OMAN (133)**
M HASSAN HUSSEI

Bee Pathology
President: Dr Wolfgang Ritter
Symposium 2
Room: Clyde 1

Chair: P. Martin, W. von der Ohe, W. Ritter

09:00-09:20 **HONEY QUALITY: THE RESIDUE ISSUE (114)**
W VON DER OHE

09.00 - 09.20 **RESIDUES IN HONEY - THE CURRENT SITUATION WORLD-WIDE (114B)**
DR. KURT-PETER RAEZKE (114B)

09:20-09:40 **CONTROL OF BEE DISEASES WITHOUT RESIDUES IN HONEY - PACKER AND CONSUMER NEEDS AND GOVERNMENT POLICY (115)**
P MARTIN

09:40-10:00 **THE RESIDUE FREE CONTROL OF BEE DISEASES (116)**
W RITTER

10:00-10:20 **RESIDUE FREE HONEY IN IRAN AND CANADA (117)**
H YEGANEHRAD

Break

10:50-11:10 **DETECTION METHODS OF PAENIBACILLUS LARVAE SUBSP.LARVAE INFECTIONS BY SAMPLES HONEY AND ADULT HONEY BEE ANALYSIS (118)**
K POHORECKA

11:10-11.30 **IN VITRO INHIBITORY EFFECT OF HEN EGG WHITE LYSOZYME AGAINST PAENIBACILLUS LARVAE SSP. LARVAE (119)**
G ZHANG

11:30-11.50 **SHAKING CAN CURE AMERICAN FOULBROOD (120)**
A. LINDSTRÖM

11:50-12.10 **DISSEMINATION AND PERSISTENCE OF FUNGI TO CONTROL VARROA DESTRUCTOR (121)**
B BALL

12.10-12.30 **A COMPARISON BETWEEN DIFFERENT OXALIC ACID TREATMENTS IN OVERWINTERING HONEY BEE COLONIES AFFECTED BY VARROA DESTRUCTOR ANDERSON & TRUEMAN (122)**
A NANETTI

12:30-12.50 **BEE DISEASES ORIGINATE NOT ONLY FROM PATHOGENS - DISEASE PREVENTION IS BETTER THAN CURE (123)**
O BOEKING GERMANY

Beekeeping for Rural Development
President: Dr Nicola Bradbear
Beekeeping for Rural Development Workshop 2
Room: Lansdowne Room

9.00-09.30 **USING TOP BAR HIVES 2**
GLADSTONE SOLOMON (TRINIDAD & TOBAGO)

09.40-10.10 **MAKING TOP-BAR HIVES 2**
JOHN DONAGHUE (IRELAND)

10.20-10.50 **HOW TO GET HIVES OCCUPIED**
TOM CARROLL (KENYA)

11.00-11.30 **HIVES FOR STINGLESS BEES**
MARINUS SOMMEIJER (NETHERLANDS)

11.40-12.10 **MAKING WALL HIVES FOR FORESTED HILLY HABITATS**
ROBERT LEO (INDIA

12.20-12.50 **SOLAR WAX EXTRACTORS EXPLAINED**
JOHN DONAGHUE (IRELAND)

POSTER PRESENTATIONS

12.30 – 13.30

Beekeeping Technology and Equipment (Abstract No331 - 357)
Pollination and Bee Flora (358 - 391)

ORAL PRESENTATIONS (PM)

Beekeeping for Rural Development
President: Dr Nicola Bradbear
Beekeeping for Rural Development Workshop 2
Room: Lansdowne Room

14.00-14.30 **WAX RENDERING**
BEN HARDEN (IRELAND)

14.40-15.10 **RECOVERING WAX FROM OLD BROOD COMBS**
BOB MALICHI & OTHERS (ZAMBIA)

15.20-15.50 **CANDLE MAKING 2**
DENNIS RYAN (IRELAND)

16.00-16.30 **MAKING COSMETICS 2**
JIM RYAN (IRELAND)

16.40 – 17.10 **MAKING AFRICAN HONEY BEER**
BOB MALICHI & OTHERS (ZAMBIA

Beekeeping Economy
President: Mr Dinh Quyet Tam
Plenary Session
Room: Concert Hall
Chair: Mr Dinh Quyet Tam

13:30-13:50 **ALTERNATIVE MARKETING STRATEGIES FOR HONEY AND OTHER BEE PRODUCTS IN TURKEY (134)**
G SANER

13:50-14:10 **NEW EDUCATIONAL MATERIALS FROM THE DANISH BEEKEEPEERS ASSOCIATION (135)**
RT THEUERKAUF

14:10-14:30 **BEEKEEPING IN UKRAINE (136)**
S BUGERA

14:30-14:50 **ECONOMICS OF HONEY PRODUCTION-THE HIDDEN BACKBONE OF NATIONAL ECONOMY (137)**
HB THOMPSON

14:50-15:10 **BKEEPING" A COMPUTER PROGRAM (138)**
K H MCLLVRIDE

Break

15:40-16:00 **FACILITIES TO IMPROVE ORGANIC BEEKEEPING IN TURKEY: PROBLEMS & SOLUTIONS (139)**
B YUCEL

16:00-16:20 **CURRENT SITUATION OF THE MACEDONIAN APICULTURE-FACTS & FIGURES (140)**
A UZUNOV

16:20-16:40 **HONEY QUALITY AS AFFECTED BY HANDLING, PROCESSING, CHANNELS OF MARKETING & OTHER CONSTRAINTS TO BEEKEEPING (141)**
DR KUGONZA

Pollination and Bee Flora
President: Marinus J. Sommeijer
Symposium 2: Greenhouse Pollination
Room: Conference Room 1

Chair: Bernard Vaissierre

13:30-14.10 **THE IMPORTANCE OF BEES AS GREENHOUSE POLLINATORS (142)**
BE VAISSIERRE

14:10-14:30 **THE EFFECT OF ENVIRONMENTAL CONDITIONS ON BEE POLLINATION ACTIVITY IN GREENHOUSES (143)**
A DAG

14:30-14:50 **BEEKEEPING FOR SEED AND VEGETABLE PRODUCTION IN GLASSHOUSES (144)**
W BOOT

14:50-15:10 **POLLINATION BY BUMBLEBEES IN PEPPER AND ZUCCHINI CULTURES IN GREENHOUSES IN ALMERIA (145)**
JM GUERRA

Break

15:40-16:00 **KEEPING ORCHIDS (CYMBIDIUM SP.) FREE FROM EXTRA-FLORAL NECTAR USING HONEY BEES (146)**
J CALIS

16:00-16:20 **THE POSSIBILITY OF THE PLANTS' DETERMINATION POLLINATED BY BOMBUS TERRESTRIS L. AND ECONOMICALLY IMPORTANT SOLITARY BEES - MEGACHILE ROTUNDATA F. AND OSMIA RUFA L. ON THE BASIS OF PALYNOLOGICAL ANALYSES THEIR FAECES. (147)**
F GUREL

16:20-16:40 **BEES AS VECTORS IN GREENHOUSE CROPS: CHANCES AND LIMITATIONS (148)**
JM VAN DER STEEN

16:40-17:00 **ROUND TABLE DISCUSSION**

Bee Biology
President: Prof. Dr. Octaaf VAN LAERE
Symposium 1: The Native Irish Black Bee
Room: Clyde 1

Chair: Albert Knight

13:30-13:50 **BECH BRETHE - ANCIENT IRISH BEE LAWS (150)**
J RYAN

13:50-14:10 **"ISLE OF WIGHT DISEASE" IN IRELAND (151)**
E MAC GIOLLA CODA

14:10-14:30 **COMPARATIVE DNA ANALYSIS OF IRISH BEE SAMPLES (152)**
D PRITCHARD

14:30-14:50 **STUDIES IN WING MORPHOMETRY OF IRISH BEES (153)**
J KAHN IRELAND

14:50-15:10 **BEE IMPROVEMENT BY EVALUATION AND SELECTION (154)**
D RYAN

Break

15:40-16:00 **SUPERSEDURE AND LONGEVITY IN DARK NATIVE BEES (155)**
A WARING

16:00-16:20 **HONEY PRODUCTION POTENTIAL OF NATIVE IRISH BEES (156)**
P BENNETT

16:20-16:40 **IRELAND INFLUENCE OF A BREEDING GROUP ON BEE IMPROVEMENT (157)**
M MAC GIOLLA CODA

16:40-17:00 **THE ROLE OF BIBBA - BEE IMPROVEMENT AND BEE BREEDERS' ASSOCIATION (158)**
A KNIGHT

17:00-17:20 **CHAIRMAN U.K. QUESTION TIME**

Thursday 25th August

ORAL PRESENTATIONS (AM)

Apitherapy
President: Dr Theodore Cherbuliez
Plenary Session: Overview
Room: Concert Hall

Chair: Th. Cherbuliez

09:00-09:25 **APITHERAPY AND IMMUNOLOGICAL ASPECTS (160)**
A HEGAZI

09:25-09:50 **WHY AND HOW TO BUILD AN APITHERAPY DATA BASE? (161)**
S STANGACIU

09:50-10:20 **THE "APITOX" PROGRAM FOR MULTIPLE SCLEROSIS TREATMENT AND REHABILITATION (162)**
I KRIVOPALOV-MOSKVIN

Break

10:50-11:20 **RELEVANCE OF POLLEN IN HUMAN DIET (163)**
P GALLMAN

11:20-11.50 **HONEY FOR NUTRITION AND HEALTH (164)**
S BOGDANOV

11:50-12:20 **WORK OF THE COMMISSION IN CUBA (165)**
R DOMEREGO

12:20-12.50 **FROM CUBA TO BURKINA FASO (166)**
T CHERBULIEZ

Pollination and Bee Flora
President: Mr Marinus Sommeijer
Symposium 3 : GMO Crops and Pollinator Behaviour
Room: Clyde 1

Chair: Juliet Osbourne

08:40-09:20 **THE PRESENT STATUS OF THE USE OF GM CROPS AND IMPACTS ON POLLINATORS (187)**
L MALONE

09:20-09:40 **ASSESSING THE IMPACT OF TRANSGENE PRODUCTS ON HYPOPHARY HONEYBEE LARVAE (188)**
D BABENDREIER

09:40-10:00 **A LONG TERM TOXICOLOGICAL STUDY ON BUMBLEBEES MICROCOL TRANSGENE PRODUCTS**
D BABENDREIER

10:00-10:20 **WILD BEE ABUNDANCE AND POLLINATION IN TRANSGENIC HERBICIDE TOLERANT AND NON-TRANSGENIC CANOLA IN ONTARIO, CANADA (190)**
C SCOTT-DUPREE CANADA

Break

10:50-11:10 **BEE-MEDIATED GENE FLOW BETWEEN GM CROPS AT A LANDSCAPE OILSEED RAPE (191)**
S GORDON

11:10-11.30 **TOOLS FOR ASSESSING THE RISKS TO GM CONFINEMENT POSED BY CROPS**
J CRESSWELL UK

11:30-11.50 **POLLINATOR POPULATIONS IN HERBICIDE TOLERANT GM CROPS (193)**
J WALKER & J OSBORNE

11:50-12.10 **TRANSGENIC SOYABEAN MATERIAL IN POLLEN SUBSTITUTE AND HONEY SAMPLES (194)**
R SIEDE

12.10-12.30 **EFFICIENCY OF THE AFRICANIZED HONEYBEE APIS MELLIFERA IN THE TRANSFER OF POLLEN OF SOY (GLYCINE MAX. L. MERRIL) ROUNDUP READ; VAR. BR 245 RR (195)**
V.A.A. DE TOLEDO

12:30-12.50 **CONCLUSIONS: CONSEQUENCES FOR BEEKEEPING AND POLLINATORS**
J OSBORNE

Beekeeping for Rural Development
President: Dr Nicola Bradbear
Beekeeping for Rural Development Workshop 3
Room: Lansdowne

09.00-09.30 **MAKING TOP-BAR HIVES 3**
J DONAGHUE IRELAND

09.40-10.10 **MAKING A BARK HIVE**
B MALICHI & OTHERS ZAMBIA

10.20-10.50 **IMPROVING HARVEST FROM LOCAL-STYLE HIVES**
V KUMAR KENYA

11.00-11.30 **USING A HONEY PRESS**
G SOLOMON TRINIDAD & TOBAGO

11.30 – 12.10 **HONEY STRAINING**
B HARDEN IRELAND

12.20-12.50 **SOAP MAKING**
D SAMMATARO USA

Bee Pathology
President: Dr Wolfgang Ritter
Symposium 3
Room: Clyde 2

Chair: Peter Neumann

09:00-09:20 **THE BEHAVIOUR OF ADULT SMALL HIVE BEETLES TOWARDS HONEYBEE WORKERS AND DRONES (167)**
P NEUMANN

09:20-09:40 **REVIEWING THE CONFINEMENT OF SMALL HIVE BEETLES (AETHINA TUMIDA) BY WESTERN HONEY BEES (APIS MELLIFERA): LIFE IN THE PENITENTIARY (168)**
JD ELLIS

09:40-10:00 **TRAPPING SMALL HIVE BEETLES, AETHINA TUMIDA MURRAY (169)**
WH HOOD

10:00-10:20 **A SIX-CHARACTER GENETIC SELECTION PROGRAM FOR VARROA RESISTENCE AND OTHER ECONOMIC CHARACTERS (170)**
KS DELAPLANE

Break

10:50-11:10 **THE REPRODUCTIVE BIOLOGY OF VARROA DESTRUCTOR ON AFRICANIZED HONEY BEES UNDER THE TROPICAL CONDITIONS OF COSTA RICA (171)**
RA CALDERÓN

11:10-11.30 **DELAYING VARROA ECONOMIC THREASHOLD WITH INTEGRATED PEST MANAGEMENT (172)**
JA BERRY

11:30-11.50 **THE EFFECT OF OXALIC OR FORMIC ACID TREATMENT ON LARVAE IN A HONEYBEE COLONY (173)**
A GREGORC

11:50-12.10 **CONTROL OF VARROA DESTRUCTOR USING DIFFERENT INTEGRATED PEST MANAGEMENT STRATEGIES (174)**
P GIOVENAZZO

12.10-12.30 **BREEDING FOR TOLERANCE AGAINST VARROOSIS - FACTORS INFLUENCING COLONY SURVIVAL WITHOUT TREATMENT IN A LONG-TERM SURVEY (175)**
C GARRIDO

12:30-12.50 **DEVELOPMENT OF BIOASSAY FOR HYGIENIC BEHAVIOUR AGAINST BROOD MITE, TROPILAELAPS CLAREAE IN APIS MELLIFERA COLONIES (176)**
N NAGARAJA

POSTER PRESENTATIONS

12.30 – 13.30

Bee Pathology (Abstract No392 - 470)

ORAL PRESENTATIONS (PM)

Beekeeping for Rural Development
President: Dr Nicola Bradbear
Beekeeping for Rural Development Workshop 3
Room: Lansdowne

14.00-14.30 **CANDLE MAKING 3**
D RYAN IRELAND

14.40-15.10 **MAKING COSMETICS 3**
J RYAN IRELAND

15.20-15.50 **HARVESTING PROPOLIS**
E MICHAELIS NETHERLANDS

16.00-16.30 **ORGANISING A COURSE FOR BEGINNERS**
C CHAVASSE IRELAND

Beekeeping Technology and Equpiment
President: Mr Gilles Ratia
Symposium 3: Queen Rearing
Room: Clyde 1

Chair: Gilles Fert

13:30-13:50 **FAST REARING OF QUEENS (197)**
DIS DRAGOSLAV ILIC SES

13:50-14:10 **A MINI-STARTER FINISHER HIVE MODEL THAT FACILITATES QUEEN REARING + MINI-SYRINGE FOR MULTIPLE INSTRUMENTAL INSEMINATIONS OF QUEEN HONEY BEES(198/ 199)**
TIAGO MAURICIO FRANCOY

14:10-14:30 **METHODOLOGY FOR SUCCESSFUL QUEEN REARING (200)**
C SPEITELSBACH

14:30-14:50 **PLANT BASED ATTRACTANTS FOR HONEYBEES IN INDIA (201)**
DG NAIK

14:50-15:10 **EARLY SPRING DIGESTIVE PROBLEMS IN COLD CLIMATES (202)**
H KIA

Bee Pathology
President: Dr Wolfgang Ritter
Symposium 4
Room: Clyde 2

Chair: Dalibor Titera

13:30-13:50 **ACTUAL SITUATION OF BEE DISEASES IN EUROPE (177)**
D. TITERA

13:50-14:10 **MULTIFACTORAL PROSPECTIVE SURVEY ON BEE TROUBLES IN FRANCE (178)**
MP CHAUZAT

14:10-14:30 **MONITORING OF BEE COLONIES IN GERMANY (179)**
W. VON DER OHE

14:30-14:50 **PRELIMINARY RESULTS ON BEHAVIOUR OF APIS MELLIFERA LIGUSTICA (SPIN.) COLONIES SUBSEQUENT TO THE APPLICATION OF THE SPAZIOMUSSI TECHNIQUE (180)**
T GARDI

14:50-15:10 **CURRENT EFFECTIVENESS OF AMITRAZ AGAINST VARROA IN PORTUGAL** (181)
SÂNCIA PIRES

Break

15:40-16:00 **THE MONITORING TECHNICS OF VARROA RESISTANCE AND ROTATION OF THE VARROA TREATMENTS (182)**
J TROUILLER

16:00-16:20 **HOW RESISTANT TO FLUVALINATE ARE VARROA POPULATIONS IN PORTUGAL? (183)**
A MURILHAS

16:20-16:40 **CONTROL OF PYRETHROID AND COUMAPHOS-RESISTANT MITES IN NORTH AMERICA USING APIGUARD (184)**
M WATKINS

16:40-17:00 **EVALUATION OF FLUVALINATE, COUMAPHOS, THYMOL, OXALIC ACID AND FORMIC ACID AGAINST VARROA DESTRUCTOR IN EASTERN CANADA. (185)**
P GIOVENAZZO

17:00-17:20 **A STUDY ON INCIDENCE OF TRACHEAL MITE(ACARAPIS WOODI)IN HONEY BEE COLONIES(APISMELIFERA)IN CHAHARMAHAL AND BAKHTIARI PROVINCE (186)**
S AGHILI

IMMUNOTH VENOM ON TAWAIN.

No 1

Siu-Wan Ip[1], [1]Graduate Sc Medical Univ [2]Department Medical Univ Medical Univ

E-mail: siuwp

INTRODUCT commonly us response of patients. Hov reaction duri side effect o

METHODS: study, patien weekly for 1 examined ev appropriate d

RESULTS: Pa after AML ve weeks of trea 24 hours afte 2-3 weeks of venom therap response and greatly impro

DISCUSSION welcome tran inflammatory However, the were the maj Human serun monitor the a therapy.

EGYPTIAN P ANTIOXIDAN FLAVONOID

No 2

Ahmed Hegaz National Rese

Email: ahmed

ABSTRACTS

IMMUNOTHERAPY EFFECT OF APIS MELLIFERA L. VENOM ON GOUTY ARTHRITIS PATIENT IN CENTRAL TAWAIN.

No 1

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[2]Department of Immunology and Rheumatology, China Medical University Hospital, College of Medicine, China Medical University, Taichung City,404,TAIWAN.

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INTRODUCTION: Apis Mellifera L.(AML) venom is commonly used in Taiwan to decrease the inflammatory response of joints and joint pain in Gouty Arthritis(GA) patients. However,we have found that the allergic reaction during AML venom treatment was the major side effect of this treatment.

METHODS: Ten G.A. patients were selected in this study, patient received AML venom therapy three times weekly for 10 months. Patient's serum IgG and IgE were examined every two weeks to monitor for the appropriate dosing for AML venom therapy.

RESULTS: Patient's serum IgG had increased 24 hours after AML venom therapy and became stable after 3 weeks of treatment. Patient's serum IgE had increased 24 hours after AML venom therapy then decreased after 2-3 weeks of therapy. After received 10 months of AML venom therapy, patients found that the inflammatory response and painful sensations of the joints were greatly improved.

DISCUSSION: The Mellitin in AML venom was a welcome trans-membrane peptide working against inflammatory response in human immune disorders. However, the allergic reactions caused by bee venom were the major side effects in bee venom therapy. Human serum IgE and IgG might act as the indicators to monitor the appropriate dosing during bee venom therapy.

EGYPTIAN PROPOLIS: 8- ANTIVIRAL AND ANTIOXIDANT ACTIVITIES IN RELATION TO FLAVONOID CONTENT

No 2

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Eight Egyptian propolis samples from different localities were investigated for their antiviral activity against NDV and IBDV. All samples showed antiviral activity. The activity was varied according to the propolis origin.
The antioxidative potential and capacity of these samples were calculated from their kinetics of the decrease of DPPH ESR signal. Samples Assiut (As), Fayoum (F), Ismailia (Is) and Dakahlia (D) showed the highest antioxidative capacity and potential respectively, while the samples Souhag (So), Sharkia (Sh), reclaimed lands from Ismailia (IsR) and El-Saff (El) have moderate antioxidative capacity and potential.
The flavonoids present in eight Egyptian propolis samples were identified by HPLC. 23 flavonoids could be identified as well as the caffeic acid esters (dimethylallyl caffeate and phenylethyl caffeate). Biochanin A and 7-hydroxy-4'-methoxyflavone were identified for the first time in propolis. Myriceten, luteolin, luteolin-3'-methylether, pinocembrin, and acacetin were present with the highly significant concentrations in Assiut sample (As). Also it has the highest concentrations of quercetin-3-methylether, apigenin quercetin-7-methylether and chrysin. While Sharkia sample (Sh) has the highest concentration of quercetin, hesperetin, quercetin-3,3'-dimethylether and biochanin A. El-Saff sample (El) showed the highest concentration of dimethylallylcaffeate, pinostrobin and galangin-7-methylether. Fayoum samples (F) have the highest concentration of pinobankasin.
The assessment of flavonoids by HPLC and antioxidant activity by ESR was done for the first time to Egyptian propolis.

ANTICARCINOGENICITY OF ARTEPILLIN C IN BRAZILIAN PROPOLIS THROUGH UP-REGULATION OF CIP1/P21 EXPRESSION IN COLON CANCER

No 3

K. Kanazawa[1], K. Shimizu[1], T. Hashimoto[1], T. Sakai[2], Y. Matsuura[3]
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Colon cancer is a major cause of cancer related mortality and morbidity in the world, and the incidence has been increasing. The potential chemopreventive agents against colon cancer have been searching in food, because dietary factors positively related with reduction of the risk. Various food polyphenols have been found to be preventive in cell line experiments. However, most of them fail to express the activity when used to cancer model animals. The dietary polyphenols are usually

conjugated with glucuronidate and/or sulfate at the intestinal absorption step, and the active forms are aglycone but not are conjugates. Artepillin C in Brazilian propolis passed through intestinal Caco-2 cells and incorporated in hepatic Hep G2 cells in the active form without any conjugations, and suppressed strongly oxidative damage of DNA. Then, artepillin C was examined in cancer preventing activity with colonic cancer model mice and in preventing mechanisms with human colon cancer WiDr cells. In azoxymethane treated mice, oral doses of 80 mg/kg and 160 mg/kg body weight propolis and 10 mg/kg artepillin C reduced significantly the frequency of colonic aberrant crypt foci by 39.2%, 43.7% and 43.4%, respectively. In WiDr cells, artepillin C inhibited cell growth dose-dependently, inducing G0/G1 arrest in the cell cycle. This event included decreasing levels of phosphorylated retinoblastoma protein and cyclin D1-cyclin dependent kinase 4 complex, and increasing level of Cip1/p21. On the other hand, artepillin C did not induce the arrest in Cip/p21-deleted cells, HCT116 p21(-/-). Thus, artepillin C induced the cell cycle arrest through stimulating expression of p21 and clearly suppressed colonic cancer. Propolis including artepillin C is one of useful chemopreventive materials against colonic cancer.

EFFECTS OF WATER SOLUBLE DERIVATIVE OF PROPOLIS AND ITS POLYPHENOLIC COMPOUNDS ON FUNCTIONAL ACTIVITY OF MACROPHAGES AGAINST TUMOR CELLS

No 4

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Effect of two preparations (Croatian and Brazilian) of water-soluble derivative of propolis (WSDP), caffeic acid, quercetin, chrysin, naringenin (components present in WSDP) on the development of Ehrlich ascites tumour (EAT) was evaluated. Test components (50 mg/kg) were given by gastric intubations (po) or intraperitoneally 2 hour prior the intraperitonel injection of EAT (2 x106) cells. It was observed that WSDP and its compounds effectively inhibited tumour growth and the proliferation of EAT. The volume of ascitic fluid induced by EAT cells and total number of cells present in the peritoneal cavity was markedly reduced in EAT-bearing mice treated with test components. Treatment with test components increased the number of polymorphonuclear (PMN) cells and decreased the number of macrophages in the peritoneal cavity of treated animals. The macrophage spreading revealed that WSDP and all test compounds affected the functional state of macrophages increasing their tumorcidal activity. The results indicate that the WSDP and its polyphenolic compounds significantly reduced the tumour growth and proliferation of EAT cells; the antitumour effect of test components might be due to an increase of peritoneal macrophage activity and not to an increase in macrophage number.

ANALSIS ESPECTROFOTOMETRICO DE FLAVONOIDES EN MUESTRAS DE PROPOLEOS COLOMBIANO

No 5

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La importancia y posición que ha ganado el propóleo obedece a su actividad biológica, la cual reside en la presencia de polifenoles, particularmente de flavonoides, isoflavonoides y acido Canféico entre otros, otorgándole al producto propiedades antioxidantes y anticonservantes, en este sentido se ha demostrado su acción como inhibidores de la peroxidación de los lípidos de la lecitina, como bacteriostático y bactericida, se conoce de su acción frente a Staphylococcus aureus, Streptococus faecaelis, Corynebacterium, E. Coli, Krebsiella, Salmonella Cholerae, Salmonella Enteridis, Tiphosa, Dublin, Shigella, Proteus vulgaris, Mycobacterium tuberculosis y Bacillus subtilis entre otros. Sus propiedades biológicas residen en la presencia de ácidos fenólicos, esteres grasos, terpenos, aminoácidos y flavonoides. En este trabajo se presentan los resultados analíticos correspondientes a la caracterización de unidades estructurales del tipo polifenol activas a los reactivos 2,4 dinitrofenilhidrazina (2,4D) y tricloruro de aluminio. Se recolectaron 10 muestras de propóleos de la zona biogeográfica de bosque seco montano bajo (bs-MB), de las localidades de Belén, Cerinza, Cucaita, Nobsa, Paipa y Tutasá, en el departamento de Boyacá. Las muestras fueron colectadas utilizando la técnica de raspado de las partes internas de las colmenas de abejas de Apis mellifera en el periodo comprendido entre Octubre de 2003 a Enero de 2004. Las muestras se acondicionaron convenientemente en recipientes herméticos de vidrio limpios y en condiciones de esterilidad, los recipientes usados fueron de color ámbar, que se mantuvieron de manera individual en refrigerador a 5 °C, contendiendo cada una de las muestras. Con fines comparativos se analizaron dos muestras de propóleos de Argentina de las localidades de Mendoza. El contenido de flavonoides en las ocho muestras analizadas siguiendo el método espectrofotométrico del cloruro de aluminio, en general fue mas bajo respecto de los observados en la determinación de la 2,4 Dinitrofenilhidrazina, tal como se muestra en la tabla 1. El rango para el primer estuvo entre 0.52 ± 0.03% (Santa Rosa de Viterbo) y 3.26 ± 0.26% (Cucaita); en el segundo caso el rango vario entre 4.83 ± 0.50% (Santa Rosa de Viterbo) y 18.4 ± 0.80% (Tame). El total de flavonoides por los dos métodos osciló entre 5.30 ± 0.51% (Combita) a 22.3 ± 5.41% (Cucaita). Los resultados indican que hay un mayor contenido de flavonoides expresados como equivalentes de quercetina en la muestra de Cucaita, condición que se

mantiene en el caso del equivalente de naringenina. Las dos muestras adicionales de Argentina (Mendoza y Lulunta), presentaron equivalentes de quercetina entre 2.60 ± 0.01 a 3.94 ± 1.17% y de 11.4 ± 1.40 a 17.5 ± 0.70% en equivalentes de naringenina. Los valores observados en las muestras de propóleo colombiano, son significativamente menores en relación a los equivalentes de quercetina observados en muestras de Brasil, China y Taiwán.

ANTIOXIDANT ACTIVITY OF SAMPLES OF PROPOLIS FROM THE STATE OF BAHIA IN BRAZIL.

No 6

ACHF Sawaya[1], ACC Oliveira[2], IBS Cunha[2], MC Marcucci[3], MN Eberlin[1], L Clarton[4], CAL Carvalho[4]
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Among its many therapeutic activities, propolis is studied for its antioxidant properties. Propolis from the northeast of Brazil has only recently begun to be studied and not much is known about its composition and activity, which is determined by the geographic and plant origins of its resin. Methods that determine the antioxidant activity of natural products often use expensive and / or toxic reagents. The purpose of this study was to test simple and safe methods for this determination and to identify components with antioxidant activity.
Samples of propolis from hives placed in the same area in Cruz das Almas, Bahia, Brazil, and collected in different months during 2003, were compared with samples from other regions. The antioxidant activity was measured by two different methods: a) discoloration of potassium permanganate solution and b) potentiometric titration using cerium sulphate. Triplicates of all samples were analysed by both methods and the results compared. Thin Layer Chromatographic plates of the samples were sprayed with the potassium permanganate solution to observe the areas where discoloration occurred; compounds from these areas were later isolated by preparative TLC and identified by negative mode Electrospray Ionization - Mass Spectrometry (ESI-MS). The areas of discoloration on the TLC plate were mainly in the area were less polar compounds are found. This result was different from green propolis from the southeast of Brazil and red propolis from other regions of the northeast. Compounds of m/z 373, 401 and 469 were isolated from these areas. Tandem MS studies of compounds of m/z 373 and 401 show their structures are similar and possibly come from the same plant source. The results of both methods showed a direct, but not linear correlation. The samples that took the longest time to discolour the potassium permanganate used the lowest volumes of cerium sulphate, and vice-versa. The lack of linearity was probably due to the inherent imprecision of the potassium permanganate method, which depends on a person with a stopwatch to measure the time of discoloration (a subjective parameter). The titration was more precise.

'CLAY IN APITHERAPIST'S HANDS'

No 7

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Purpose: Making a new preparation – product: apiproducts + clay for increasing possibilities of patients' sanitation.
Methods: Effect of clay:
a) The possibility of giving microelements through skin and mucous coats (microelements contained in clay define its colour: blue, white, red, pink, yellow and their lack in the organism results in sicknesses.)
b) The possibility of adsorbing toxins, and metabolic products including radio-active substances through skin, mucous coats and lymphatic system that is an effect of enterosorbent. Wax plays the similar part in apitherapy. It gives its healing substances through skin and mucous coats and adsorbs that is takes away all that is necessary to eliminate from an organism having antitumoral effect. As an apitherapist I make individually ointments, creams and other apiproducts for patients.
I began to make Ruzankincreamproduct according to needs of those patients who can't be treated with bee stinging for different reasons. (This cream is prepared on the principle of making antihomotoxic preparations.) This complex preparation is applied in case of all kinds of inflammation. It can be applied locally, per os as it is a product and also per rectum. The mechanism of its action is determined by combined effect of all its ingredients.
Results: The preparation is obtained. The main effects of Ruzankincream: anti-inflammatory, regenerative, antiexudative, antispasmodic, analgetic, metabolic, antitoxic and immunostimulating.
Conclusion: The suggested preparation Ruzankincreamproduct is an optimal corticosteroid substitute. This is a nonsteroid anti-inflammatory agent with a mechanism of action which is similar to that of allopathic ones. However, it doesn't cause side effects in contrast to allopathic nonsteroid anti-inflammatory agents. It can be applied in case of different inflammatory reactions including sport traumatism, bronchitis, gastritis and colitis.

EVALUATION OF SYNERGISTIC AND ANTAGONISTIC ANTIBACTERIAL EFFECTS OF HONEY, PROPOLIS AND ROYAL JELLY ON PATHOGENIC BACTERIA

No 8

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Some Honey, Propolis and Royal jelly samples were gathered in E. Azerbaijan province in the northern Iran and were taken in to the lab. All the samples were prepared separately. Propolis samples were taken with EEP through Soxhlet's method and EEP through the method excluding heat and the antibacterial effects of all pathogenic bacteria were evaluated.
After getting conclusion, all the three substances were blended with one another in different degrees and all the synergistic and antagonistic effects of them on the same bacteria were verified. In the first step, gel diffusion and Disk diffusion were considered in order to evaluate the antibacterial subsequences. MIC experiment was done on the registered ones. Antagonistic and synergistic subsequences of each combination were compared with other combinations. The resulted subsequences were outstanding.
Key words: Antagonist, synergism, Honey, Propolis, Royal Jelly antibacterial, MIC method

THE APITOX PROGRAM FOR NARCOMANIA TREATMENT

No 9

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The treatment of narcological addiction according to the "APITOX" programme is based on the bee venom use. The treatment consists of 2 stages: during the period of abstinent syndrome and during remission period.
During the period of abstinent syndrome application of apitoxinotherapy is possible due to:
- powerful analgetic effect of MSD-peptide and adolapin, which stimulate production of the endogenous opioid peptide and slow down the synthesis of prostaglandin E;
- sedative effect - melittine inhibits the incitement of the reflexogenous zones, prevents the nerve impulses conduction through the spinal cord;
- normalization of patients' physical condition (somato-vegetative stabilization), normalization of the metabolic processes, tissue microcirculation increase, blood reology improvement;

During the remission period apitoxinotherapy allows achieving:
- reduction of compulsion to the drug (the biogenic amine system and hypophisis epinophros system activation with the help of bee venom; apipsychotherapy);
- normalization of the mood and sleep (sedative effect of secapine and tertiapine; apipsychotherapy),
- reduction of asthenia, anxiety and stress.

For 3 years we've been studying the influence of apitoxins while having provided treatment for narcomania. Clinical observation have been carried out at 2 stages:
- in-patient observation (anamnestic data; clinical examination of the psychical, neurological and somatic states; the dynamics estimation);
- clinical observation during 1 year afterwards.

61 patients of the initial and middle stages of opiate addiction have been treated under medical observation. The data shows that the use of apitoxins along with existed method of abstinent syndrome treatment is more effective: reduction of the main symptoms of abstinent syndrome (somatic) has been observed with 75,4% of patients in 2-3 days. The psychic component of abstinence has lasted up to 10 days with 47,5 %, up to 3 weeks – with 37,3 %, up to 4 weeks – with 9,8 %. That improves the existing figures to some great extend. The apipsychotherapeutic influence has been used as well at the stage of psychological dependence to have obtained remission with 44,3 % of patients up to 6 months, with 24,7 % of patients from 6 months up to 1 year.
The scrupulous clinical data analysis of the apitoxonitherapy use in treatment and rehabilitation of opium narcomania shows that:
- the use of apitoxins allows achieving quicker inhibition of the abstinent symptomatology during the drugs addiction and makes early psychocorrrective actions possible. It allows as well diminishing the doses of psychotropic remedy and lowering the chemical pressure on the Central Nervous System and liver, which is really important for concomitant hepatitis;
- psychical component of the abstinent syndrome (depression, dysphoria, asthenia, sleep disorder) during the treatment has been less evident; its dynamics have been more favorable than during the treatment exclusively with the adopted methods;
- the combination of psychotherapeutical and apitherapeutical influence has helped achieving more constant remission of the narcological illness

CHEMICAL COMPOSITION, ANTIVIRAL AND ANTIMICROBIAL ACTIVITIES OF ALGERIAN PROPOLIS

No 10

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Four Algerian propolis samples were investigated by GC/MS, 95 compounds were identified, 19 being new for propolis. Propolis (1) was characterized by the presence of 5% of caffeate esters; one of them is new to propolis. Propolis (2) was characterized by the presence 13.24% of sterols. Sample (3) contained 35% of benzoic acid. Sample (4) characterized by the presence of 32.44% fatty acid esters mainly for hexadecanoic and oleic acids, 11 of them are new to propolis. It was also characterized by the presence 13.24% of sterols, 4 of them are new to propolis. No flavonoids were detected, except 2 chalcones in Sample (3). That is the first time to investigate Algerian propolis from different localities.

The antiviral activity of Algerian propolis samples against avian reo virus (ARV), bovine ephemeral fever virus (BEFV) and infectious bursal disease virus (IBDV) was evaluated. All propolis samples reduced the viral infectivity in variable degree according to the propolis origin. Propolis sample 3 showed the highest activity against BEFV.
The antimicrobial activity against Staphylococcus aureus, Escherichia coli and Candida albican was also investigated. The propolis samples showed inhibition in the growth of the examined pathogens but the inhibition varied according to the propolis origin.

MANAGEMENT OF ALGETIC SYNDROME DURING BEE VENOM INJECTIONS

No 13

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Apitherapy has won the leading position in the treatment for too many different diseases, bee venom (especially bee venom injections followed by the apparent algetic syndrome) being undoubtedly of prime importance. This fact appears an obstruction while treating patients with low threshold of algetic sensitivity, and as a matter of fact it becomes an obstacle in treatment of children. Nevertheless sometimes it becomes necessary to increase effectiveness in order to achieve faster result, no matter how strong the activity of bee venom during injections is. Consequently we've worked out ways, which would allow managing the bee venom activity power and algetic syndrome.
The aims in view are as follows:
a) Influence on velocity of bee venom admission into the body during injections in order to manage algetic syndrome;
b) Distractive therapy
The methods are as follows:
1. Reduction of bee's activity with:
a) Thermal influence;
b) Reduction of dietary habits
2. Influential application of Krivopalov-Moskvin's Apparatus or other devices.
3. Multiuse of the bee sting:
a) During injections into the body;
b) In non-injective ways
4. Taking bee's age into account.
5. One-time bee venom injections into two or more body spots to increase algetic, reflexive and stress process.
This way of algetic syndrome management allows to:
1. Increase a coverage of:
a) Patients with pain fright;
b) Children
2. Alleviate pain, especially during critical situations connected with spinal and joints problems.
3. Adapt the human organism to bee venom under heightened allergy.

COMPLEX TREATMENT OF SENSORINEURAL HEARING LOSS BY BEESTING TO BIOLOGICALLY ACTIVE POINTS AND BEEKEEPING PRODUCTS

No 14

N. Khismatullina, Tentorium Apicompany

New method of sensorineural hearing loss treatment is still to be to found because up-to-date medical treatment of this progressive disease is ineffective and seen as a problem to be solved.
Apitherapy includes the use of different forms of honey, pollen, propolis, chitosan, ambrosia, royal jelly, and bee venom. The main principle of apitherapy is an influence of every beekeeping product upon the certain cause of sensorineural hearing loss. Due to some useful properties of bee venom to stimulate host defenses of human organism, to influence positively upon cerebral circulation and facilitate impulses transmission through nerve fibers, this apiproduct is applied in creams and in form of bee stinging to the biologically active points.
Royal Jelly contains acetylcholine – a transmitter of nerve impulses, essential element of nerve system performance.
Clinical research carried out in a group of six patients, has given the following results: improvement of whispered speech perception from 1.5 to 4 meters, regular speech from 2 to 4,5 meters. Bone conduction increased by 8-13%. Before the treatment there were descending lines in audiograms of all the patients that is lesion of sound perception with bone-air interval 5-10 decibel. After the treatment cochlea reserve increased up to 15-30 decibel, all the patients performed improvements, such that ear noise reduced or disappeared, better sleep, appetite and general condition. The result was obtained in1,5-2 months after the first course of apitherapy.

HOW TO BUILD AN APITHERAPY SOCIETY?

No 15

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There are many advantages of being enrolled in an Apitherapy Society in comparison with staying in your own more or less isolated "tower":
- Better exchange of information through more frequent events like: Courses, Conferences, Symposiums, Workshops, meetings, etc.;
- Better "image", extremely important to start new projects at national scale (like building an Apitherapy Centre or convincing your National Health Department to start officially accepted Apitherapy Courses for

medical doctors and therapists;
- Better legal protection;
- Better communication with other similar Societies located in other countries/continents.

To create and build an Apitherapy Society, among the first and most important steps to do are:
- Increase the awareness of the general population on the importance for health of a constant use of bee products through as many as possible Mass Media presentations;
- Contact the best specialists in bee products you have in your own country to form a first "nucleus" of your future Society;
- Contact the best medical doctors and therapists you have in your own country and ask for their support and help;
- Write a draft of the future status (by-laws) of your Society using similar documents from other Societies;
- Do your best to get the best people on the Executive Board: a medical doctor (for the president position); a dentist, a veterinarian, a pharmacist and a beekeeper specialised in Apitherapy for the vice-presidents positions; an expert in editing medical journals + an expert in Internet (for your future website);
- Obtain the harmony among all these people by focusing on the main goals of the Society;
- Announce the first meeting of your future Society...!

A PRACTICAL EXPERIMENT USING BEE PRODUCTS ON OPEN LEG WOUNDS TO PROMOTE THE HEALING PROCESS

No 16

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Introduction: To demonstrate the use of bee products to promote healing in open infected wounds.
Method: Patient presented with two open wounds on the left leg following a road traffic accident. These started as deep grazes on the leg amongst extensive bruising throughout the leg. A couple of weeks post accident the wounds became infected and weeping, deepening into the soft tissue. It was decided at this point to use honey as a wound dressing to cleanse the infection and promote rebuilding of the subcutaneous tissue.
Results: Honey was placed in the wound and covered with an adhesive, Meopore (non-stick) gauze dressing. The dressings were changed daily with daily re-applications of honey. The infection was drawn out and within two weeks the infection had abated. Daily dressings with honey continued until a healing plateau was reached approximately two months from the original injury. At this point 0.05% alcoholic propolis tincture was added to the honey to stimulate healing. Honey and Propolis cream was also used on the surrounding skin to reduce soreness from the prolonged use of adhesive dressings. The upper wound healed after a month of this treatment but the surrounding skin of lower shin wound was very sore and had small open surface wounds. The use of Propolis was discontinued and the area only treated with honey and gauze dressings with minimum use of adhesive tape. The surface wounds healed after two weeks and it was then decided to use bee stings in the centre of the wound itself to stimulate blood supply and also the healing process. Propolis was also gradually re-introduced in cream form and the wound has continued to heal. Photographs were taken to record progress.
Conclusion: The conclusion that I have made is that the combined use of bee products stimulates open wound healing on all areas including those with minimum depth and blood supply. Experiments continue of other open wound situations.

APITHERAPY IN ROMANIA – A REVIEW

No 17

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At the beginning of the sixties, what we call now the Romanian Apitherapy or the Romanian School of Apitherapy, had as a starting point the ideas of prof.dr.V.Harnaj- president of Apimondia between 1965 and 1985 – and the enthusiasm of a group of specialists in chemistry, pharmacology and medicine who succeeded to define the bee products for both their chemical composition and pharmacological actions and to put thus the basis of a new medical branch.
The actions of each of the collected or secretion products in the bee hive that were defined and supported by laboratory clinical and paraclinical data, made it possible to create formulas with specific actions in the treatment of some human diseases. More than 40 formulas of apitherapeutical products were prepared in the production department of the Institute for Beekeeping Research and Development in Bucharest. All these products were accepted and appointed as medicines by the Ministry of Health. Thus, a new a prospective was open and the first Medical Centre of Apitherapy in the world was founded. This Centre functioned and still functions as a polyclinic with all the medical specializations. Under the management of the institute, the specialists of centre carried out several research projects at the level of the Academy of Medical Sciences. The encouraging results had also open the gate to a new approach – the preparation of more than 30 specific formulas of nutritional supplements used in complex treatment protocols. The new exigencies related to the adhesion of the country to the E.U., led to the implementation of a modernization programme consisting in the introduction of the GMP regulations and the accreditation of the laboratory for the quality analysis of the bee products, two important objectives that will be completed by the end of this year.

APITHERAPY IN THE TREATMENT OF INFANTILE CEREBRAL PARALYSIS (ICP)

No 18

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ICP might be characterized by absence of any treatment for it up till now, some methods for rehabilitation being known just as a part of the general physical rehabilitation, which corrects locomotive abnormalities only.
Some years ago we developed a new approach for solving the problem within the framework of the program "APITOX" based on the application of bee venom fractions; it allows applying therapy and rehabilitation simultaneously during the reasonable period of hospitalization.
We'd like to introduce an absolutely new approach for the treatment of ICP based on applying of apitoxinotherapy in combination with apikinesitherapy, including medicines prepared on the basis of pollen, honey, herbs, propolis and royal jelly along with a special rehabilitation complex.
Aims of the treatment are physical and psychic medical rehabilitation of ICP patients.
Physical rehabilitation allows improving of locomotive abilities of the patient due to:
- Rehabilitation of normal muscle tone of limbs;
- Correction of contracture and deformity of limbs;
- Destruction of old and habitual motor skills;
- Formation of new range of motions;
- Fastening motor skills acquired during the period of treatment.

Psychic rehabilitation improves mental power of the patient due to:
- Improvement of enunciation;
- Improvement of memory;
- Normalization of cerebral blood flow and metabolism.

Other aims of the treatment:
- Reduction of spasmodic attacks frequency;
- Removal of hyper excitability;
- Increase of protective strength of organism;
- Normalization of metabolism.

An integral part of the treatment, which allows achieving significant results, is apikinesitherapy (that is combination of apitoxinotherapy and exercise therapy along with mechanical and reflector actions). Physical power extends due to: muscle hyper tonus reduction under influence of melittine; owing to adolapine's analgesic effect; fastening of new skills owing to central stimulating action of apamin; improvement of metabolism in the muscular tissue.
The effectiveness of the therapy was estimated with clinical observation (psychomotor development including locomotive activity, muscular tonus and somatic status). During 4 years 23 ICP patients have been provided with the treatment by means of this method; 18 children of 1 to 14 years old and 5 grown-ups over 18 are among them. There were 14 patients with spastic form, 3 – with dyskinetic, 6 – with mixed form. We got the following results:
- 21 patients improved their motor abilities
- 2 of them have got somatic status improved with no progress in movements.

Clinical observation showed that spastic form of ICP responses to the treatment better than others.
The "APITOX" program of ICP treatment allows:
- first, providing treatment and rehabilitation simultaneously,
- second, providing psychic rehabilitation and improving the quantity of psychic development.

ANTIOXIDANT ACTIVITY OF SAMPLES OF PROPOLIS FROM THE STATE OF BAHIA IN BRAZIL.

No 19

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Among its many therapeutic activities, propolis is studied for its antioxidant properties. Propolis from the northeast of Brazil has only recently begun to be studied and not much is known about its composition and activity, which is determined by the geographic and plant origins of its resin. Methods that determine the antioxidant activity of natural products often use expensive and / or toxic reagents. The purpose of this study was to test simple and safe methods for this determination and to identify components with antioxidant activity.
Samples of propolis from hives placed in the same area in Cruz das Almas, Bahia, Brazil, and collected in different months during 2003, were compared with samples from other regions. The antioxidant activity was measured by two different methods: a) discoloration of potassium permanganate solution and b) potentiometric titration using cerium sulphate. Triplicates of all samples were analysed by both methods and the results compared. Thin Layer Chromatographic plates of the samples were sprayed with the potassium permanganate solution to observe the areas where discoloration occurred; compounds from these areas were later isolated by preparative TLC and identified by negative mode Electrospray Ionization - Mass Spectrometry (ESI-MS). The areas of discoloration on the TLC plate were mainly in the area were less polar compounds are found. This result was different from green propolis from the southeast of Brazil and red propolis from other regions of the northeast. Compounds of m/z 373, 401 and 469 were isolated from these areas. Tandem MS studies of compounds of m/z 373 and 401 show their structures are similar and possibly come from the same plant source. The results of both methods showed a direct, but not linear correlation. The samples that took the longest time to discolour the potassium permanganate

used the lowest volumes of cerium sulphate, and vice-versa. The lack of linearity was probably due to the inherent imprecision of the potassium permanganate method, which depends on a person with a stopwatch to measure the time of discoloration (a subjective parameter). The titration was more precise.

COMPARATIVE STUDY OF IN VITRO METHODS USED TO ANALYSE THE ANTIFUNGAL ACTIVITY OF ETHANOLIC EXTRACT OF PROPOLIS AGAINST TRICHOPHYTON RUBRUM AND T.MENTAGROPHYTES

No 20

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A broth microdilution method following the recommendations established by the National Committee for Clinical Laboratory Standards (NCCLS) and agar dilution method were used to compare the in vitro activity of propolis with that of itraconaole (ITC) against 29 clinical isolates the dermatophytes belonging to two different species of Trichophyton. In terms of MICs, ITC showed greater activity than propolis. MICs of propolis at which 50% (MIC50) and 90 % (MIC90) of the isolates were inhibited were 0.1 mg/ml and 0.2 mg/ml, respectively. Propolis merits further investigations as a potentially useful agent for treatment of dermatophytosis and the broth microdilution and the agar dilution methods were good agreement for propolis against dermatophytes. Moreover, the study suggests the potential value of the broth microdilution as a convenient alternative method for testing the susceptibilities of dermatophytes to propolis.

Key words: Propolis, dermatophytes, Trichophyton spp., itraconazole

POSSIBLE USE OF APITOXINS IN NORMALIZATION OF ALCOHOL DRINKING

No 21

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In 1995 a program was worked out to let people with the alcohol abuse and alcoholism not to give up drinking alcohol completely but to rehabilitate destroyed functions. As a complete compensation of the alcohol for the organism we offer apitoxins (components of bee venom), that influence the main mechanism of addiction development – catecholamines exchange by means of hypophysis-epinephros system activation. Besides by managing the opioid peptides production apitoxins remove primary and secondary inclination to alcohol, normalize alcoholdehydrogenase exchange and improve trophic process. A new conditioned reflex for taking control of alcohol use is being built up.
The objectives are: changing of organism's needs of alcohol; creating new psychological attitude towards alcohol; molding of the self control.
The effectiveness of the treatment has been estimated by the absence of alcohol excesses during 6 months, 1 year and 3 years periods after of the program was finished.
4300 patients have been treated during 10 years, and 679 of them have been observed. They were divided into 2 groups: 412 men with alcohol abuse, 267 men with alcoholism.
The effectiveness of the programme of the dosed usage of alcohol

Groups	Remission 6 months (%)	Remission 1 year (%)	Remission 3 years (%)
Alcohol abuse	84,9	77,9	69,9
Alcoholism at 1st and 2nd stages	79,9	69,8	55,1

As a conclusion we can say that:
Either at the stage of the alcohol abuse or at the stage of developed alcoholism the normalization of the alcohol use is possible.
Use of apitoxins increases the possibility of the normalization process.
At the first stages of alcoholism normalization without apitoxins would be rather difficult because of absence of any compensation.
At the stage of the alcohol abuse normalization is the most effective preventive measures of alcoholism.

CHEMICAL CLASSIFICATION OF BRAZILIAN PROPOLIS: A WAY TO OBTAIN STANDARDIZED NATURAL MEDICINES USING THIS BEE PRODUCT

No 22

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This work is about a process to classify different kinds of chemical compounds in Brazilian propolis from different regions, using HPLC and GC-MS. It was possible to establish chromatographic methods to identify and quantify different chemical compounds in Brazilian propolis. After analyzing more than two thousand samples, and using the multivariate analysis, we found three majority groups. Group 1, named BRP (Brazilian prenylated compounds) with a lot of prenylated compounds (p-coumaric acid derivatives, including

Artepillin C) including caffeoylquinnic acids. The sub-groups were stablish based on differences between the concentration of chemical markers, such as: high content (BRP-X), intermediate 1 (BRP1), intermediate 2 (BRP-2) and low content (BRP-3). This group includes another sub-type named BRP-PR. Group 2, named BRG with vanillin, aldehydes and coumaranes. Group 3, called BRPG is a mix between the first and second group, with chemical compounds from group 1 and group 2. This classification was comproved by mass spectra technique. With this classification it is possible to establish quality control of all products elaborated with Brazilian propolis. Now, we are including propolis from other regions in Brazil inside the classification. This research was supported from FAPESP: 95/09606-5 and 00/10031-0.

NEW NEEDED QUALITY REGULATIONS FOR THE PRODUCTION OF APITHERAPICS

No 23

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In a world increasingly polluted physically, chemically and biologically the stringent need for new quality regulations in the production of bee products for Apitherapy/medicinal use is obvious.
There are still too many beekeepers that use in an excessive or inappropriate manner various chemicals to treat or prevent various bee diseases...
So, we can say that we have an external, environmental, pollution and an "internal" one, made by some of our own beekeepers...
Many beekeepers and/or processing companies still do not know very well how to protect the active/useful ingredients from their raw bee products, preparations or final products, by exposing them for example to light, selling the final products in transparent jars or packages. Such products can be used for their still good nutritive qualities, for healthy customers, but they have smaller chances to heal or prevent diseases in humans and/or animals.
A list with the most important rules and principles to be applied in Apitherapy related Apiaries, but also by the processing companies will be presented, for analysis and discussion, during the Congress.
If a general consent will be achieved, we will propose that our new German quality related regulations to be used in the future not only by the members of the German Apitherapy Society but by all interested people in getting better results from a modern Beekeeping and a more effective Apitherapy.

NEW APITHERAPEUTICS IN ROMANIA

No 24

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Whether pure secretion products (royal jelly) or collected products (pollen, propolis, honey), bee products offer to the human body, some of the richest spectra of biochemical compounds with nutritive, functional and therapeutic actions.
Based on the biochemical and pharmaceutical studies carried out within the Apitherapy Centre in Bucharest, belonging to the Institute for Beekeeping Research and Development and on several clinical trials that have already proved their action, some formulas of balanced nutritive-functional supplements as well as medicines were developed during the last years. Thus, beside bee products (royal jelly, pollen or pollen extracts, propolis - as soft (spiss) extract and honey) plant lecithine, mineral salts (calcium, phosphorous, kalium) and an extra supply of vitamins, were used to potentiate their actions. These food supplements (Apivital, Vi-fort, Meltonic) are especially designated to regulate the metabolic processes in both healthy organisms and those affected by several deficiencies generated by pathological processes or suffering the effects of special environmental and working conditions. In their turn, medicines have their special destination and new formulas were developed or old formulas were improved according to the new technologies and demands from EU regulations.

STANDARDIZATION OF PRODUCTS OF THE HIVE

No 25

R Domergo. Standing Commission for Apitherapy, Apimondia Executive Council

Standardisation des produits de la ruche

Dans pratiquement tous les produits de la ruche aucune standardisation n'a été mise en place. Seul, le miel, par le Codex alimentarius a une grille bien définie pour sa commercialisation et sa consommation. Tous les autres produits n'ont que des criteres toujours succints d'habitudes mises en place par le marché. Aucune grille de standardisation n'impose une qualité que ce soit pour la propolis, la gelée royale, la cire, le venin ou le pollen.

Nous mettons en place, dans cette publication, une approche de raisonnement qui permette de rationaliser la standardisation nécessaire des produits de la ruche qu'ils soient à destination alimentaire et encore plus pour leur utilisation thérapeutique. Dans cette partie, les travaux de la Commission d'Apith_rapie, en particulier à Cuba, ont montré la nécessité °© lors de l'écriture de protocoles de traitement °© la nécessité de la

standardisation à des fins de quantification, de stabilité et de reproductibilité.

Dans ce monde presque 40% des miels sont testés positifs aux antibiotiques et/ou aux pesticides. La nécessité d'une grille de standardisation est encore plus éloquente.

Mots-clé : standardisation, produits de la ruche, tous les produits, apithérapie, protocoles,

Liste des publications et références sur demande

ROLE OF BEEKEEPING IN POVERTY ALLEVIATION: MARKETS AND MARKETING OF BEE PRODUCTS IN TANZANIA

No 26

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During October 2003 to June 2004 a study was carried out in ten urban centers to determine marketing of bee products, honey in particular, in Tanzania. The study was conducted using semi-structured questionnaires and direct observations. Although awareness of honey was generally high throughout the study area, honey availability was generally low, ranging from 5.3% to only 53% of all market sources namely hotels/ restaurants, supermarkets, retails shops etc. Honey as food and medicine were the main uses recorded, with Tabora Region being the main source of honey available in the market in Tanzania. There are no public announcements on honey in all except two urban centers surveyed. The results are discussed in the context of a need for beekeeping playing a role in poverty alleviation in Tanzania.

PARTICIPATORY ACTION RESEARCH AS A BEEKEEPING DEVELOPMENT STRATEGY

No 27

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Introduction: The paper explores the importance of a Participatory Action Research approach to beekeeping development in Africa
Methods: The paper discusses the author's experience and observations of beekeeping development in Eastern Africa over the past 12 years.
Results: New ideas and knowledge generated, documented and shared.
Develop the confidence of target groups.
Innovation promoted.
Empowerment, self-reliance and sustainability promoted.
Discussion: We as beekeeping development workers, frequently set out to 'train' in beekeeping/beekeepers. However we must recognise the importance of already existing knowledge and skills amongst communities in beekeeping. Frequently development workers ignore the good in front of them in the rush to introduce 'modern' beekeeping methods. So much is not know about beekeeping in Africa – we cannot wait for researchers to assist us. We, as beekeeping development workers, in close collaboration with rural communities, must become our own researchers to tap into this existing wealth of knowledge. We must also facilitate the generation of new knowledge and ideas. This old and new knowledge/experience must be documented and shared with others so that we can all learn from each other. Participatory Action Research is an appropriate beekeeping development strategy in Africa.

BEEKEEPING IN TANZANIA: WHEN THE BEES GET OUT OF THE WOODS. AN INNOVATIVE CROSS SECTORAL APPROACH TO COMMUNITY BASED MANAGEMENT OF NATURAL RESOURCES.

No 28

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The present trend in Community Based Natural Resources Management (CBNRM) had lead to a focus on research of alternative economic activities to the destructive and environmental detrimental practices of slash and burn agriculture, forest clearing and poaching that occurs in most of the rural areas in Africa.
The development of activities linked to the so called non timber forest products (NTFP) has received considerably more attention and support than previously from financing organizations, cooperation agencies and national public agencies in charge of natural resources management. The promotion of those environmental friendly but productive activities are now widely recognized as being among the good practices that occur in this field. Nevertheless, little has been finally done. While focusing on the subject, it appears that beekeeping is often quoted as being one of those particular activities. A lot of Integrated Conservation and Development Projects (ICDP) Initiatives include it in a number of other "alternatives activities" that should be supported and promoted in the course of the project life. But few examples relate more than an experimental or demonstrative experience that have generally fallen short within expectation regarding the socio-cultural (appropriation of new techniques) and economical sides (profitability) of the issue.
We will present the first lessons of an initiative supported by NORAD in central and western Tanzania that shows interesting findings regarding both conservation and development issues and links.

We will first make an assessment of the current situation of beekeeping in Tanzania, its opportunities and constraints, then, through the case study of MNRP/NORAD project, we will try to identify the key elements of a successive approach to cross-sectoral beekeeping.

HONEY QUALITY AS AFFECTED BY HANDLING, PROCESSING, CHANNELS OF MARKETING AND OTHER CONSTRAINTS TO BEEKEEPING

No 29

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We report the factors that affect honey quality in a pioneer study representing the national outlook. A total of 120 beekeeping households were randomly sampled in four districts, one representing each of the four geographical regions of the country, and a questionnaire was administered to each. Processed honey in both branded and unbranded forms was sampled across supermarkets, hawkers and stall markets along four transects across the capital city. Honey quality parameters assessed were moisture content (MC), free acidity (FA), diastase number (DN), hydroxymethylfurfural (HMF), and water insoluble solids (WIS), using recommended methods. Over half of beekeepers were 40 years and above, and across ages, males were predominant (77%). Honey was the major hive product (93%) and was mainly for sale. Majority of beekeepers kept traditional hives. Pressing of combs, boiling and straining were the predominant honey processing methods. Beekeepers reported that honey quality was mainly compromised by harvesting immature honey, poor extraction and storage methods and contamination by extraneous materials. The main constraints to beekeeping were lack of appropriate equipment (52%), lack of transport and poor rural infrastructure, inadequacy in skills due to weak extension service, bad weather and vermin. Significant differences ($P < 0.05$) in HMF and DN were observed among the five honey brands. All brands met National and Codex Alimentarrius MC and WIS standards while most failed in HMF and DN. For the European Union market, 40% of the brands would qualify in HMF and 20% in DN. Strong correlations were observed between HMF vs. DN ($r = 0.94$) and MC vs. FA ($r = 0.56$). Supermarket honey was more superior ($P < 0.05$) in DN (5.07) and WIS (0.1%) than stall markets and hawkers. Honey from all the retail groups qualified for all standards only in MC while DN and WIS were major tailbacks to quality. Diastase, HMF and WIS levels are all management related hence, farmer training and extension in proper honey harvesting, handling and processing should be strengthened. Quality monitoring at all levels especially processing, should be emphasized.

DEVELOPMENT OF APIS CERANA BEEKEEPING WITH ETHNIC MINORITIES AND SMALL FARMERS IN VIETNAM

No 30

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The project was carried out from 2004 to 2005, in the provinces of Thai Nguyen, Hoa Binh, Thuathien-Hue and Cat Ba Island. Main objective of the project was to increase income opportunities among ethnic minorities and small farmers through intervention in the technical, economic and ecological aspects of beekeeping. In 2004, the project had successfully conducted an advanced training workshop for 15 local key technicians and the staff of BRDC, four technical training courses in beekeeping for 90 local farmers, supported 260 beehives to beekeepers and training apiaries, beekeeping tools, technical consultancies and training apiaries in four project sites. Trainees learnt beekeeping techniques three times per month from local key technicians and learnt each other by seeing and doing in the apiaries. Thanks to these supports, the beekeepers of the project have got good opportunities to learn and improve their basic advanced beekeeping techniques in the village and commune scales. They also took a field investigation on floral resources for bees in their areas and made a floral calendar for their beekeeping through the year Therefore, by the end of 2004, almost beekeepers maintained well their beehives and collected much honey. Total number of beehives and bee combs were increased 19% and 8% respectively, compared to those at the beginning of the project. They also collected 1,328 kg of honey and their income was 276,442 VND (=18 USD) per hive. This confirms that the project is on well progress and has got some fruitful achievements. However, the knowledge and skills of the beekeepers are not sustainable. Therefore, it is necessary to have follow-up supportive activities to upgrade their experiences and skills, so that they can run their beekeeping better and get more income for their family life.
Key words: Ethnic minorities, small farmers, Apis cerana beekeeping.

BEEKEEPING AN ALTERNATIVE LIVELIHOOD OPTION IN THE WESTERN GHAT REGION OF KARNATAKA, INDIA

No 31

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Beekeeping with Apis cerana indica, wild honey harvesting from Apis dorsata, some efforts of introduction of Apis mellifera and its problems, beekeeping extension, alternative income generating and outreach activities have been analysed during 2003-04. Information pertaining to the role of beekeeping cooperative societies in bee management practices, training, procurement of honey, its marketing and income generation have been analysed and discussed. In addition to beekeeping a traditional rural employment generating activity, people were also involved many crafts including collecting minor forest produce for which market support was provided by Large and Multipurpose forest produce cooperative societies and its federation. The number of beekeepers, type of beekeeping activity, methods of honey collection, harvesting, processing, value added products has been obtained and the results are also being discussed.

FOREST BEEKEEPING SYSTEMS: KNOWLEDGE AND CHALLENGES TO INDIGENOUS COMMUNITIES IN NILGIRIS (WESTERN GHATS) INDIA

No 32

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The indigenous community collects honey from Apis cerana bee colonies – this has been a long time traditional / seasonal activity. This activity has a strong cultural, economic and ecological linkage for centuries together in the mountain ecosystem. The natural cavity beekeeping - collecting system supports their livelihood for three to four months by selling honey to other mountain communities. The activity starts by November by cleaning all traditional cavities and fixing the cap stones for the safety of nesting structures. These special nesting sites will be recognized and occupied by Apis cerana bees in late November. The honey collector visits tree cavities during mid-February and begins honey collection by drawing out few honey combs, again visits two weeks later for the next round of collection. Bees migrate during monsoon, the honey gatherer exactly track on which side of the hill slopes the bees fly and next November again the activity continues. This forest-beekeeping practice has been going on from generation to generation. Structures are treated as family properties and livelihood sources and passed on from father to son. Cultural linkages and practices in forest-beekeeping are being tried to pass on to younger generations. This binds the community socially. The first harvest is always offered to forest deities – praying for profuse yield, supplies to other mountain living communities as medicine, offering, food and rituals. The people earn three to four months by selling honey – this takes care of six months livelihood needs.

Protection of ecology is a tradition: bee plants are protected; forest patches are protected where cavities are located. Songs and stories are passed on the younger generations about bee flowers, seasons, bee pollination on forest flowers & indicators of natural eco-systems.

The threats and challenges to the Indigenous Forest-Beekeeping Systems:

- Changes in forest policies: declaring wildlife reserves, a sanctuary prevents the community to access honey resources and losing ancestral domain.
- The raiding of cavities by Non tribal community who do not understand the ecological and social linkages.
- Introduction of exotic bees, Apis mellifera, by Government agencies, who are not familiar with tribal economics and technology.
- Hive beekeeping systems require larger extent of management which is lacking.
- Constant reduction of forest areas affects natural bee habitats and foraging.
- The extensive usage of chemical inputs, change in crop patterns by agrarian community's limits foraging and danger to bee forage.
- The lack of an organized marketing structure & unfair price for honey by co-operatives.

Due to these issues – which are often beyond the control of Indigenous Communities – the younger generations do not continue as forest-beekeepers or honey gatherers and migrate to other areas for non-traditional occupations. This trend is an intrinsic threat to the sustainability of the forest-community – losing their traditional livelihoods and losing their linkages to ecology and local society. They become wage-gatherers and ecological refugees in an urban world.

RAFTER BEEKEEPING IN CAMBODIA WITH APIS DORSATA

No 33

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Western beekeepers are familiar with honeybees, bumblebees and solitary bees. However, Asia adds a whole new dimension with its own particular species of honey bees, several of which build a single comb in the open air and protect it with a curtain of workers. One such, Apis dorsata, the giant honeybee, suspends its large combs from a tree branch. Colonies migrate to take advantage of the nectar flows, returning to the same bee tree season after season. However, in various areas in the region, notably the Mekong delta in Vietnam, deforestation has removed the large trees, leaving the colonies with nowhere suitable to build their nests. Rafter beekeeping has been reported in Vietnam, Malaysia, West Kalimantan in Indonesia, Little Andaman in India, and Myanmar. A long pole is supported on uprights at each end, 2-2.5 m from the ground. The rafter is set at an angle of 30-40°, inducing Apis dorsata

colonies to take up residence. Honey collectors then harvest brood and honey.
In October 2003, rafter beekeeping was recorded for the very first time in Cambodia. The tradition here goes back many generations and appears to have developed completely independently of other beekeeping traditions. Many families of subsistence farmers in the area are involved. Rafters are set out in the low shrub. Each is protected on all but one side which serves as the bees' flight path at the upper end of the rafter. Colonies build comb, rear brood, and collect and store honey and pollen.
The harvest was recorded for the very first time in March 2004. A crude torch is made from green foliage to smoke bees off the comb. The honey and brood are removed separately. Honey is squeezed at home by hand, bottled and sold by the litre to middlemen for re-sale in the urban areas. Brood is cooked and shared among family and friends or sold to others in the village. Wax is rendered and sold by the kilo to middlemen.
We report the first record of rafter beekeeping in Cambodia. Sustainable honey-harvesting methods are now being encouraged allowing several harvests per year; the first taking place on 29 January 2005.
Further progress of sustainable rafter harvesting will be reported.

FAO'S ACTIVITIES FOR PROMOTION OF BEEKEEPING FOR RURAL DEVELOPMENT

No 34

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Technical and development activities in apiculture are handled by the Food and Agricultural Engineering Technologies Service (AGST) in the FAO. The work of FAO for apicultural industries for rural development aims to serve FAO member countries through assistance in formulation and execution of field projects, information and technology transfer, and promotion of beekeeping as additional income and employment opportunities in order to enhance livelihoods of rural population. AGST has been involved in executing 59 projects in 46 countries (2000 ~2005), in three funding categories, namely Tele-Food Programme (TFD), Technical Cooperation Programme (TCP), and Trust Funds (TF). FAO's work under the regular programme and field projects will be introduced, in addition to presentation of guidelines for preparation of TFD and TCP proposals.

GOOD AND BAD EXPERIENCES FORM BEEKEEPING PROJECTS – A SLIDE LECTURE

No 35

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During the last 14 years Danish beekeeping projects have taken place in both the tropics as well as in the arctic.
All projects have had the purpose either to support local industrial development or to secure a better pollination of tropical crops. All projects have taken the local conditions in consideration, been using local materials if possible and drawn on local beekeeping knowledge. In spite of this, the results of the projects have been quite different. The lecture deals with some of the reasons for success as well as reasons for failure.

SUSTAINABLE RURAL DEVELOPMENT THROUGH APICULTURE

No 36

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ORDSE is implementing apiculture as optional school subject in Moldovan orphanages with gymnasium level teaching. At the moment apiculture is taught in 10 rural orphanages. 400 children benefit by the apiculture project. During 3 academic years the students follow 500 hours of apiculture sessions: theoretical sessions, practical courses and laboratories. The theoretical sessions and laboratories take place in Apiculture Learning Classrooms supplied with teaching aids, demonstrative equipment and tools. The practical sessions take place at school apiaries organized for this reason. Biology professors, who are beekeepers in the same time, conduct the lessons according to specially elaborated curriculum. Apiculture textbooks, notebooks and visual aids are elaborated for boarding schools. Produced honey is used for children food.
In the frame of the second apiculture project ORDSE sustains Moldavian beekeepers to rehabilitate their bee yards in order to market honey and other produces of the hive. This financial support benefits 100 beekeepers from 10 rural districts. Mostly young associated beekeepers are involved. Along with increasing honey production the main aim is to advise rural beekeeping farmers in sustainable modern bee farming techniques and management. We pay a considerable attention to instructing hivers in the diversification of bee products. There is an important unexploited potential to produce nutritional supplements and medicines. The beekeepers and the consumers have to know most of the bee products show important antioxidant properties due to a large series of natural non – enzymatic compounds. In this way ORDSE promotes the beekeeping business as a sustainable income source in rural localities of Moldova.

A RURAL DEVELOPMENT PROJECT IN A MOUNTAINOUS AREA OF TURKEY

No 37

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The Eastern Black Sea Region of Turkey is a mountainous area. The Camili (Macahel) basin is in the province of Artvin borders the state of Georgia on the eastern edge of the Black Sea Region. The Camili area is socially and economically underdeveloped. To overcome this conditions, a rural development project was geared towards improving the local economy by creating new resources, providing basic social services, and increasing awareness among the local people about protecting biodiversity. Initiated in 1998, the project was implemented by the TEMA Foundation, a non-profit NGO in Turkey. Queen bee production and ecotourism were promoted as new sources of income for the region. Caucasian bee (Apis mellifera caucasica) species lives only in the Camili region of Turkey and genetically pure. The TEMA Foundation considered this an important factor in the success of Project. On initiation of the Project in 1998, volunteers among locals in the basin were trained in queen bee production for 3 months. These producers then received subsidies to set up queen bee production enterprises. Artificial insemination laboratories were established. This management has been continued by the TEMA Foundation since initial of the Project. As a result of successful management of queen bee production in 2004, 23 families earned an income of $105.000 from the production of 7000 queen bees. Income per family, $700-1.000 annually prior to Rural Development Project, increased by a factor of 5 or 6 for individuals involved in queen bee productions. The people of the area appreciate the benefits of the project, since the Rural Development Project has brought economic vitality to 6 villages. The project has also being supported by Central Finance and Contracts Unit (CFCU), EU with 130.000 Euros due to queen bee production education of additional 60 young villagers. With this 60 new producers total number of queen bee producers reached to 83. In 2005, a production goal of 20.000 queen bees is expected with an income of $300.000.

CURRENT STAGE AND PROSPECTS OF BEEKEEPING INDUSTRY OF ARMENIA

No 38

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The Armenian beekeeping sector produces high quality honey, which is a traditional agricultural activity for many Armenians in the rural regions. Natural nectar, honeydew and pollen sources are mostly gathered from chemical-free Alpine poly-flora, which provides the specific taste and flavor to Armenian honey. However, beekeepers have been isolated from many improvements that occurred in the beekeeping industry in recent years, resulting disease problems in the bees, lack of a diversified genetic base, and lack of queen production capabilities.

To address these issues "Multi Agro" Ltd, one of the biggest apiary farms in the country, conducts couple of research projects in Armenia on genetic improvements, hive management, bee disease control systems through IPM, economic analyses of beekeeping, etc.

The "Train-the-Trainer" program was designed to train Armenian beekeepers in appropriate beekeeping technology and techniques to be disseminated to the general beekeeping community in Armenia. The program is being successfully implemented in Armenia now.

The leaders of beekeeping industry are re-instituting a national queen-breeding center in Armenia to speed up the enhancement of the genetic pool with more productive traits, where quality breeder queens can be produced and sent to production queen breeders in local areas. In turn, the local production queen breeders will distribute production queens to the beekeepers in their areas and will also return the best of their production to the national center where they will be evaluated for continual up-grading of the breeder queen genetic pool.

In October 2004, regional Armenian beekeeping associations established the "Armenian National Federation of Beekeepers". "Multi Agro" is a proud member of the Federation and works together with them to realize the prioritized objectives mentioned above.

TRADITIONAL HIVES IN IRAN

No 39

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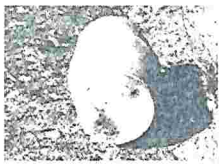
Introduction: Iran with a long history in beekeeping has about three million colonies which 370,000 of them are traditional hives. Most of traditional hives are in north, north-west and west of Iran. The climate in north is moderate, the humidity is high, and the weather in west and north-west is cold and mountainous.

Methods:
We researched in six provinces of Iran and we found different types of traditional hives and prepared digital photos.

Results:
The traditional hives have different shapes and most of them are trunk hives, the other shape of hives is ceramic hives, In addition, basket forms of hives, and wooden hives.

Basket Hive



Ceramic Hive

The average production of honey in these hives is 6 kg per year.
This hives have some advantages and disadvantages, which will be explained.
There are different pictures, which will be sent in future.

STUDY ON STEADY STATE OF BEE KEEPER IN IRAN WITH RESPECT TO ALL CAPABILITIES AND INHIBITIONS

No 40

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Iran with 1.64,000 km2 areas has different potential such as 1.3X108 hectares forest and 14 x 106 hectares farm. In Iran near 50,000 beekeepers and more than 2X106 beehives are estimated and near 20,000 tones of honey per year are produced by these number of bee keepers. This much honey production between our neighbor countries is acceptable but if we look at to the development countries this much production is very less. In this study we have focused on all problems which caused less production of honey in Korasan as a biggest province of Iran. We analyzed some important cases such as management, government policy for honey production and all related rules. The study was preformed in two stages. In the first stage 23 beekeeper cooperations were selected and asked them to fill a questionnaire. After analyzing the filled forms we have found that the most important difficulties for cooperations and the beekeepers are marketing, education, continuous drought and office problems. In the second stage we focused on all rules regarding to production and marketing, duties of each related office and operation of different government offices related to this industry. The results showed that all beekeeper difficulties in this area are because of unstable policy, some times wrong legislation, old rules and operation of the rules. Finally we suggested that a solution for these all problems is right revenue of the rules by government and non-government offices related to honey production.

BEEKEEPING IN THE ANDES: A PROPOSAL FOR QUEEN BEES REARING.

No 41

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Among the 3,000 and 3,500 meters above the sea level, in the Mountain Range of the Andes, among Peru, Ecuador and Bolivia (South America), a very particular beekeeping is developed. It is conditioned by climatic and geographic factors. The Production Season takes place in heavy-raining months, short spring, and long drought periods, in which temperature drops up to 0º C. Likewise, the difficult terrain and the few asphalted ways make the work more difficult.
The Andean settler has incorporated beekeeping as a complementary activity to his daily labors; among them we can mention agriculture, livestock, etc.
He takes the advantages of flora resources (in many cases, native) for the honey and pollen production and in less quantity for the royal jelly, propolis and wax production.
After a diffusion process of the beekeeping activity, we consider that the improvement of productivity is an objective of priority. For that purpose, we have adapted the modern beekeeping exploitation techniques to our conditions.
Some considerations that have been taken:
The European and American traditional techniques are not fully successful in the particular conditions of the Andes. For instance; in the Inter-Andean valleys, the temperature outside the hive endangers the colony when traditional methods, as the "swarm box", are applied.
Beekeepers have limited access to printed material about Queen Rearing.
There is a necessity of developing the beekeeping techniques in the Andes for being in better competitive conditions.
Canalize the ingenuity and creativity of beekeepers (most of them self-taught) in order to revaluate their ancestral knowledge of nature
We have adapted a method for the intensive queen rearing having as a starting point the "swarm box" technique. This new method is taught to the Andean beekeepers because it is simple and beekeepers can afford to it.
The objective is to create queen bee lines with the desired characteristics: hygienic behavior, mite resistance, adaptation capacity to specific climatic conditions, productivity, among others.
These technical adaptations are part of what we want to understand as sustainable development.

IMPORT RISK ANALYSIS AND THE HARMONISATION OF SURVEILLANCE AND DIAGNOSTIC METHODS

No 42/43

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Global activity has intensified in recent years, and we now live in a global economy with trade and international exchange increasing all the time, both in terms of means

of transport and its speed. Trade in honeybees and hive products are governed by the Sanitary and Phytosanitary (SPS) under WTO. Under this agreement the OIE (Office International des Epizooties) is recognised as the relevant international organisation for developing standards, guidelines and recommendations relating to animal health. The aim of this agreement is to ensure that SPS measures are applied only to the extent necessary to protect human, animal or plant life or health, i.e. they do not constitute a disguised restriction to international trade. Trade is therefore based on managed or acceptable risk, rather than zero risk, and these agreements should permit commerce to be done more safely by reducing the risks. The trade is permitted unless there are valid scientific based grounds for restricting it. Risk Analysis is a systematic aid to decision making in support of this process and is used to examine the risks associated with import and export of commodities such as honey bees, inform import policy and pest and disease control strategies. The robustness of the risk analysis depends on the available data both in the exporting and importing country. The accuracy of these data will depend on the level of and standards and systems of surveillance employed, the sensitivity of the diagnostic methods used by the appropriate authorities responsible for bee health policy and disease control. Furthermore, any bee or bee product import policies, which may include prohibition recommendations on honeybee imports, based on the apparent absence of a pest or pathogen needs be supported up by robust surveillance data. An important element of this is a standardized approach to both disease diagnosis and surveillance for pests and diseases. A diagnostic tool that CSL routinely uses for disease identification and surveillance is TaqMan real time PCR. This approach allows delivery of very rapid, comprehensive and large scale testing services for beekeepers or and in the case of survey work to regulatory bodies.

SENSE AND NECESSITY OF HARMONISATION OF DIAGNOSTIC METHODS

No 44

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In Germany, a federal state, the organisation of veterinary services is decentralised. The great advantage of the non centralised structure is, that a competent local authority involves veterinarians in diagnose and control of infectious diseases, directly. Especially, in cases of bee diseases or questions on bee keeping a bee specialist is assisting. To ensure correct diagnostics within a federal system, a high level of standardisation and harmonisation is quiet necessary. The National Reference Laboratories in the central national institute for animal health, Friedrich-Loeffler-Institut (FLI), ensure this level within Germany, especially in cases of notifiable diseases controlled on the basis of the German Animal Infectious Disease Law and special control programs. The National Reference Laboratories are setting diagnostic standards and prove their implementation regularly by ring tests. In Germany diagnostics (commercial diagnostic test kits) for the detection of animal infectious diseases have to be licensed by the national competent authority, the FLI.

Similarly, the harmonisation of national veterinary services has to be designed for the opportunities of the community trade in the European Union (EU) as well as for open international trade. There are established Community Reference Laboratories (CRL's) on the level of the EU and World Reference Laboratories (WRL's) on the level of the World Organisation for Animal Health (OIE). These laboratories ensure the implementation of harmonised test methods, the basis for animal health certificates and infectious disease control measures, to save the open trade with live animals and their products.

RISK OF INTRODUCTION OF DISEASES IN HONEY BEE PRODUCTS IMPORTED INTO NEW ZEALAND

No 46

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Introduction: In 2004, New Zealand's Ministry of Agriculture and Forestry completed an import risk analysis on honey bee products - honey, propolis, pollen, royal jelly, beeswax, bee venom.
Methods: The standard WTO risk analysis methodology, as agreed internationally by member countries of the OIE, was used. A broad range of viruses, bacteria, protozoa, fungi and parasitic insects was considered in the hazard identification process. For each disease agent, the epidemiology and the nature of the organism were considered in detail to assess the risk of introduction and the possibility of management of that risk through the application of safeguards. The draft risk analysis and the recommended safeguards were subjected to international expert peer review.
Results: The risk analysis concluded that the risk was non-negligible, and that safeguards were justified, for

- Paenibacillus larvae subsp. larvae, the cause of American foulbrood
- Melissococcus pluton, the cause of European foulbrood
- Braula coeca, the bee louse
- Aethina tumida, the small hive beetle
- Parasitic mites of the family Varroidae

Discussion: Application of the OIE risk analysis framework to devise science-based measures for trade is complicated by the lack critical data regarding individual organisms - in particular the level of contamination of products, the infectious dose, and the rate of inactivation by various processes. There is a strong need for further research.

POTENTIAL IMPACT OF DIRECTIVE 2004/28/EC ON HONEYBEE DISEASES MANAGEMENT

No 47

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The Review of the European legislation on veterinary medicinal products concluded on 30 April 2004 with the publication of Directive 2004/28/EC of the European Parliament and of the Council of 31 March 2004 amending Directive 2001/82/EC on the Community code relating to veterinary medicinal products, and Regulation (EC) No 726/2004 of the European Parliament and of the Council of 31 March 2004 laying down Community procedures for the authorisation and supervision of medicinal products for human and veterinary use and establishing a European Medicines Agency. The requirement that a veterinary medicinal product may only be dispensed after a veterinary prescription has been made out should, as a general principle, be extended to all medicinal products for food-producing animals. However, it should be possible to grant exemptions, where appropriate. Beekeepers have been so alarmed at the new legislation that lobbying for an exemption for honeybees has begun since this legislation could be disastrous for beekeeping, honey production and agricultural pollination in Europe. It will lead to an increase in treatment costs, encourage the use of unapproved products and result in the loss of bee colonies across Europe. Why Directive 2004/28/EC is bad for beekeeping? Veterinarians in most European countries have little knowledge or experience of honeybees. Will beekeepers take hives to veterinarians to obtain prescriptions, or call veterinarians to attend their apiaries? The involvement of any other agency in dispensing bee treatments will increase costs of treatment which in turn will encourage the use of unapproved and cheap alternatives that can be unreliable and even dangerous. Furthermore, existing approved honeybee treatments have been shown to offer no significant risk to humans. The need for prescriptions is therefore totally irrelevant. Anything that interferes with or inhibits honeybee treatment will be disastrous for the survival of bees, honey production and the pollination of agricultural crops and native flora. Comments on relevant aspects of Directive 2004/28/EC and veterinary medicinal products intended for honeybee diseases are given.

DEVELOPING NEW ZEALAND'S IMPORT CONDITIONS FOR HONEYBEE GENETIC MATERIAL AND HONEYBEE PRODUCTS

No 48

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From the 1950's until 2003, New Zealand's borders have been almost closed to honey bees, bee genetic material and bee products. The only form of genetic material allowed entry has been bee semen. Most of the honeybee products allowed entry have been highly processed, shelf-stable and sealed. There have been robust border controls to prevent unintentional and illegal importation of live honeybees, products and used beekeeping equipment. New Zealand is also fortunate that it is an island nation surrounded by the Pacific Ocean.
Because of tight import controls and geographical isolation, many of the diseases affecting honeybees in other countries have not yet been detected in New Zealand. As New Zealand honeybees play a major part in pollinating pasture and horticultural crops and the economy relies mainly on primary production, it is imperative that these honeybees maintain their high health status.
This paper discusses the process by which MAF modified New Zealand's import conditions to make decisions more transparent and risk-based in accordance with the OIE code and SPS Agreement. It highlights some of the dilemmas that arose as part of this process and some of the challenges which still exist if New Zealand wants to maintain freedom from many honeybee diseases.

THE IMPACT ON THE BEEKEEPING INDUSTRY OF A SUSPECT INCURSION OF VARROA DESTRUCTOR IN THE SOUTH ISLAND OF NEW ZEALAND

No 49

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Varroa destructor was first detected in the North Island of New Zealand on 11 April 2000. Over the subsequent four years, the infestation became widespread in the North Island. During this time, movement controls were maintained between the North Island and South Island of New Zealand and the South Island remained free of varroa.
In June 2004, the Ministry of Agriculture and Forestry (MAF) national reference laboratory detected two varroa mites on sticky board samples submitted from two areas of the South Island.
MAF instigated a full exotic disease incursion response for ten weeks, which involved extensive surveillance of over 15,500 hives in the two areas. During this period, no infestation was found and the investigation was closed. MAF concluded the varroa finds at Oxford and Murchison were the result of cross contamination, either from North Island surveillance samples or from equipment used in the testing process.
As no evidence of varroa infestation was found, the South Island continues to be regarded as varroa-free. The

movement controls between the North Island and South Island of New Zealand that have been maintained since the North Island outbreak of V. destructor in 2000 will be continued.
This paper considers the challenges that have arisen from the detection of the two mites and the subsequent impact on New Zealand's beekeeping industry.

THE SMALL HIVE BEETLE (AETHINA TUMIDA MURRAY): DIAGNOSIS, PREVENTION AND CONTROL OF A NEW HONEYBEE PEST

No 50

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The small hive beetle [SHB] is an African honeybee parasite, which recently became an invasive pest species in populations of European honeybee subspecies. In contrast to its native range, SHB can be harmful parasites of European bees, where they can reproduce even in strong colonies. Indirect diagnosis of SHB can be achieved via the characteristic smell of infested colonies and signs of SHB damage to colonies. Direct diagnosis is possible using eggs, larvae, pupae and adult SHB. A post mortem diagnosis of colonies is feasible via the traces of wandering larvae inside and outside of the hive, the remainders of destroyed colonies on the bottom board and screening of surrounding soil for SHB wandering larvae and pupae. Prevention of SHB includes sanitation in the honey house and in the apiary to prevent reproduction outside of colonies and keeping of strong colonies. Control approaches focus so far on acaricides and insectizides, bearing the potential risks of residues in the bee products and of pest resistance. A number of alternative control approaches using traps, modified hives or biological control agents will be discussed.

AN ECOLOGICAL EXAMINATION OF THE SMALL HIVE BEETLE (COLEOPTERA: NITIDULIDAE, AETHINA TUMIDA)

No 51

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Small hive beetles (Aethina tumida; Coleoptera, Nitidulidae) are native to sub-Saharan Africa where they exist as both scavengers and symbionts in colonies of African subspecies of western honeybees (Apis mellifera). The beetle is a scavenger in its native range, feeding on pollen, honey, and bee brood. In extreme circumstances, the beetle may act as a superorganismic parasite that destroys weakened or diseased hives, but this scenario is the exception rather than the rule. In Africa, beetle reproduction is maximized in bee colonies that abscond. In this instance, the beetle confers a positive benefit, disposing of weakened/diseased hives or abandoned nests that can harbor disease organisms. Having never been found outside sub-Saharan Africa, the beetle was recently discovered in the southeastern United States and in pockets of eastern Australia where it has proven deleterious to colonies of European subspecies of honeybee.
Honeybee colonies provide a wealth of resources for would-be symbionts but their behavioral repertoire (including a complicated confinement scheme, tightly guarded colonies, etc.) has proven insurmountable to most insects. Indeed, these factors make the occurrence of would-be symbionts comparatively rare in honeybee colonies. Among insect taxa, the sap beetle family Nitidulidae is predisposed to overcome the obstacles presented by a social bee group. As nitidulids, small hive beetles fill an ecological niche that other potential symbionts in honeybee colonies have been unable to exploit. The reason the beetle has penetrated this niche lies in its behavioral convergence with its host and suite of adaptations. An exploration of beetle ecology allows one to illuminate the unique symbiotic relationship it and its host share and understand how this relationship is fostered, place this relationship in context with that of other social insect symbionts, understand its natural reliance on honeybee colonies, and predict its spread and effect on other potential hosts outside its native range.

THE EPIDEMIOLOGY OF SLOW PARALYSIS VIRUS IN HONEYBEE COLONIES INFESTED BY VARROA DESTRUCTOR IN THE UK.

No 52

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Varroa destructor was first detected in the UK in early 1992. Studies of pathogen incidence in infested colonies showed that virus prevalence differed significantly from the results of previous long-term studies in uninfested colonies. In particular, in severely infested colonies, adult bees and brood were killed by slow paralysis virus (SPV), an infection which had never previously been known to cause mortality in the field.
In the subsequent studies reported here, detailed observations were made on a small number of infested colonies during a complete year. Adult bee and brood populations were assessed every 21 days, and 1% of the adult bees, 1% of the sealed brood, and fallen mites were sampled and analysed individually for SPV by ELISA. Thus, estimates of the proportion of adult bees and brood infested with mites and infected with virus could be made throughout the season. The results showed that SPV first appeared in those colonies with

the largest mite populations, and virus infection was most prevalent late in the season when multiple infestation of brood cells frequently occurred. Colony death often followed, although where virus infection declined, colonies could recover and overwinter successfully.
Laboratory studies have shown that adult bees die approximately 12 days after injection with SPV, whilst semi-field longevity studies have demonstrated that overwintering adult bees infected with SPV have their lives significantly shortened. Thus, since infected individuals are rapidly lost from the population, large numbers of mites are necessary to sustain virus transmission sufficient to cause a colony scale infection. SPV normally persists in the bee population as an inapparent infection, but overt infection may potentially reappear in any infested colonies left untreated.

VITAMIN E CONTENT IN BRAZILIAN POLLEN PELLETS – PRELIMINARY STUDY

No 53

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Pollen grains are the male reproductive cells, formed in the anthers of flowering plants for pollination purposes. Besides, pollen is collected by honeybees and it is the most important product of the hive, as it supplies all nutrients, such as proteins, lipids and minerals for the bee survival. Bee pollen is usually mixed with nectar or regurgitated honey so that it can be stuck together and adhered to the bees' hind legs. The nutritional value of the pollen collected by beekeepers depends on the drying process, temperature, storage and its botanical origin. It is usually used as a Health Food supplement for humans, as it is composed of proteins of highly biological value, carbohydrates, lipids, minerals, anti-oxidant vitamins (provitamin A, vitamin C and E), B complex vitamins and D vitamin. The present work has two main objectives. Firstly, to determine the value of vitamin E in fresh pollen pellets samples and secondly to evaluate the possible loss of this vitamin by the conventional drying process (40 – 42 °C). Samples were collected in the city of Pindamonhangaba, Brazil (Agência Paulista de Tecnologia dos Agronegócios) in 2004. In order to quantify vitamin E (alpha-tocoferol), the HPLC method described by PRESOTO et al. (2000), which uses silica column and fluorescence detection, was applied. The vitamin E values varied from 22.05 mg/kg to 33.09 mg/kg. The results showed that the conventional drying process does not decrease the vitamin E value.

*PRESOTO, A.E.F., et al. **Bolletino del Chimici Igienisti**. n.7, p.111-114, 2000
Thanks to Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for scholarship

10-HDA AS A CHEMICAL MARKER FOR PURE ROYAL JELLY AND ROYAL JELLY PRODUCTS

No 54

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The aim of this paper is to determine the 10-HDA (10-hydroxy-2-decenoic acid), in pure royal jelly samples and bee products containing royal jelly, using HPLC methodology. Royal jelly is the unique material product that has the 10-HDA, and this acid can be used as a chemical marker giving the authenticity and purity of royal jelly and also of the products that contain it. As material it was used pure royal jelly samples and honey added with royal jelly. The method used was based on the GARCIA-AMOEDO and ALMEIDA MURADIAN procedure (2003)* with the following chromatographic conditions: isocratic system, C18-H column, auto sampler, diode array UV/VIS detector (225 nm), methanol/water (45:55) as mobile phase, pH = 2.5 and alpha-naphtol as internal standard. The results obtained varied from 0% for pure honey to 2.37% for pure royal jelly.

*GARCIA-AMOEDO,L.H, ALMEIDA-MURADIAN,L.B. **Cienc. Tecnol. Aliment**. v.23, Supl., p. 62 - 65, 2003.
Thanks ara due to the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for scholarships

PROFICIENCY TESTING OF CHARM II TESTS FOR RESIDUE CONTROL OF HONEY

No 55

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An interlaboratory study was set up among 15 users of Charm II tests in order to validate the tests for the determination of sulphonamides (25 samples), (dihydro)streptomycin (17 samples), tetracyclines (19 samples) and chloramphenicol (13 samples) in honey. With the Charm II Sulfa Drug Test for Honey 2 positive samples (5.2 µg/kg sulfamethazine and 26 µg/kg sulfathiazole) were tested negative in one lab. A high percentage of false positive results (resp. 76.4% and 47.2%) were obtained for 2 samples and their duplicates.

With the Charm II Streptomycin Test for Honey 4 positive honeys (24.9 µg/kg, 27.9 µg/kg, 33.9 µg/kg and 34.7 µg/kg (dihydro)streptomycin)) were once reported as negative. The problem of false positive screening results was solved by reanalysing suspect positive samples using a C-8 extraction column.
Using the Charm II Tetracycline Test for Honey, 2 positive samples were tested negative: 3 resp. 38 µg/kg tetracycline was missed by 5 resp 1 lab(s). The number of false-positive results was very high (85 results out of 150 or 56.7%). Some labs even reported all negative honey samples as positive.
All labs using Charm II Amphenicols Test for honey reported the positive honey sample (153 ppb chloramphenicol or CAP) as positive. However due to this very high concentration, there was no real test for false negative results. The number of false-positive results was very high (66 results out of 132 or 50.0%).
When screening tetracyclines or CAP in honey with Charm II tests, the number of false positive results is unacceptable high. This problem is smaller for the Charm II Sulfa Drug Test (18.6% false positive results).
The authors would like to thank all ring trial participants.

VALIDATION OF THE TETRASENSOR HONEY FOR THE SCREENING OF TETRACYCLINES IN HONEY

No 56

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Regarding the European legislation, the use of antibiotics is not allowed in apiculture: no MRLs are fixed in honey. Discussions are going on in order to set action limits on European level. In Belgium action limits for residues of some antibiotics (e.g. tetracyclines) are fixed at 20 µg/kg.
The Tetrasensor Honey (Unisensor, Liège, BE) is a receptor-based assay using dipsticks for a rapid screening (30 minutes) of honey on the presence of tetracyclines. The intensity of the colour formation on the dipstick can be read visually or instrumentally. Since no special equipment is needed, even beekeepers or honey packers can easily perform the test.
The test was validated at DVK-CLO according to Commission Decision 2002/657/EC. The test detects in a specific and sensitive way tetracycline, oxytetracycline, chlortetracycline and doxycycline in honey. Depending on the type of tetracycline, a detection capability between 6 µg/kg and 12 µg/kg was obtained. When the dipstick becomes dry, the detection capability improves. When reading dry dipsticks, detection capabilities between 4 µg/kg and 7 µg/kg were obtained.
The test is rugged: no influence on the test capability was noticed by the geographical or botanical origin or by physical parameters (solid versus liquid) of the honey. Only limited matrix effects were encountered for a Spanish honeydew honey in which 9 ppb tetracycline was only detected when the dipstick was read dry. Small differences in test capability between 2 different batches of the test kit were also observed. Participation with the test in an international ring trial gave no false negative and no false positive results.
The Tetrasensor Honey is a simple and reliable screening test.

PRELIMINARY RESULTS OF CHEMICAL COMPOSITION IN HONEY BY NEAR-INFRARED SPECTROSCOPY

No 57

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Our Beekeeping Center researchs alternative treatments and genetic selection of tolerant bees for the control of varroa.
In 2003 a new research topic started to prove the feasibility in the use of near-infrared spectroscopy (NIRS) on the performance of calibration equations useful for determine honey quality, according to principal physical-chemical parameters.
The calibration equations were made up with 65 samples collected during 2003 and cross validation with 65 samples. All samples collected during 2003. The statistical results (R2 and SECV) are presented.
NIRS technique could be very important to the professional beekeeping sector because it´s an easy, fast and cheap technique that employs minimun chemical reactives and produces minimum residues.

PERFIL ANALITICO PARA EL CONTENIDO DE AZUCARES MAYORITARIOS EN MIELES TROPICALES COLOMBIANAS

No 58

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La miel es un alimento, elaborado por Apis mellifera y subespecies, a partir del néctar de las flores y de otras secreciones extraflorales de las plantas. Estos insectos liban, transportan, transforman y adicionan enzimas para finalmente deshidratar, concentran y almacenar en panales. La fracción de azúcares por lo general representan niveles que oscilan entre 95 al 99% de los sólidos totales, otorgándole a cada tipo de miel propiedades físicas entre las que vale mencionar el índice de refracción, actividad de agua (aw) e higrospicidad, su tendencia a la granulación y el poder rotatorio. Los azúcares mayoritarios corresponden a la

fructosa que puede alcanzar niveles hasta del 38% de una parte y glucosa de otra en proporción del 31%. La composición en azúcares es útil para valorar el grado de pureza de la miel.
En este trabajo se presentan los resultados del análisis por cromatografía líquida de alta eficiencia cosechadas en seis consociaciones biogeográficas correspondientes al bosque húmedo premontano (bh-PM), bosque muy húmedo premontano (bmh-PM), bosque seco y húmedo tropical (bs-T; bh-T) y las zonas de bosque seco y húmedo montano bajo (bs-MB; bh-MB).en el Departamento del Tolima. En las determinaciones se ha usado la técnica de estándar interno. Se caracterizó un total de 98 muestras. Se usó un modulo Watersœ™ LC Modulo 1 plus, acoplado con automuestreador y con detector de índice de refracción diferencial. El sistema se operó mediante software Millennium 2010 Chromatographic Manager. Se usó una columna 4 mm Nova-Pack" de fase esférica y de sílica enlazada con grupos aminopropilsilano, específica para la separación de carbohidratos. Las caracterizaciones se realizaron siguiendo la técnica de estándar interno, empleando lactosa como referencia.
En conjunto de muestras de miel de la zona tropical de Colombia, presentan diferencias significativas para el contenido de glucosa (Pvalor < 0.05), aspecto que induce variabilidad en los contenidos totales de azucares reductores y totales. La fracción azucarada oscila entre 89 y 92% de los sólidos totales observados. Los promedios para la fructosa en las muestras de (bs-MB) son mayores respecto de las de (bh-T). Mientras que se observa una contraposición en el caso de la glucosa, donde el promedio mas alto pertenece a las muestras de la zona cafetera (bmh-PM); la sacarosa presentó valores altos en las muestras de (bh-T) y (bs-T) respectivamente.

IMPROVING MASS SPECTROGRAPHIC CONFIRMATION OF ANTIBIOTIC CONTAMINATION IN HONEY USING CHARM HPLC RECEPTORGRAM

No 59

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Receptor and polyclonal based screening tests for detecting antibiotics in honey detect cumulative levels of family specific antibiotic compounds. Mass spectrographic confirmation detects specifically mapped compounds for quantification to MRPL. Positive screening test samples, initially confirmed negative by LC-MS, were confirmed LC-MS positive after new compound identification by HPLC-Receptorgram, a hybridization of HPLC sample fractionation and fraction testing with Charm II receptor assay.
A positive tested Charm II Sulfa Drug honey sample tested "sulfa drugs not detected" with EU accepted LC-MS confirmation for 12 sulfa drug compound library. The fractioned sample exhibited a Charm Receptorgram positive fraction correlating with sulfachlorpyridine, a sulfa drug compound not mapped by LC-MS. LC-MS verification of sulfachlorpyridine was confirmed with examination of LC elution time correlating with the Receptorgram identified compound.
Market honey samples tested positive by newly developed Charm II Macrolide method for MRPL of 10ppb tylosin displayed dual peak Receptorgram profiles. The minor peak correlated with tylosin A, and samples containing this peak confirmed LC-MS positive for tylosin. The second majority peak did not elute with known macrolide standards, erythromycin, tilmicosin, spiramycin, pirlimycin, lincomycin or clindimycin. Some positive screening samples had single Receptorgram peaks correlating only with this unknown compound and were "not detected" for LC-MS macrolide library (tylosin and erythromycin). Tylosin has minor components B, C and D. Tylosin B, an acidic pH de-glycosilated breakdown product of tylosin A with equivalent antibiotic activity, had Receptorgram elution profile corresponding to the unknown peak. LC-MS confirmed tylosin B at >100ppb after mapping tylosin B LC elution profile. MS-TOF confirmed tylosin B from Receptorgram isolated and concentrated fractions. Tylosin B was the major macrolide component antibiotic found in tylosin contaminated honey.
LC-MS library for confirmation of positive screened honey was enhanced with Receptorgram profile of LC-MS "unconfirmed" screening test "positive" samples.

COUPLING OF LIQUID CHROMATOGRAPHY WITH CARBON STABLE ISOTOPE RATIO MASS SPECTROMETRY (LC-IRMS) – A PROMISING NEW TECHNIQUE FOR DETECTION OF SUGAR ADULTERATION OF HONEY

No 60

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Honey is valued by consumers expecting to buy a foodstuff of natural origin and genuine purity. However, due to rather high costs of honey production in comparison to narrow margins of profit achieved and high consumer demand, especially in Europe, honey has always been, and still is, subject to sugar adulteration attempts using cheap sugars to maximise profits. In the beginning, sugar adulterations were of a simple nature and thus detected rather easily, e.g. by analysing the sugar composition (fructose/glucose ratio) and quality parameters such as diastase and hydroxymethylfurfural. Later on, sugar syrups emerged that imitated the natural sugar profile of honey quite well, thus making it more difficult to detect sugar adulterations. At about the same time a new analysis method called Carbon Stable Isotope Ratio Mass Spectrometry (13C/12C-IRMS) has for the first time been successfully applied to prove adulteration with cheap corn or maize syrups. As the analytical methods gradually got more and more sophisticated, the

adulteration methods did so as well. The current state-of-the-art method for detection of so-called C4 sugars (e.g. maize or corn sugars) in honey is "AOAC 998.12". This method uses the isolated protein in honey as an internal standard because it is not influenced by sugar addition. Both protein and bulk honey are subsequently analysed by 13C/12C-IRMS and their isotope ratios are compared. If the 13C/12C isotope ratio value of the bulk honey is > 1 ‰ more positive than that of the protein, this is proof of the fact that C4 sugars were added to the honey. Unfortunately, this method does not allow to interpret results in which the 13C/12C isotope ratio value of the protein is more positive than that of the bulk honey. Presumably, in this case there may also be other adulterations such as e.g. beet sugar addition or protein manipulation. Therefore, a new and sensitive method for the detection of sugar adulterations other than C4 sugars has become necessary. Recently, a new interface has been developed allowing the coupling of liquid chromatography with 13C/12C-IRMS. The principle of this LC-IRMS technique is going to be discussed using practical examples to show its usefulness for honey authenticity testing.

IDENTIFICATION AND DETERMINATION OF TYLOSIN AND ERYTHROMYCIN AND THEIR METABOLITES IN HONEY USING IONTRAP LC-MS/MS

No 61

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The analysis for macrolides forms part of the routine testing of honey for antibiotics. Confirmed positive results are as yet available for tylosin and erythromycin. Macrolides are relatively unstable and form corresponding metabolites. According to the European Pharmacopoeia Tylosin consists of the metabolites tylosin A (main component), tylosin B, tylosin C, and tylosin D. Erythromycin consists of the metabolites erythromycin A, erythromycin B, and erythromycin C, which at the same time represent its main components. This metabolisation is also taken into account in Annex I of the Directive VO 2377/90. Tylosin is being detected by means of the marker residue tylosin A, and erythromycin is being detected by means of the marker residue erythromycin A.
Due to their molecular structure, both tylosin A and erythromycin A are relatively unstable in honey. Using Iontrap LC-MS/MS it is possible to identify the metabolites of tylosin A and erythromycin A in honey. Depending on the pH of honey, they do form metabolites or completely convert into their metabolites, respectively:
Tylosin A forms the metabolite tylosin B at a pH < 4, with a complete conversion from tylosin A into tylosin B not being observed and with variations in the ratio between these two being detected subject to the given pH of the honey that is being tested.
Erythromycin A, however, forms not clearly identifiable metabolites in honey already after a short period of residence (approx. 2 hours subject to the given pH), with an almost complete conversion taking place. Only in the case of high concentrations (> 50 µg/kg) of the active substance erythromycin the marker residue erythromycin A can be actually detected.
To know the metabolism of macrolides in honey as well as to identify and to determine their metabolites are important features of a tool indicating the usage of drugs which are forbidden for beekeeping.

MAIN SUGAR COMPOSITION OF BRAZILIAN MELIPONINEA HONEY – PRELIMINARY STUDY

No 62

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Beekeeping with stingless bees (meliponiculture) is practiced in Brazil although the more widespread is beekeeping with honeybees belonging to the genus Apis.. The Meliponinea honey is quite different from the honey produced by the bees of genus Apis, and there is little information about its chemical composition, both in the national and international literature. The handling of these bees is also different from the one praticed for European bees. The increasing Meliponinea honey production and the possibility of commercialization both in the national and international markets, indicate the need to establish the chemical composition of this product. The objective of this work is to analyse the three most important sugars in Meliponinea honey samples collected in the Amazon region of Brazil. Sample 1 is from Meloponina compressipes manaoense bee (jupará honey), samples 2 and 3 were from Meliponina seminigra merribae bee (jandaira honey). For the analysis of glucose, fructose and sucrose the HPLC method based on the procedure described by BOGDANOV et al (1997)* was used. The content of glucose (mean) were: 28.59% (sample 1), 29.50% (sample 2) and 29.80% (sample 3); for fructose were 32.04% (sample 1), 31.95% (sample 2) and 31.73% (sample 3); for sucrose were 0.21% (sample 1), 0.18% (sample 2), 0.18% (sample 3). Fructose and glucose account for more than 60% of sugar content in the analysed samples. Fructose content is higher than glucose, similarly to Apis honey, while sucrose content is lower than those observed for Apis honey.
* BOGDANOV et al. **Apidologie**, extra issue, p.42-47, 1997.
* BOGDANOV et al. **Apidologie**, extra issue, p. 42-44, 1997.

BEHAVIOR DIVERSITY OF *APIS FLOREA* AND *APIS ANDRENIFORMIS:* TEMPERATURE CONTROLS BY FANNING AND RAIN PROOFS BEHAVIOR

No 247

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Apis florea and Apis andreniformis construct a single comb in on a twig exposed to sun in summer and rain in rainy seasons. In this study, temperature controls and rain proofs behaviors of A. florea; and A. andreniformis were observed in northern parts of Thailand. When the nest directly exposed to the sunlight, curtain formation bees of A. florea were fanned, deformed and took a short flight to reduce brood temperature. Subsequently, A. andreniformis, fanned but did not deform, formed a tail like structure from the bottom of the nest. During the rainy time, all the curtain formation bees of A. florea came up on the dancing floor and formed an umbrella shaped by spread wings up on wings and formed a roof of waterproof jacket to protect the nest from rain. In case of A. andreniformis, curtain formation bees oriented their heads upwards and rest compactly against the brood cells and spread the wing in_ _-shaped, so that one wing can overlay another wing of curtain formation bees. In both species, the honey cells sizes are double than the brood cells serve as a roof of nest.
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BIODIVERSITY OF HONEYBEES (APIS CERANA) IN CHINA

No 64

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There is a profound lack of information on many aspects necessary to improve beekeeping and breeding of honeybees (Apis cerana) in China. This paper contributes aspect on genetic structure of honeybees (Apis cerana) populations.
Honeybees (Apis cerana) were collected from seventy-nine sites in China with an altitudinal range from 7m to 3300m, a geography rang of E92° to E134°, N18° to N52°. Both mtDNA variations and morphological characteristics were studied.
Polymorphisms in the mitochondrial DNA COI-COII intergenic region were determined by PCR. 3 haplotype length variants were found and 30 haplotype patterns were documented by sequencing. In general the COI-COII intergenic region of Chinese Apis cerana are longer than philippine's. All these haplotypes are not previously described.
40 morphological characteristics were analysed and data is under analysis.

GENETIC STATUS OF HONEYBEES (APIS MELLIFERAL.) IN COLOMBIA TODAY

No 65

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Allozyme and mitochondrial DNA analyses were conducted on adult workers of thirty-one Apis mellifera colonies from five different Colombian localities. A high frequency of the Mdh-1 F variant was observed in the analyzed samples (85 to 96%), with the exception of Boyacá, where a marked increase in the variant M frequency was found (68%). The Cytochrome b mtDNA analysis revealed that Apis mellifera populations of Colombia are constituted mostly of the African pattern (97%). Three COI-COII intergenic region haplotypes were found, corresponding to A1, A4 and C1 patterns previously reported; a fourth haplotype possibly corresponds to an as yet undescribed pattern. Our results indicate a strong introgression of the "African" genes into the Colombian populations, very similar to what is seen in northern Brazilian honeybees.

ANALYSE DES RESULTATS DE RECHERCHE SUR LES CARACTERES BIOMETRIQUES DE L'ABEILLE TELLIENNE APIS MELLIFICA INTERMISSA PEUPLANT LE NORD DE L'ALGERIE.

No 66

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Suite à l'introduction de races d'abeilles originaires d'Europe surtout de France et d'Italie afin d'augmenter les rendements des produits de la ruche Le but escompté par les apiculteurs n'a pas été atteint car ces races introduites n'ont pu survivre aux conditions du milieu du nord de l'Algérie .En même temps ,les spécialistes on constaté un autre problème qui a surgi lors de ces importations de races d'abeilles ;c'est la pollution du bagage génétique de l'abeille locale Apis mellifica intermissa par les croisements des hybrides étrangers. La Tellienne ,connue par ses grandes qualités (Rusticité, productivité ,grande pollinisatrice etc.) a tendance à ne plus répondre aux critères économiques .L'étude des caractères biométriques de l'abeille locale qui peuple le Maghreb en général et l'Algérie en particulier, appelée communément ''la Tellienne'' ont infirmé ces constatations sur terrain et confirmé que quelque soit l'intensité des introductions frauduleuses de reines étrangères l'abeille locale a toujours gardé ses caractères originaux. L'étude a été réalisée sur su plus de 5,000 abeilles récoltées au niveau de tous les écosystèmes du nord algérien.

THE INFLUENCE OF SMALL-CELL BROOD COMBS ON THE MORPHOMETRY OF HONEYBEES (APIS MELLIFERA L.)

No 67

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The advent of moveable hive frames and artificial comb foundation in the second half of the nineteenth century enabled changes to be made in the size of the brood cells in which honeybees were raised. The trend in agriculture in this period was towards breeding larger livestock and a similar trend in apiculture resulted in a general increase in the cell diameter of colonies of Apis mellifera mellifera bees from circa 5.0 mm to circa 5.5 mm by the 1920s. This period also coincided with the outbreak of the condition in Britain and Ireland known as the 'Isle of Wight' or acarine disease that devastated honeybee colonies.
We investigated the ability of Apis m. m. colonies to draw out foundation and raise brood in the comb sizes (5.0 mm) of the mid nineteenth century and evaluated the resulting changes in honeybee morphometry. Three colonies of honeybees were raised in hives where the brood nests were made up of both standard and small-sized brood cells. The changes in key physical dimensions of the bees due to the reduced cell sizes were analysed.
The paper describes how the bees, that were predominately of the strain Apis mellifera mellifera, had no apparent difficulty in drawing out the small-cell combs and details the small, but significant reductions in the resulting physical dimensions of the bees. Proportionality did not exist, with the change in the physical dimensions of the bees being much less (~ 20%) than the change in cell size. The possible implications for honeybee mite infestation, honey production and the use of old brood combs are considered.

COMPARATIVE STUDIES BETWEEN MORPHOMETRICAL CHARACTERS OF SOME RACES AND HYBRIDS OF HONEYBEE COMIN ASSIUT REGION, UPPER EGYPT"

No 68

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The Carniolan race characteristics of workers were better. The Carniolan workers had significantly the longest organs in all morphometrical characters measurements except for in case of dry body weight (mg) where, Italian hybrid was the highest weight; body water content (%) where, Carniolan hybrid was the highest value and proboscis length (mm) where, Caucasian hybrid was the longest. The maximum distance between the two first wax mirrors (mm) was found in Egyptian race, and maximum sting shaft length (mm) was noticed in Italian hybrid. On the other hand, the Egyptian workers were with significantly the shortest measurements, in general. The Egyptian queens had significantly the shortest morphometrical characters measurements, except in case of: cubital index, and number of hamuli. Insignificant differences were noticed between the other tested hybrids and races. The Carniolan hybrid queens, the Carniolan race, the Caucasian hybrid and the Italian hybrid followed descendingly in the measurements of most organs. The Egyptian drones had significantly the shortest organs in all morphometrical characters measurements except for in case of number of hamuli where, insignificant differences was noticed between the tested hybrids and races. The Carniolan race drones, the Carniolan hybrid, the Italian hybrid and the Caucasian hybrid followed descendingly in the measurements of most organs. For workers egg length (mm), the Carniolan race was the longest. On the other hand, Egyptian race was the shortest. While in case of egg width (mm), the Egyptian and the Carniolan races were the highest values. In

contrast, Italian hybrid was the lowest value. Fifty four morphological characters were used for evaluation, or scoring method for tested hybrids and races. Total scores and (ranking order) of morphometrical characters were: 86 (1), 140 (2), 151 (3), 180 (4) and 247 (5), in Carniolan race, Carniolan hybrid, Caucasian hybrid, Italian hybrid and Egyptian race, respectively.

BIOMETRICAL STUDIES ON SOME RACES AND HYBRIDS OF HONEYBEE IN ASSIUT REGION, UPPER EGYPT

No 69

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The descending order of the tested races and hybrids of honeybee, during 2000-2003, in Assiut region according to the mean workers sealed brood area (in sq. inch/colony) was as follows: Italian hybrid, Carniolan race, Caucasian hybrid, Carniolan hybrid and Egyptian race; the mean drones sealed brood area (in sq. inch/colony) was as follows: Carniolan race, Carniolan hybrid, Egyptian race, Caucasian hybrid and Italian hybrid; he mean colony population was as follows: Italian hybrid, Carniolan race, Caucasian hybrid, Carniolan hybrid and Egyptian race, the mean number of unsealed and sealed queen cells and drawing out wax foundation (sq. inch/colony) were as follows: Egyptian race, Carniolan race, Carniolan hybrid, Caucasian hybrid and Italian hybrid; he mean surplus honey (in sq. inch/colony) and honey yield (kg/colony) were as follows: Carniolan hybrid, Caucasian hybrid, Carniolan race, Italian hybrid and Egyptian race; he mean pollen stored (in sq. inch/colony) was as follows: Italian hybrid, Carniolan hybrid, Caucasian hybrid, Carniolan race and Egyptian race; the mean honey-sac weight (mg/bee) was as follows: Carniolan race, Italian hybrid, Carniolan hybrid, Caucasian hybrid and Egyptian race; the mean T.S.S. (%) of honey-sac contents was as follows: Egyptian race, Italian hybrid, Caucasian hybrid, Carniolan hybrid and Carniolan race; the mean pollen loads weight (mg/bee) weighted all over the different seasons was as follows: Caucasian hybrid, Carniolan hybrid, Carniolan race, Italian hybrid and Egyptian race. The descending order for tested races and hybrids was: Carniolan race, Carniolan hybrid, Italian hybrid = Caucasian hybrid and finally, Egyptian race.

HONEYBEE (APIS MELLIFERA) RACES, ECOYYPES AND THEIR GENERAL CHARECTERISCTISC OF TURKEY

No 70

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Turkey with its broad geography, topography, rich flora and different ecological characteristics is one of the most suitable regions and is highly rich country with its gen resource for honeybees (Adam, 1983). Archaeological studies showed that honeybees culture in Anatolia have practised since 7000 BC (Crane, 1983).
The present honeybees population show a great genetic variation and this variation provides some advantages to improve the present and future honeybee culture in Turkey. The studies carried out before the development of migratory beekeeping on the identification of the Anatolian honeybee population showed that the honeybee population could be a valuable genetic potential for breeding and also preservation (Bodenheimer, 1941). Since these initial studies, many research have been carried out to identify races, ecotypes, morphological, physiological and behavioural characteristics of honeybees inhabited in Turkey (Do_aro_lu, 1981; Ruttner, 1988; Kaftano_lu et al., 1993; Güler, 1995; Gençer, 1996; Dülger, 1997 and Akyol, 1998).
According to the behavioural and ecological data of Ruttner (1988), there are three different honeybee races in Turkey; Apis mellifera anatoliaca is spread around Thrace, Aegean, Mid Anatolia and seashore of Mediterranean regions, Apis mellifera caucasica is colonised around Northeast Anatolia and seashore of east Blacksea, while Apis mellifera meda is mostly distributed around the Southeast Anatolia. Additionally, ecotypes of Apis mellifera antoliaca, East Aegean Island Bees (Apis mellifera adami) spread, mainly in different Aegean Islands Gökçeada, Mu_la Bee is distributed around the West Mediterranean and Aegean Regions of Turkey and Thrace Bee is located around the European side of Anatolia.

A STUDY OF COMPARISON OF DIFFERENT BEE GENOTYPES IN THE HATAY REGION WITH RESPECT TO THEIR PHYSIOLOGICAL CHARACTERISTICS

No 71

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This research conducted to compare physiological characteristics of different honeybee genotypes as Mu_la (Apis mellifera anatoliaca), Italian (Apis mellifera ligustica) and Carniolan (Apis mellifera carnica) in Hatay region. Total of 36 cell builders were used during the experiment. Survival rates were determined according to, Akyol, 1998; Gençer, 1996; Gözenler, 2000; Güler, 1995; Dülger, 1997. Numbers of frame with covered bee, brood area, and weight change in the experimental colonies were determined as described by Akyol, 1998; Genç, 1990;Dodolo_lu, 2000; Fresnaye and Lensky, 1961. Samples were taken for measurement once every

two weeks. Brood areas were established by Puchta methods (Fresnaye and Lensky, 1961). SPSS 9.05 windows of version statistical software analyzed all data and the DUNCAN multiple comparison tests were used the comparison of the means (Bek and Efe, 1988).
With respect to survival rates and the number of frame covered with bees, Carniolan (Apis mellifera carnica) and Italian (Apis mellifera ligustica) bee genotypes were better than Mu_la (Apis mellifera anatolica) bees. It was found out that three was no difference between genotypes in respect to the colony weights and brood areas (P>0.05). Survival rates in Carniolan and Italian bee genotypes at the present study were similar to previous findings (Do_aro_lu, 1981; Kaftano_lu et al, 1993; Güler, 1995; Akyol, 1998) also Mu_la bee genotype was lower than previous studies (Akyol, 1998; Do_aro_lu, 1981;Güler, 1995;Budak, 1992). Average brood areas in Mu_la bee genotype in our study were higher than previous findings (Do_aro_lu et al, 1992; Budak, 1992; Güler, 1995). Wintering abilities in all genotypes did not differ from former study (Akyol, 1998).

COMPARISON OF THE PERFORMANCES OF IMPORTANT HONEYBEE (*APIS MELLIFERA* L.) RACES AND ECOTYPES IN DIFFERENT REGIONS OF TURKEY

No 72

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In this research, peformance tests of important honeybee races and ecotypes between North (Thrace) and South (Cukurova) regions of Turkey have been compared. Colony livability, adult bee population, brood production, swarming tendency, flying activity, aggresiveness and honey production have been evaluated.
In Thrace region, the differences among the Anatolian, Caucasian, Thrace and Mugla races and ecotypes have not been found significant (P>0,05) according to the livability where as the same groups have exhibited significant differences (P<0,01 in Cukurova Region. In Thrace, races and ecotypes have indicated higher performance (P<0,01) for adult bee population and brood production fllowed by Mugla, Thrace, Caucasian and Anatolian, respectively. In Cukurova conditions, the differences among groups according to adult bee population have been found important (P<0,01). Mugla ecotype has indicated higher performance (P<0,01) than all the groups in brood production whereas Anatolian was higher than Thrace (P<0,05) and Caucasian (P<0,01). Thrace was higher (P<0,05) than Caucasian.
In terms of swarm tendency, no significant difference (P>0,05) has been observed between the races and ecotypes in the conditions of Thrace and Cukurova. According to flying activity and aggresiveness the difference between races and ecotypes were not significant (P>0,05) in Thrace conditions where as differences were important (P<0,01) in Cukurova conditions. In Thrace Region conditions, average honey production of Caucasian, Anatolian, Mugla and Thrace races and ecotypes were 29,971 ± 7,797; 24,857± 8,545; 23,171 ± 7,721 and 19,529 ± 4,067, respectively. On the other hand, in Cukurova conditions, average honey productions of groups were 20,544 ± 1,386; 24,670 ± 3,353; 34,862 ± 3,576 and 17,381 ± 2,852, respectively. Caucasian ecotype in Thrace conditions and Mugla ecotypes in Cukurova conditions have yielded the highest honey production.

IMPACT OF TRANSGENE PRODUCTS ON HONEYBEE LARVAE

No 73

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In order to assess the impact that transgenic plants pose on larvae of the honeybee, Apis mellifera, several aspects of bee life history are important: (a) information on pollen consumption is needed as this is the only direct route of exposure of toxins expressed by transgenic plants, (b) the effects of transgene products on development of the hypopharyngeal gland of adult worker bees have to be assessed because they are producing the jelly necessary for rearing of the brood and (c) this jelly has to be checked for the presence of transgene products which may be passed on to the larvae.
We conducted experiments in which small queenright colonies of about 1,000 bees were kept in field cages (8m x 14m) containing only flowering maize plants. Fully grown worker larvae that were fed no other than maize pollen were dissected and the number of maize pollen grains counted. We could show that honeybee larvae ingested only about 2mg of maize pollen, indicating that protein provided directly to the larvae via pollen contributes less than 5% of the protein required for larval development.
The effects on the hypopharyngeal gland experiments were tested in small cages in a climate cabinet. Freshly emerged worker bees were added to small experimental hives, containing about 200 workers and a queen. Bees were exposed to Bt-maize pollen (event MON 810), Bt-toxin (Cry1Ab, 0.0015%) and to a Protease inhibitor (Soybean Kunitz trypsin inhibitor, SBTI) at 0.1% and 1% concentration. While the Bt treatments had no effect, the SBTI treatments significantly reduced the size of the hypopharyngeal gland of adult worker bees. ELISA tests did not detect any Cry1Ab Bt-toxin in the hypopharyngeal glands in the Bt pollen treatment while traces (close to the quantification level) were found in the Bt toxin

treatment. These results are of high significance to conduct realistic bioassays especially for honeybee larvae.

BEE BREEDING AND SELECTION IN UKRAINE

No 74

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Ukraine breeding and selection of three bee breeds – Ukrainian Steppe, Carpathian and Poliska. Ukrainian steppe bee breed was formed in Steppe and Forest-Steppe zones of Ukraine. They are characterized by high winter hardiness and are able to endure long-term period without flight. They effectively use the food stores during the winter period. The prolificacy of queens in the period of the most intensive development is 1,100-1,800 and sometimes even to 2,500 eggs per day. The selective work is directed at reproduction, use and extending of thoroughbred and high-quality material. The result of this work will allow to develop selective bee stock work with Ukrainian steppe bees, to raise genetically new types, to organize bee stock beehives-reproducers in different regions of Ukraine. The Department of Selection and Reproduction of Carpathian bees (P.I.Prokopovich Beekeeping Institute) is situated in the town of Mukachevo, Zakarpatska oblast. In conditions of high Carpathian Mountains bee breeding of local ecotype is being finished. Their morphological qualities are different from the known lines. The Department works on creation of thoroughbred, high-productive Carpathian bees. Mountainous relief allows to create isolated areas for complex of programs on selection and reproduction of thorough-bred half-stud types of Carpathian bees in closed micropopulation. The problem of breeding of Poliska stocks in an area divided into is investigated.

BEEKEEPING IN URUGUAY, OPPORTUNITIES FOR FUTURE DEVELOPMENT IN THE INTERNATIONAL HONEY MARKET.

No 75

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The objective of the present work is to determine, characterise and evaluate the present situation, opportunities for future developments of beekeeping in Uruguay, and how to improve the position of the country in the international honey market.
This study is based on data from government publications and the results from researches published in the last years in Uruguay and in the world.

Uruguay is located between the 30th and 35th parallels, and has subtropical weather with natural conditions for the development of beekeeping. Uruguay borders on the Northwest with Brazil, and on the west with Argentina. Beekeeping was first introduced in 1834 but it was only in the second half of the 20th century that it has developed significantly.
Eventhough Uruguay has only 3,440,205 people and an area of 173,215 km2, it was in the top 15 countries of honey exporters in the world as shown in the statistics published by FAOSTAT in 2003. In 2004 the total exports of honey were 13,600 ton with a value of U$ 29.7 million dollars, 77 % to the European Union and 23 % to the EEUU.
This work analyses the main factors and characteristics of beekeeping in Uruguay that made the country reach a position in the international honey market either in quantity but also in quality.
The strengths, weakness and opportunities for the Uruguayan beekeeping and its position in the international trade of honey are studied.
Finally different proposals to increase the beekeeping economy and consolidate the position of Uruguay in the international honey market are presented.

ADVANCING CHINESE APICULTURE

No 76

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China, an ancient and civilized nation, boasts a long history and valuable experience in apiculture. Nowadays, china has become the largest country in apiculture in the world. It has already held approximately 7 million colonies of domestic bees. And the output of honey is 200,000 tons, royal jelly is 2,500 tons, bees pollen 3,000 tons, and 400 tons propolis per year. The 7 million colonies of bees have devoted the indelible contribution to increasing output and improving product quality of the major farm crops, trees of an economic value and grasses by pollination.
Nevertheless, due to tie the tradition small skill agriculture economy and some other reasons, there is some disparity in apiculture between China and the developed country in the world. Specially in 2002, European Union ban to import Chinese honey because of the traces of chloramphenicol in honey, it is projected that beekeeping do has the certain problem in the developing process, especially in the bee products quality security. Therefore, Chinese government pay more attention to it and held "the national apicultural development symposium", and formulated and promulgates beekeeping production regulation, bee products production standard, the criterion of using drug, the remnant medicine monitoring in order to healthily develop Chinese apiculture. At the same time,

Apicultural Science Association of China(ASAC) takes "the small scale, the big community" as the strategy guiding ideology, makes the "main enterprise + beekeepers households (Union of beekeeper/federation of communes/Cooperative society)" as the way to sets up" Bee Products Security and the Standardization Production Base ". and carries on training according to the international standard request. Recently, the trained beekeepers are aware that: first of all, beekeeping must have a good production environment without pollution; Secondly, not to use the bee drug or reasonably uses the bee drug in regulation; furthermore, a good faith production record should be written so as to trace the source; finally, beekeeper must have good training frequently. In brief, beekeeper must aware that bee products should be "original ecotype" that means pure nature.
With the joint efforts of everyone of all apiculture, it is possible that china shout not only be a large country but also a powerful country in the world apiculture. We believe that the honey industry will be more "honey"!

A RESEARCH ON DETERMINATION OF THE TECHNICAL AND STRUCTURAL CHARACTERISTICS OF BEEKEPING IN TURKEY

No 77

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Turkey has enormous beekeeping potential with over four million bee colonies and diverse floral ecotypes (Sahinler et al., 2003). In terms of honey production, Turkey has been ranked fourth in the world, with 60 190 t produced in 2002 (Anonymous, 2002).
In this study, the structural situations of beekeeping were investigated by surveying to migratory and stationary 320 beekeepers (200 stationary + 120 migratory) that have15,698 hives in 10 district and 68 villages of Konya province where has the largest geographic place of Turkey.
At the end of study, it was determined in average that the age of beekeepers involved in survey was 46.18 years, their experience in beekeeping was 14.40 years, the number of the old type hive was 3.75 per beekeeper, the number of the new type was 45.30 per beekeeper, and honey yield per hive was found as 21.08 kg per colony.
It was determined that migratory beekeepers were professional ones who see beekeeping as the main job and major income provider. The migratory beekeepers were more educated, careful and experienced than stationary beekeepers in usage of high quality queen bee, queen bee production with Doolittle (larvae transfer) method, the time of queen bee usage in breeding, evaluation of nectar flow period, being aware of bee diseases and parasites, medication methods and wintering. All beekeepers' applications of spring feeding in their colonies were also determined.

Key Words: The Beekeeping in Province the Konya, Bee Diseases And Parasites, beekeeping applications.

HOW TO INCREASE THE YIELDS OF PROPOLIS PRODUCTION USING TOP-BAR HIVES

No 78

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Propolis is a natural resin produced by bees and used widely in folk medicines. Bees use it is sealing cracks or unnecessary openings in the hive, covering of any foreign object as well as an antiseptic.
In 2004 I therefore decided to carry out an experiment to find out how beekeepers can increase the production of this valuable product propolis using the top-bar hives.
The hives were put into two categories. In the first category were hives that had small entrance holes, no cracks, no space within the top-bars and propolis harvesting was not frequently done.
The second category contained top-bar hives that had cracks and large entrance holes, a lot of space within the top-bars, no lids and harvesting of propolis was frequently done.

Observation

In the first category very little propolis was harvested as compared to the second. The lids on the hives did not encourage the bees to produce propolis because it was already sheltered from weather. Very little of the product was formed between the bars and the entrance holes due to limited space.
However, it was observed that in the second category more propolis was harvested than in the first group of hives and spaces within the top-bars were sealed with propolis. This shows that bees have a tendency of sealing the cracks and gaps within the hive with propolis once spaces have been opened. This enables the beekeeper to harvest the product as many times as possible because the bees continuously keep on closing the opened spaces as well reducing the size of the entrance hole with this product.
The knowledge of trees that are known to be used by bees in making propolis is vitally important, this will assist the farmer to plant as many trees as possible around the apiary in an effort to reduce the time taken by bees in visiting similar trees very far away from the hive.

Conclusion

To increase the yields of propolis in beekeeping systems that employ top–bar hives it is very important to have hives that have enough openings.
That is large entrance holes, cracks and reasonable space between the top-bars. Once these empty spaces have been sealed with propolis harvesting should be frequently done because this stimulates bees to produce more of this product. The knowledge of trees known to be used by bees also plays a vital role in the production propolis as was observed.

BEEKEEPING IN NORTHEAST OF BRAZIL AND ITS DEVELOPMENT:THE BIG CHALLENGE REPRESENTED BY EXPLOITATION OF THE AFRICANIZED HONEYBEES (AHB).

No 79

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The introduction of the African honeybee Apis mellifera scutellata into Brazil in 1956 is considered today the most important event responsible for the expressive development of the beekeeping activities and huge increase in honey production in this country since its beginnings in 1839. At the beginning the African bee caused a serious concern due to several accidents and the complete absence of information about its biology and methods of control. This bee crossed with the European ones (ligustica, mellifera etc) previously introduced into the country and gave rise to the Africanized honey bees (AHB). The several accidents in the sixties greatly concerned and alarmed the public for many years. Today the AHB is the only bee found in the nature in Brazil and today beekeeping has changed considerably. Thanks to the scientific and technical support of researchers, technicians and beekeepers the biology of this bee is now better understood and the technologies to handle the AHB was improved a lot of. Today there is no need to import beekeeping equipment. The Brazilian honey production before 1956 was about 5.000 tons/year and today is more than 50.000 tons/year. The AHB became resistant to the mite parasite Varroa destructor. The most important honey producer region of Brazil was the South. In 2001 Brazil exported about 2,5 thousand tons of honey and the South region of Brazil (Rio Grande do Sul, Santa Catarina and Paraná states) was responsible for about 78% of the honey exported. The Northeast region was responsible for less than 10%). In 2004 Brazil exported more than 24 thousand tons of honey, specially organic honey, and the Northeast region of Brazil (with native vegetation: Caatinga, Cerrado etc.) was responsible for more than 30% of the honey exported (produced mainly by Piaui and Ceara states).However, beekeeping in that region is still disorganized and the beekeepers need technical support They lose yearly about 40% of their AHB colonies due to swarming and absconding behavior. Undoubtedly, the investment in beekeeping in northeast of Brazil is a very important challenge which can transform that region in the most important honey producing region of the world.

THE STANDARDIZATION BUILDING OF BEEKEEPING INDUSTRY IN CHINA

No 81

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China is the greatest country in the world in apiculture and production of bee products, which plays an important role in international beekeeping industry. For the sake of furthermore developing beekeeping industry in China and promoting exchange in international apiculture technical, the strengthening the standardization building of beekeeping industry is very important.
In near decades the standardization work of national beekeeping industry set highly store by China government, which is strengthened in the management of the standardization work studying and fund. Many standards have being issued, including the standards of apiculture technical, bee products and testing methods and so on, which are bringing into active play in driving the modernization of beekeeping industry in China .
The standard system on apiculture as other agriculture products in China is made of the standards of four kinds, called nationality-standard, ministry(trade)-standard, region-standard and corporation-standard. The pioneer technical criterion on apiculture in China was issued in 1930s. After time comes into 1990s, new serious standards on apiculture have being continuously issued along with the strengthening of work of standardization in China. Up to now, early and late, there have been about 60 nationality or ministry (trade) standards on apiculture issued, including the standards of beekeeping technical, the standards of bee products such as honey, royal jelly, bee pollen and propolis, the standards of sanitation and the standards of testing methods such as medication remain in honey and royal jelly, otherwise there still are some region-standards issued. These standards make of a framework of the standards system on beekeeping industry in China.
But making the standardization work of beekeeping industry perfect there still is a long way to go. Many work must be made, such as perfecting the standards of all kinds of bee products, strengthening the study of standardization and international information communion, optimizing the construction of standards and so on.
The standardization of beekeeping industry is an important part in food safety to government. In China the establishing nationality or ministry (trade) standards are brought into national finance plan, the found used as establishing standards is supported by the government. In organization management generally each standard is put forward and organized by correspond technical department. Recently a standardization technical committee of the agriculture products are going to come into existence by the leader of national standardization committee in China, which will play an important role in putting forward standards plan, examining and approving standards, making communion with international standardization organization. The standardization committee of the apiculture will be a embranchment which belongs to livestock product one, its secretariat would be set up in National Animal Husbandry &

Veterinary Service Ministry of Agriculture.
Along with the developing of modernization, our antiquity beekeeping industry is coruscating new energy. To be a advantage agriculture traditional apiculture pattern in China must be replaced by the modernization and standardization one The setting up and perfecting standardization system in apiculture as soon as possible will lead beekeeping industry in China from tradition.

HONEY BEE PRODUCTS – PRODUCTION, MARKETING, PERSPECTIVES IN REPUBLIC OF MACEDONIA

No 82

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Republic of Macedonia has favourable conditions for beekeeping.
This paper presents current situation in the Macedonian beekeeping sector according to the production of bee products, average production per honey bee colony, market of honeybee products, its marketing, packaging and labelling, average prices per product, average consumption, recommendations for its development. The data presented in the paper are result of the conducted Analysis of the beekeeping sector in the Republic Macedonia.

THE HONEY PRODUCTION IN CHINA FROM 2000 TO 2003

No 83

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The honeybee management is a traditional breeding in China. Since the founding of the People's Republic of China in 1949, the drastic changes of apiculture took place in China.
The beehives and honey production in 2004.
The largest colony was obtained in China from 2000 to 2004. In 2004, China obtained 7,001,500 beehives. The ten major countries produced 55.1% honey in the world.
Honey production in different district of China.
Honey productions made some progress in China. China is divided to seven districts: north, north-east, east, middle, south, south-west and north-west of China.The largest honey producing district in China is east of China, and the second is middle of China, the third is south-east of China.
The ten major honey provinces of China
The amount of ten major honey provinces added and the percent dropped. The ten major provinces are losing their importance slowly, the other province are developing more quickly than the ten provinces.
No change was observed at the rank of six major honey production provinces.
The characteristic of honey production in China
There are 28 records of provinces and cities for honey production. The honey production of China has two characters in geographical district: Firstly, there is unbalance between south and north district. Secondly, there is unbalance between east and west of China.
Change characterstic of China
There are four types of honey production change in China from 2000 to 2002. Firstly, the change is constantly raised. Secondly, the change is constantly dropped. Thirdly, the change curve like "_". Fourthly, the change curve is like "_". The developing district is south-west. The developing speed of honey production is different among seven districts. The speed of developing in north is faster than south.

QUALITY OF SLOVENIAN HONEY

No 84

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In cooperation with the Slovene Beekeepers Association, the monitoring of quality of 600 honey samples was performed at the Agricultural Institute of Slovenia* in 2004. The essential quality parameters for honey were analysed according to the French standard methods "Méthodes Officielles d'Analyses des Miels": moisture content, electrical conductivity, free acids, hydroxymethylfurfural (HMF), diastase activity, water-insoluble content, fructose, glucose and sucrose content. Different types of honey were analysed, which were declared as honey from acacia, fir, chestnut and lime tree, blossom honey, honeydew honey and blends of honeydew honey with blossom honey. Analysed parameters were compared to composition criteria described in "Council directive 2001/110/EC. Among 600 samples, 554 samples corresponded to the European regulations and 46 samples deviated in certain chemical parameters such as: diastase activity, HMF, sucrose, the sum of fructose and glucose and electrical conductivity. The diastase activity and HMF are indicators of honey freshness and overheating. In three analysed samples the HMF exceeded the maximal tolerance value which is 40mg HMF/kg. The diastase activity was too low in two analysed samples (DN<8). The specific sugars' content detects the difference between blossom and honeydew honey and also yields information about authenticity and adulteration of honey. Seven samples did not correspond to European regulations regarding the sum of fructose and glucose content and one sample of honey exceeded the value of 15g /100g which is the maximal tolerance value for sucrose in all types of honey. Deviations in electrical conductivity that indicate wrong characterization of botanical origin of honey were recognised in 33 analysed samples. The parameters such as moisture content, free acids, water-insoluble content

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SECOND
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No 85

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were within tolerance limits in all samples.
The results of monitoring indicate that 92,3% of analysed honey samples are appropriate for selling on the market.
* The authorized laboratory for honey analyses in Slovenia is a part of the Agricultural Institute of Slovenia and has been accredited by French and Slovenian accreditation authorities (COFRAC – Comité Francais d'Accreditation and SA – Slovenian Accreditation) since 2003.

SECOND ATTEMPT FOR A BEE GARDEN MUSEUM IN VENEZUELA

No 85

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The National Museum of Apiculturé "Ignacio Herrera" (MUNAPIH) operated in the city of Mérida, Venezuela, in the period 1988-1999. It was coordinated by representatives of the University of The Andes, the Corporation of The Andes, and The Beekeepers Association of Mérida State. We received local, regional, national and international donations. The exhibition operated ad honorem during weekends and holidays. We held communitary course on beekeeping, honey quality control and apitherapy. Three honey competitions were organized, and the honey samples were exhibited in the collection, displaying the quality standards of genuine Venezuelan honey.
The idea to create this museum of apiculture in Venezuela was suggested during the plenary session of the First National Meeting of Apiculture held in Mérida, in 1986. The unexpected closure and vandalism occurred in 1999 still demands investigation. However, a new plan is taking place to open a consolidated museum with administrative support to fulfill a matured set of objectives. The opportunity to present our project in the Apimondia Congress 2005 is providing feedback to improve our ideas, and also motivation for attempts to create bee museums in other countries. Honeybees are inspiring creatures for mankind evolution and healing. Additionally to the technical, scientific and artistic issues covered by the study of bees, their products and the environment, a Bee Garden Museum is also a spatial structure to rejoice the spirit. Our multidisciplinary team is working towards the insertion of such museum in the Health Science complex of the university, aiming to achieve educational impact by therapies to improve the quality of lyfestyle.
In Venezuela, an important section for a Bee Garden Museum is the stingless bee culture, because Meliponini were native Indian traditions and are still kept in rural communities.
Our acknowledgement to all the donations received for Museo Nacional de Apicultura "Ignacio Herrera", that we hope to retrieve with a media campaign in the city of Mérida.

PAENIBACILLUS LARVAE SUBSP. *LARVAE* – CLASSICAL AND MOLECULAR ASPECTS

No 86

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Paenibacillus larvae subsp. larvae (P. l. larvae), a spore-forming Gram positive bacterium, is the etiological agent of American foulbrood disease of honeybees. American foulbrood (AFB) is the most virulent bacterial disease of honeybee brood not only killing infected larvae but also leading to colony collapse. AFB is highly contagious and has spread around the world causing considerable economic loss to beekeepers. In many countries, AFB is a notifiable disease and, hence, control measures are often regulated by disease control orders. Diagnostic of AFB by molecular methods was hampered by the fact that no specific PCR protocols were available to differentiate between P. l. larvae and his close relative Paenibacillus larvae subsp. pulvifaciens (P. l. pulvifaciens), thought to be the causative agent of the rare powdery scale disease of honeybee larvae. Most recently, a subspecies-specific PCR as well as a diagnostic kit based on the detection of bacterial proteins were developed for the diagnosis of AFB. We evaluated both methods for the detection and identification of P. l. larvae strains causing disease outbreaks in Germany. The strains used for this study as well as reference strains of P. larvae were genotyped using rep-PCR and analyzed biochemically and genetically. In addition, pathogenicity and virulence of these strains was determined via exposure bioassays. Genotyping of P. larvae resulted in the identification of four major types which showed differences in their metabolic fingerprint. 16S rRNA sequencing revealed only minor heterogeneity as expected from the literature. All strains analyzed were pathogenic but revealed clear differences in their virulence. We propose to consider these new results in the classification of P. l. pulvifaciens and in the description and diagnosis of AFB.

OXYTETRACYCLINE SENSITIVITY AND PULSED-FIELD GEL ELECTROPHORESIS TYPING OF PAENIBACILLUS LARVAE SUBSP. LARVAE ISOLATES OF AUSTRALIAN ORIGIN AND THOSE RECOVERED FROM HONEY IMPORTED FROM ARGENTINA

No 87

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The aims of this study were to determine the oxytetracycline (OTC) sensitivity and type Paenibacillus larvae subsp. larvae isolates obtained from Australian and Argentinean sources. P. l. larvae minimum inhibitory concentrations (MICs) to OTC were determined using an agar dilution method and isolates were typed using pulsed-field gel electrophoresis (PFGE). PFGE fingerprints of P. l. larvae DNA generated by the restriction endonuclease XbaI produced 12 distinct PFGE types. Types I, II and VIII comprised the majority of strains (28/44; 63.6%). Type I (9/44: 20.5%) consisted only of isolates cultured from Argentinean honey and Argentinean honey blended with Australian honey and all these isolates had a MIC to OTC of 0.6 µg/ml. Type II consisted of 10 (22.7%) isolates from New South Wales (3), Queensland (6) and one isolate originating from honey containing a mixture of Argentinean honey blended with Australian honey. All these isolates had MICs to OTC of 0.04 µg/ml or 0.05 µg/ml. Type VIII consisted of 9 (20.5%) isolates all of New South Wales origin with MICs to OTC of 0.04 µg/ml or 0.05 µg/ml. The other PFGE types consisted of 3 or less isolates (Type XI, 3 isolates; Types III, V, VI, VII and IX, 2 isolates each; Types IV, X and XII, 1 isolate each). P. l. larvae isolates of Australian origin and Argentinean origin were all very sensitive to OTC. However, the isolates of Argentinean origin and Argentinean/Australian honey blend origin were less sensitive to OTC (MIC of 0.6 µg/ml) than isolates of Australian origin (MICs of 0.04 µg/ml or 0.05 µg/ml). Collectively these data indicate that PFGE is an affective means of discriminating between P. l. larvae strains and could be used to determine whether OTC resistant strains are from local or imported P. l. larvae strains.

PHENOTYPIC AND GENOTYPIC FEATURES OF PAENIBACILLUS LARVAE STRAINS FROM FINLAND AND SWEDEN

No 88

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A phenotypic and genotypic characterization of 45 isolates of Paenibacillus larvae from honey and diseased brood of Swedish and Finnish origin were made. The characterizations were based on determination of the metabolism of carbohydrates (API), detection of specific enzymes (APIZYM), sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) of whole-cell proteins and pulsed-field gel electrophoresis (PFGE) of bacterial DNA. The last method is a high-resolution DNA fingerprinting method proven to be superior to most other methods for biochemical and molecular typing, not earlier described for identification of P. larvae subspecies. The results indicate biochemical and genetic variance at the subspecies level. Four strains showing all the characteristics of Paenibacillus larvae ssp. pulvifaciens, formerly associated only with a rare disease called Powdery scale disease were isolated from brood with clinical signs of American foulbrood.

MONITORING FOR AMERICAN FOULBROOD SPORES FROM HONEY AND BEE SAMPLES IN CANADA

No 89

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In Canada, the recent advent of oxytetracycline-resistant American foulbrood (rAFB) is leading to a major change in the management of AFB for beekeepers that have relied on prophylactic applications of antibiotics. In order to more effectively manage AFB in large commercial beekeeping operations where inspection of colonies does not occur regularly, more efficient techniques are needed to alert producers of their risk of disease. We examined whether the relationship between Paenibacillus larvae subsp. larvae spore levels from honey or from adult bees could be used as a sensitive indicator of AFB risk. Multiple samples of extracted honey were collected from 14 beekeepers in the Province of Alberta and 19 beekeepers in the Province of Manitoba over three years. In addition to honey, adult workers were collected from brood nests during provincially–regulated inspections in Manitoba and were stored in 70% ethanol. The number spores in each honey and adult bee sample was determined microbiologically. Honey samples were prepared for analysis by combining 300 mg of honey with 1 ml of phosphate buffered saline (PBS), pasteurising this solution and then pipetting eight 20 ml drops onto a plate containing a modified PLA agar. Adult bee samples were prepared by rinsing approximately 40 workers, macerating them in 30 ml of PBS, and then plating the supernatant. Inoculated plates were incubated at 34∞C + 5% CO2 and scored for P. l. larvae growth after 4 and 7d. Following the enumeration of P. l. larvae spores, the susceptibility of the P. l. larvae cultures to tetracycline and tylosin was determined using a standardised disc diffusion assay. The density of CFUs per g honey or adult bee was found to be a more reliable predictor of AFB history in a beekeeping operation than the number of samples positive for any detectable P. l. larvae growth. Initial results suggest that 500-1,000 CFUs /g of honey are indicative of beekeeping operations with >2% of their colonies exhibiting clinical symptoms of AFB. Nevertheless, adult bees appear to be a much more sensitive predictor of AFB infections. These techniques may eventually serve as new extension tools to pinpoint operations with high AFB risk.

THE DETERMINATION OF TRACHEAL MITE *ACARAPIS WOODI* INCIDINCE IN THE REPUBLIC OF TURKEY

No 90

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Introduction: Acarapis woodi, which lives in the trachea of honeybees and feed on honey bee hemolymph, causes an important honeybee disease. Turkey presents an indispensable environment for bees in terms of its floral diversity and favourable climate conditions. Turkey plays an important role in honey production depending on the fact that it has a rich floral diversity and is acting, in its integrity, as a transit line, being located between Asia and Europe. Migratory beekeeping is a common activity in Turkey, however there exist no control mechanisms to prevent the spread of honeybee diseases. In addition, there is no supervision over bee entry and exit, particularly in areas near the borders! For this reason, bee diseases, which are common in neighbouring countries, are highly likely to develop in Turkey, too. Especially feral and smuggled colonies regularly cross the country without regulatory inspection, coming from Greece and Bulgaria in the west and north-west; and from Azerbaijan, Armenia and Republic of Georgia in the north-east. Concerns about the existence of this disease in Turkey are increasing day by day due to migratory beekeeping activity and bee movements in the borders. For the last two years in particular, beekeepers have been continuously reporting some complaints, which are overlapping with the symptoms of the disease.

For the aim of scanning the existence of this disease, honeybee sample collected from 281 apiaries on border zone of Turkey are examined by direct (dissection method) and indirect (guanine visualization) methods and it was taken comparative results from both direct and indirect methods and evaluated. Several methods have been proposed and implemented for positive tracheal mite identification (Shimanuki and Knox, 1991). These methods roughly fall into either direct or indirect categories. The former includes bee dissection and homogenisation and staining of tracheae, by which mites are actually seen. In the indirect method, such as ELISA or Guanine visualization, infestation is determined by a colorimetric reaction of some molecules (Koch and Gerson, 1997; Grant et al, 1993; Fichter, 1988; Ragsdale and Furgala, 1987).

Methods: In this study, we applied both direct and indirect methods in a way to control one another. In direct method, honeybees are dissected in the classical manner; as for the indirect method, a purine compound, guanine, is used to determine the presence of A. woodi. A total number of 10290 samples from 281 apiaries were collected randomly in winter and early spring, when honeybee tracheal mite populations are at a high level. All bees were kept at -200C until assayed. We took about 50 live adult bees out of each colony. They were divided into two subsets. The thoraces of the first 25 bees were dissected and thoracic discs were cleared in 8% KOH (Delfinado-Baker, 1985; Shimanuki and Knox, 1991), then stained with lactic acid and observed microscopically. A preliminary evaluation of the method was conducted by dissecting the insects in one of the 25-bee samples from group 1. Their tracheae were ranked according to four categories of infestation (0: uninfested, meaning both tracheae were quite silvery; 1: incipient, one trachea with vague dark blemishes; 2: medium, one trachea clearly dark; 3: high, trachea brown to black). Other 25 bees were examined by Guanine visualization method. For this purpose, they were placed in 0.1M NaOH basic solution. All thoraces were separately homogenized by Ultra-Turrax tissue homogeniser and ultrasonic cell disruption and finally centrifugation. The supernatant was collected for guanine determination via TLC. Guanine was loaded as a standard. An eluent of 5% w/v ammonium sulphate/ 13M ammonia/ 1-propanol (60:30:10) was used for samples that extracted in a basic solution. Guanine spots were visualized by a UV lamp and were compared with the spots obtained by the above-mentioned standards.

Results: The results demonstrated that 12.8% A. woodi positive according to the dissection method, 16.3% A. woodi positive according to the Guanine visualization method. A good concordance between the two methods was obtained in categories 0,1,2,3, ($P < 0.05$; _2 tests), suggesting that the guanine method provided results comparable with and more sensitive than the dissection methods.

Discussion: A. woodi was discovered, for the fist time, in Turkey by this study. So many reasons have been thought, up to now on, to justify the fact that in Turkey, there exist only two studies in this filed (Özkırım and Keskin, 2003; Çakmak et al, 2003), the results of which were negative. However, this study revealed the fact that the choice of method plays a very important role in identification. Before all, the way and time of collecting the samples may directly affect the result. That is, A.woodi infestation is at its highest level during winter and early spring. Collecting honeybee samples any time other than winter or early spring makes it more difficult to detect Acarapis woodi. Samples should not be put in any solution, especially alcohol. Contrary to what has been done in the study, conducted in Turkey by _. Çakmak et al.; fresh or frozen samples were preferred for the experiment rather than any material preserved in alcohol for our study; as alcohol darkens the tissues, making visualization of mites difficult. Furthermore, alcohol clears the trachea and causes the loss of mites (Tomasko et al, 1993; Shimanuki et al, 1994). For this reason, starting from the very early stage of the experiment, samples should be collected during the right season, that is, winter or early spring, and should be stocked at -200C until the beginning of experiment, without being placed in any kind of solution (Peng and Nasr, 1985). Taking into account the distribution of A. woodi infestation incidence in percentages in some provinces in Turkey, it is found that the infestation level is higher in border regions. It is normal to get positive

results in these regions because of high rate of bee entry-exit and existence of A. woodi in neighbouring countries. To conclude, in the last years, A. woodi is very quick to spread in our country especially starting from border regions. It is still pleasing to have a very low level of infestation. However, all the necessary steps shall be taken soon against this disease. Thus, spread of this disease will be prevented at a very early stage in Turkey, which is an important country in beekeeping industry. Bee Diseases Laboratory of Hacettepe University is continuing its studies hereon.

SEARCHING FOR DEFORMED WING VIRUS IN NEW ZEALAND HONEYBEES

No 91

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Studies in many countries on the prevalence and pathology of honeybee viruses associated with the parasitic mite Varroa destructor have identified deformed wing virus (DWV) as an almost ubiquitous infection in infested colonies of Apis mellifera. Investigations to determine the primary viruses responsible for the death of varroa-infested honeybee colonies in New Zealand were begun in 2001. The analysis of samples of live and dead bees from infested, untreated colonies comprised AGID and ELISA tests, which included a specific antiserum to DWV. These tests did not detect DWV in any of the samples. Further analysis of purified bee extracts using SDS-Page protein analysis of both the 2001 samples and additional samples, collected from different NZ colonies in 2002, also failed to detect any established DWV infections. The sequencing of the DWV genome has permitted the development of reverse transcriptase PCR-based testing for this virus. Analysis of NZ honeybee samples for DWV using this much more sensitive means of detection has still so far failed to detect the virus.

INCIDENCE OF THAI SACBROOD VIRUS DISEASE TO ASIAN HONEYBEE *APIS CERANA INDICA* FAB., IN KERALA, INDIA

No 92

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Asian honeybee Apis cerana indica Fab has been infected with Thai Sacbrood Virus (TSBV) and 95 per cent of the colonies were destroyed. Studies were made on the larval susceptibility, symptomatology and sequence of changes observed in the affected colony. Ten larvae were ground in 10 ml of distilled water (1 larva / ml) using a mortar and pestle kept in an ice bath. Resulting suspension was filtered through muslin cloth and the filtrate was centrifuged at 8000 g for 10 minutes. The clean supernatant fluid mixed with 50 per cent (w/v) sugar syrup in the ratio 1:10 was used for inoculation. 1, 2, 3 and 4 day old larvae were selected for inoculation. One day old larvae were highly susceptible, recording 100 per cent mortality closely followed by two and three day old larvae showing 84 to 92 and 82 to 96 per cent mortality respectively. Four day old larvae were comparatively less susceptible recording 72 to 74 per cent mortality only. Affected larvae appeared slightly plumby compared to healthy ones when examined by taking out of the infected cells. Infected larvae were seen stretched on their back in the cells with the head directed outwards and turned upwards like the prow of a boat. The dead larvae looked like a sac filled with milky white fluid when lifted up and it ruptured easily releasing the milky fluid. Cadavers changed their colour from white to pale yellow and sank down on the floor of the cell and dried up in 10 to 15 days as brownish black boat like cells. Sequence of visible symptoms were the presence of unsealed cells in brood area with the head of the larvae directed outwards like the prow of a boat. Dead larvae lying stretched out on their back, appearing like sacs filled with milky white fluid when lifted up. Dead and dying larvae seen strewn on the floor board, hive entrance or on the floor near the hive. Mottled appearance of brood combs with uncapped cells interspersed with capped cells with perforated cappings. Scales like remnants of dead larvae seen within the cells. Decreased foraging activity, egg laying and irregular placement of eggs. Dwindling of bee population of the colony and desertion of the infected hive by the bees.

BIOLOGICAL AND MOLECULAR CHARACTERISATION OF DEFORMED WING VIRUS AND KASHMIR BEE VIRUS

No 93

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Deformed wing virus (DWV) and Kashmir bee virus (KBV) are two of the most damaging virus diseases of honeybees. In combination with the parasitic mite Varroa destructor, which is a vector of both viruses, they can precipitate the collapse of an entire colony, usually during the fall and winter. Larvae and pupae infected by either virus are removed at a high rate by the bees. Both viruses can be detected in all life stages as well as in adult glandular secretions and larval brood-food, which is the natural form of transmission and persistence of the viruses in the colony. Virus titres in pupae increase

drastically when infested with viruliferous mites and this constitutes the engine of the epidemic that finally kills the colony. DWV is an Iflavirus and has a single open reading frame (ORF) with the structural proteins N-terminal to the nonstructural proteins, a long 5' nontranslated region and a poly-A tail. It is distantly related to several other insect viruses including sacbrood and slow paralysis virus. KBV is a cripavirus characterized by a poly-A tail and a highly conserved intergenic region separating the 5' nonstructural polyprotein ORF from the 3' structural polyprotein ORF. It is closely related to acute bee paralysis virus (ABPV) and more distantly to black queen cell virus and other insect dicistroviruses. KBV is considerably more variable than the other honeybee viruses, including its close relative ABPV, with an especially high proportion of non-synonymous nucleotide changes among different isolates, possibly pointing to a recent acquisition by A. mellifera. Co-variate analysis of the KBV-ABPV internal IRES, responsible for the translation of the structural proteins, showed it to be structurally similar to the cricket paralysis virus IRES and different by one major stem-loop from the IRES' of other dicistroviruses. For both viruses, the processing sites for the viral proteases were deduced by comparative analyses. The open reading frames of both viruses were expressed in bacteria for the production of monoclonal antibodies for use in immunomicroscopy, genome mapping and expression studies, surveillance and field studies.

GENERIC TECHNOLOGIES FOR THE DETECTION OF BEE PESTS AND DISEASES IN THE FIELD AND THE LABORATORY

No 94

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Honeybees can be affected by a large range of diseases, pests and parasites that are of importance for the health of colonies and also from the point of view of regulation and the movement of bees in trade around the world. In order to provide a complete health status test for beehives, it is necessary to develop generic techniques that facilitate testing for a full range of pests and pathogens using a single type of assay in a centralised facility. This approach allows the delivery of very rapid, comprehensive and large scale testing services both direct to beekeepers, and in the case of survey work, to regulatory bodies. In order to facilitate the routine usage of PCR at CSL in a high-throughput environment, work has focused on real-time PCR (TaqMan®) systems permitting quantitative gel-free detection of PCR products. The development of these techniques has made a significant impact in these areas for Plant Health, and is now being developed to fulfil the needs of the National Bee Unit and bee inspection services. Another aspect of diagnostics of particular interest to inspections services and beekeepers is that of 'field tests' or 'point of care tests' where the assays is carried out by non-specialists at the point of inspection. These need to be simple and rapid but speed up the decision making process. To allow detection of pathogens in the field, a 3 minute, single step, lateral flow test incorporating antibody coated latex particles has been developed. Examples will be presented of both aspects of testing from the UK survey for the detection of Kashmir bee virus (KBV) and other bee viruses using real-time PCR, and for the detection of European and American foul brood using lateral flow devices. In addition, a forward look to technologies on the horizon that are likely to make an impact in the field of bee disease detection will be discussed.

EFFECTS OF ARTIFICIAL SUGAR FEEDING ON SUGAR COMPOSITION OF ROYAL JELLY

No 96

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European Regulation on organic agriculture contains a specific section for organic beekeeping (section C). Here a number of breeding conditions are indicated that are suitable for honey production, but do not consider other bee products. In particular, supplement with artificial nutrition is not allowed, except in case of danger for bee colony life, while for the production of royal jelly it is often necessary to provide the colony with both glucydic and proteic nourishment.
A research was carried out in order to contribute to a better knowledge of the royal jelly (RJ) composition and to ascertain the effect of the glucydic nutrition. Four groups of three bee colonies, equipped for RJ production, were fed with 4 different sugar nutrition (honey, sugar syrup, and 2 commercial products with different sugar composition). Another group was kept without artificial nutrition. Altogether 90 RJ samples were collected and the main sugars (fructose, glucose and sucrose) were determined, according to a HPLC-RID method previously developed and validated.
The results show that the types of nutrition tested have no or little effect on RJ sugar composition. The ranges of values found for the 3 main sugars are (g/100 g of fresh product): 2.4 – 6.9 for fructose; 3.7 – 8.2 for glucose and 0 – 2.1 for sucrose.

MICROSCOPIC CHARACTERISTICS OF ROYAL JELLY

No 97

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Royal jelly (RJ) contains pollen grains, derived from the foraging activity of the honeybees that reflect the environment where beehives are located. Microscopic analysis of RJ can be used to determine its geographical origin. In this work a new simple method for quantitative (total amount of pollen grains) and qualitative (relative frequencies) pollen analysis is described and precision data are given.
An experiment was organized to study the influence of pollen or protein feeding supplements on microscopic characteristics of RJ.
Finally, microscopic characteristics of 30 samples of commercial RJ (imported and national) were studied and results are presented.

ORGANIC BEEKEEPING AND PROSPECTS IN HUNGARY

No 98

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Since the demand for safe agricultural products has grown in the last decade Europe-wide the number of organic beekeepers in Hungary has increased.
Depending on the nectar-source (bee-pasture) there were significant difference between organic and conventional beekeeping for a long time. After the appearance of the Varroa mite the beekeeping practice changed and divided into organic and so-called conventional. Hungary is an important – mainly acacia – honey producer and there is no doubt that high quality honey gives the greatest reputation. Though the number of organic beekeepers is still – relatively – low compared to the conventional ones their achievements and technology are often used by the "non-certified" beekeepers as well.
Different treatment methods were studied and efficiency survey was carried out. The effect of oxalic acid and formic acid was assessed during the season. Organic beekeepers – certified according to European Union Regulation 2092/91 – were selected and surveyed. The database of the studied beekeepers consists of 5164 colonies. The natural bee pasture has also a great effect on the possibility of being certified. Result shows a representative picture of the practical treatments, the preferred hives, visited bee pastures, the number of migrations during the season and the willingness to follow sustainable practices.
The effect of organic acid treatment on Varroa mite mortality was studied during the period of 2002-2004. Moreover the effects of the different treatments were studied on the development of the colonies during the season.

AN ATTEMPT TO ESTABLISH RELIABLE "BEST BEFORE" DATES FOR HONEYS ORIGINATING IN BOTH CONTINENTAL AND OCEANIC CLIMATES

No 99

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Honey is increasingly appreciated as a sweetening by European consumers. Nowadays, it is of particular importance to know how long honeys will last before they lose their quality. The purpose of this work was to research into "best before" dates for honeys originating in continental ("C" samples) and oceanic ("O" samples) climates. Evolution, throughout thirty months, of several quality control parameters was determined. The study was carried out on 60 high quality unheated Spaniard honeys (35 "C" samples and 25 "O" samples). All honeys were kept at room temperature, as they are usually stored both at home and at the supermarket. All parameters were analysed each five months by applying either official methods or equivalent procedures. Results are discussed with regard to average values. Electrical conductivity was not modified. Moisture kept constant during twenty months in both "C" and "O" samples, and then it decreased. Fructose and glucose decreased whereas HMF increased in all samples, but more markedly after 20 months. pH of both "C" and "O" samples kept constant during 15 months and then steadily decreased. In general, free acid showed a similar behaviour in both "C" and "O" samples with similar increases and decreases until 20 months and then, this parameter increased in all samples. Diastase activity decreased steadily in all samples. Acid phosphatase decreased steadily until 15 months in "C" samples and until 20 months in "O" samples then, it increased and decreased again in both group of samples, showing unpredictable evolutions. In conclusion, changes of honey composition regarding several parameters included in the composition criteria for this foodstuff are marked after 20 months. Thus, 20 months could be proposed as a "Best before" date for honeys originating in both continental and oceanic climates.
NOTE: The Spaniard INIA (Ministerio de Ciencia y Tecnología) and Junta de Castilla y León have supported this work under the projects API98-007 and BU17/99.

IDENTIFICATION OF HONEY ASSOCIATED YEASTS

No 100

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The matrix honey is nearly unperishable because of prevailing living conditions for microorganisms. Due to that fact only a few yeast species are able to survive in this matrix – osmophilic or osmotolerant species – and cause the one known spoilage. To discuss the matter "yeast cell limits" or "parameter to detect fermentation" correctly it is imperative to have knowledge of the species which cause the observed fermentation.
Yeasts were isolated and identified from the matrix honey (Accumulation: 90%ic Glucose-Bouillon; Isolation: Wort-, Sabouraud- or Maltextract-Agar; Identification: biochemical) The following genera were identified during a two years project period: Zygosaccharomyces, Schizosaccharomyces, Debaryomyces, Pichia, Torulaspora, Cryptococcus, Rhodotorula and Candida. From the first genus – if it was possible to name the species – one found Z. rouxii resp. mellis. Candida showed six, Cryptoccocus two and the other genera one species each.
Occurrence and statistical distribution of theses species will be explained in detail, the species will be comprehensively described.
According to the mentioned studies the genera/species Zygosaccharomyces spec., rouxii and mellis, Candida magnoliae and parapsilosis, Schizosaccharomyces octosporus as well as Debaryomyces hansenii (appearance >70%) seem to be the main causes of fermentation.

HONEY QUALITY PARAMETERS FROM THREE DIFFERENT SPECIES OF APIDAE:MELIPONINAE IN GUANARE, VENEZUELA

No 101

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Honey samples from seven colonies of Trigona (tetragonisca) angustula, four from Melipona compressipes and three from Melipona favosa were harvested directly from the sealed honey pots of each nest located in Las Panelas sector, Portuguesa State, Venezuela and processed using the methodology for Apis mellifera L. honeys at the Biochemistry and Bromathology Laboratories (UNELLEZ-Guanare) in order to study some quality physical and chemical parameters. Average yields did not show much difference within the honeys. The analysis of variance applied to average values of the studied fractions did not show differences (P<0,05) except for Reductive Sugars (%) and Brix (%) for M. favosa honeys; what suggests a particular flora foraged and special manage for ripening the nectar in the honey pots. Samples of honeys studied did not fulfil all the quality requirements parameters stipulated for Venezuelan honey normative (COVENIN) and foreign regulations (CODEX Alimentarius).

Key words: stingless bees, honey, quality parameters, sucrose

PHYSICOCHEMICAL PROPERTIES OF TURKISH HONEYDEW HONEY

No 102

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Turkey is the biggest honeydew honey (mediation of Marchalina hellenica insect) producer and exporter in the world. As the quality of honeydew honey is quite high here in Turkey, it plays a very significant role in the economy of the country. The aim of this research was to study the physicochemical properties of Turkish honeydew honey harvested from different locations in the provinces of Izmir and Mugla where the most of the world pine honey production (approximately 92%) is realized.
Sixty honeydew honey samples have been collected from individual apiaries for this purpose in autumn 2003. Ash, moisture, hydroxymethylfurfural (HMF), diastase activity, reducing sugar, apparent sucrose, total acidity and pH value have been analysed to determine physicochemical properties. Reducing sugar (>60 %) and pH (> 4.2) values were found higher, HMF content (< 40 mg/kg) was lower than the limits of National and European Regulations. Other parameters were appropriate with the regulations.
The low HMF contents indicate that the studied samples were not heated and were stored in good conditions. These results also state the high quality of the honeydew honey analysed with regard to the parameters studied.

IDENTIFICATION AND MANAGEMENT OF HAZARDS IN THE APIARY'S ACTIVITIES TO GUARANTEE HONEY SAFETY

No 103

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Farmers and food operators have the primary responsibility to ensure food safety. For this reason, all the sectors of the food chain must be considered, including primary production. This concept is well explicated in the EU legislation (White Paper on Food Safety and Regulation 178/2002). At the present time, it is not mandatory in Europe for HACCP principles to be applied to primary production, but the Regulation (EC)

852/2004 "on the hygiene of foodstuffs", states the development, dissemination and use of guides to good hygiene practice for the control of hazards in primary production and associated operations. Nevertheless, the same Regulation requires Member States to encourage operators at the level of primary production to apply the HACCP principles, as far as possible.
Our efforts are directed to give a tool for beekeepers – European and non-European - to facilitate their identification, prevention and elimination/reduction to acceptable levels of those hazards for honey safety that could appear during their beekeeping practices in the apiary.
Through a flow chart, we describe the different phases of beekeeping, from the harvesting/purchasing of the swarm to the removal of the supers for their delivery to the honey workrooms.
The flow chart's analysis shows that two phases could be considered critical for chemical hazards as a consequence of inappropriate therapeutic treatments on the hives: the breeding of the honeybee families before the supers' position; and the breeding of the families with the supers posed. About microbiological hazards, only the honeycombs contamination with spores of Clostridium botulinum could be considered relevant during the phase of the supers' removal, but the difficulties related to the monitoring of this hazard makes this phase manageable with the proper training of the beekeepers and with their proper application of good practices.

USING BEES AND HIVE PRODUCTS TO ASSESS METAL POLLUTION IN FINLAND

No 104

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The main objective of this study was to determine the degree of selected heavy metal (Cd, Pb, Cu, Fe, Mn, and Zn) pollution in Finnish pollen, honey and bees, and to evaluate their use as biological indicators of environmental pollution. The study sites (four in each category) represented the three categories: industrial, urban and control areas around Finland. The metal concentrations in honey were very low at all study sites. No significant differences were found in metal pollution in honey or in pollen between these categories. The level of Cd, Cu, Zn and Fe in bees were significantly different between these categories. It was concluded that under Finnish conditions honey and pollen are not good bio-indicators of heavy metal pollution, but bees can be used for bio-monitoring purposes at least for these metals. The average level of Cd, Cu, Zn and Fe that bees posses in industrial sites were 0.423:g g^{-1}, 19 :g g^{-1}, 76.25 :g g^{-1} and 172.5 :g g^{-1} , respectively.

A REVIEW OF OSMIA SPP. (MEGACHILIDAE) AS MANAGED POLLINATORS: BASIC NESTING BIOLOGY AND ANATOMICAL AND BEHAVIOURAL REASONS FOR THEIR SUPERIORITY OVER APIS AS POLLINATORS OF CERTAIN CROPS.

No 105

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At least five species of the mason bee genus Osmia (Family: Megachilidae) have been shown by various researchers to be superior to the honeybee as managed pollinators of a range of crops, including apples, almonds, strawberries, blueberries, raspberries, tomatoes, peppers, alfalfa and sainfoins.
The anatomical and behavioural reasons for this will be outlined and the potential of these as mass-reared managed pollinators will be discussed.

POLLINATION OF INVASIVE PLANTS BY BUMBLEBEES AND BUMBLEBEE CONSERVATION IN IRELAND

No 106

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Non-native (alien) plants have become established in many habitats worldwide, causing a wide range of impacts and often disrupting key ecosystem processes. Since many exotic plants require animals to transfer pollen between flowers, they have the potential to disrupt native plant-pollinator interactions. In addition, native pollinators have the potential to control the demographic processes of invasive plant populations. In this presentation, I will discuss the pollination of an ecologically and economically damaging invasive plant in Ireland, Rhododendron ponticum. This species, native to Southern Spain, relies on insect mediated pollination in order to set seed. In Ireland, its primary pollinators are bumblebees.
Populations of many native bumblebees in Ireland are thought to be under threat from changes in agricultural practices which have caused a reduction in wild flowers and nesting sites. Invasive alien plants with large floral displays which produce substantial volumes of nectar may therefore provide an alternative forage resource for native bumblebees. In the second part of my presentation, I will examine the role invasive plants may play in supporting native bumblebee populations and discuss bumble bee conservation in Ireland.

EXAMINING PATTERNS OF BEE MOVEMENT WITH HARMONIC RADAR

No 107

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A harmonic radar system for tracking individual flying insects at low altitude has now been used successfully on bumblebees, honeybees, butterflies and moths. It has provided a novel insight into how individuals search for resources and how they exploit these resources in a complex landscape. The radar has also enabled us to answer questions about the navigational abilities of these insects whilst in flight.
The harmonic radar is a 3.2 cm wavelength, 25 kW peak power, azimuthially scanning, dual frequency system. A transponder, weighing approximately 10mg and measuring 16mm long, is carefully attached to the dorsal surface of the insect. The transponder can be detected within a circle of radius 900m centred on the radar, in unobstructed flat terrain. Experiments in a flight room suggest the insects are not unduly hindered by the presence of the transponder, and continue to fly and feed as frequently as they do without the transponder in place.
To illustrate the power of this technique, examples will be given of how honeybees and bumblebees explore the landscape during their first flights, and how these flights develop into experienced forager flights. Radar tracking has enabled scientists to examine bees' searching strategies in detail, both when naïve bees are looking for food and also when bees are displaced into unfamiliar surrounding and are motivated to find their way home.

HABITAT PREFERENCES AND FOOD PLANTS OF BUMBLEBEE QUEENS IN AN AGRICULTURAL LANDSCAPE

No 108

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Introduction: There are only a few studies dealing with the occurrence of bumblebee queens in agricultural landscapes. However, the weather conditions and resource availability in the spring determine the performance of queens and therefore the whole bumblebee community later in the summer.
Methods: The data was collected in spring 2000. The study area consists of ten large patches of farmland. Bumblebees were counted using the line-transect method. Each line-transect was of a specific habitat type. Some other qualities of the habitats (for example ditch type and width of field margin) were also recorded and food plants were mapped.
Results: 13 bumblebee and cuckoo bumblebee species were recorded in this study. The total of individuals observed was 3,711. At the first and second counts the highest densities of food-collecting queens were in stream sides and at the third and fourth counts on leys. In stream sides the mean area (m2) covered by willows was at its highest and on leys the mean coverage (%) of dandelions was at its highest. Habitats used by different ecological species groups were somewhat different.
Discussion: There are differences in habitat selection by different bumblebee species according to previous studies as well. Habitats used by bumblebees change during the spring as food plants have different flowering periods. Willows are very important at the beginning of the spring and later dandelions become important.

THE RELATIONSHIPS AMONG VARIOUS BEE GENERA (*APIS MELLIFERA* L., *BOMBUS* SPP., *MEGACHILE ROTUNDATA* F. AND *RHOPHITOIDES CANUS* EV.) AS OBSERVED ON FLOWERING ALFALFA (*MEDICAGO SATIVA* L) AND CROWN VETCH *CORONILLA VARIA* L.

No 109

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As a side product of the research carried out in Czech Republic on insect pollination effectiveness in alfalfa and crown vetch interesting data illustrating relationships among various insect genera were obtained.
1. Generally – where several bee species occurred together, negative correlations were found between the abundance of both, the solitary bees and honeybees in various field situations.
2. Where abundance of M. rotundata increased in the time as a result of their emergence from cocoons brought to the field, the numbers of honeybees declined concurrently. Similar dependence occurred in the area: if M. rotundata bees' abundance decreased with the distance from their nests, the abundance of honeybees increased on the field parts less visited by the leaf cutting bees.
3. If abundance of both, M. rotundata and Rhophitoides canus females increased at the same time, the two species of wild bees divided with the field. The larger the distance from the nest, the lower the abundance of M. rotundata, and, consequently, the higher the numbers of R. canus was found on the field parts concerned.
4. On the flowering C. varia the negative correlation was found between the abundance honeybees and bumblebees (the group of B. terrestris, and B. lapidaries) during the cause of the days. Honeybees were most frequented at the warm noon hours, whereas bumblebees' numbers were highest in the morning and afternoon.
In the relations observed on alfalfa, the solitary bees seem to be the determinative factor. They trip flowers effectively what causes the cease of nectar secretion

and consequently the decline of attractiveness for honeybees. Then, honeybees concentrate on the field parts less covered by wild bees where the degree of pollination is lower. Paradoxically, in such cases even negative (naturally false) correlations between the abundance of honeybees and the seed yield were found.

The presentation was possible thanks to the project of NAZV IR44014

ENHANCING BEE POPULATIONS ON UK FARMLAND USING FORAGE MIXTURES.

No 110

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Populations of many species of bee in the UK have declined since the Second World War. Many species of solitary bee are now scarce or endangered, most arable areas now have only six of the twenty or so species of bumble bee, and managed honeybee populations are threatened by the parasitic mite Varroa destructor. This reduction in pollinators may threaten both the yield of arable crops that require insect pollination, and the survival of rare wild plant species. Reasons for the decline in bee populations are complex, but essentially habitat loss through arable intensification has led to a reduction in the supply of nectar and pollen for food, and suitable places for nest sites. Studies of suitable food plants for enhancing bee populations have been carried out by both Rothamsted and Monks Wood since the late 1980s, and have included various mixtures of both annual and perennial plants. The work has usually involved the use of small plots, which inevitably have limitations. One can, for example, easily demonstrate that such mixtures attract insect visitors, but it is difficult to prove that such plots are actually leading to long-term increases in populations, rather than simply diverting bees from other food sources. In order to answer some of these questions for bumblebees, a new five-year project (funded by defra and English Nature) has recently begun. Plots of different sizes have been sown with a mixture of plant species specified in the UK Countryside Stewardship Scheme "WM2 pollen and nectar mixture" at eight sites across England. These sites vary in farming intensity and landscape complexity from more intensive arable production in the east to more extensive, mixed farming further west. Regular observations of the bee species foraging on both the sown plots and the surrounding landscape are being undertaken, and non-destructive sampling techniques will allow genetic analysis of bees collected from the sites at the beginning of the project in order to estimate the size of existing bee populations, for comparison with samples collected four years after the establishment of the experimental plots. In addition, artificially reared bumblebee colonies will be placed adjacent to the experimental plots and their growth rates compared. The results of this project should help to identify the scale of habitat restoration required to sustain or enhance bumblebee populations and to better understand the influence of the surrounding landscape on the response by bees to such newly created habitats.

POLLINATOR DECLINE – ASSESSING THE RISKS: ALARM & EPI

No 111

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Europe, along with several other regions of the world, is experiencing marked declines in pollinators and the services they provide. Evidence for these changes is highly fragmented and it is difficult at this time to build a consistent picture at the continental level. Honeybees and some solitary bees have been shown to be important providers of pollination services, but the overall extent of their contribution remains largely unknown. As part of the ALARM project a consortium of researchers has embarked on a long-term programme to assess the large-scale environmental risks associated with the loss of pollinators. The primary objectives are to:
(1) Develop standardised methodologies to survey and monitor pollinators and the services they provide;
(2) Quantify the distribution shifts in key pollinating taxa throughout Europe;
(3) Determine the economic and biodiversity value of major pollinator groups;
(4) Identify the primary drivers of pollinator loss;
(5) Develop predictive models for pollinator risk assessment.
ALARM is aiming to achieve these goals and will allow the construction of a knowledge base to enable the EPI to underpin future programmes for the conservation, restoration and sustainable management of pollinators in agricultural and natural ecosystems across Europe. Only by quantifying the problem at the European level can we effectively target our resources to overcome the negative impacts of pollinator and pollination loss.

CAN PLANTATION FORESTRY REPLACE DECLINING FLORAL RESOURCES FOR APICULTURE IN AUSTRALIA?

No 112

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There are approximately 1000 commercial beekeepers in Australia managing over 500,000 hives. The primary floral resources are diverse and strongly influenced by climate. The dominant gena for honey production is Eucalyptus spp. and its close relations accounting for 70% of the Australian honey harvest.
The Australian industry is suffering a decline in floral resources due to a range of factors including public land policy restricting access, continued land clearing, urban development, prolong drought periods, fire wood harvesting, soil salination, logging of older reliable nectar yielding trees, reduced flooding, dieback of mature trees and the biological control programs for agricultural weeds of importance to honey bees. In recent years the national forest plantation estate has dramatically increased, offering some optimism that this may provide beekeepers with alternative melliferous flora.
The total area of forest plantations up to Dec. 2003 was 1,665,693 ha, 41% hardwood and 59% softwood. The softwood component is dominated by pinnus spp. which offers very little in the way of floral rewards to honeybees. The percentage area planted to hardwood plantations has increased at a greater rate than that of softwood spp. Eucalyptus globulus represents over 60% of the hardwood plantings with other Eucalypts accounting for 19%. The current harvesting rotation for eucalypts on high rainfall sites is 8 to 12 years. At this age flowering and nectar secretion is unreliable thus this floral resource is of limited value to commercial beekeepers.
Species selected for dryer sites for purposes other than pulp wood production hold better prospects for beekeeping although the area devoted to such species is small compared to the total national plantation estate. Plantation forests in Australia are not in the foreseeable future going to replace the existing floral resource focus of the commercial beekeeping industry.

HONEY QUALITY: THE RESIDUE ISSUE

No 114

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In the traditional opinion of consumers honey is a natural and healthy product. This is taken into account by high standards of honey quality and control in the European Community. The original quality concerns mainly ripeness, natural state and no adulteration. But since some years residues are the main problem. In some cases MRL are fixed for some pesticides which may occur in honey. There are also discussions about GMO pollen in honey. But the main problem is still residues of medical treatments against bee diseases especially antibiotics. There is an improvement, but there are still problems. The problem areas are to lead beekeepers to best apicultural practice without the use of antibiotics, progress in new methods of analyses and dealing with zero tolerance for antibiotic residues in honey.

RESIDUES IN HONEY – THE CURRENT SITUATION WORLD-WIDE

NO 114B

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Honey, as a genuine natural product, has to fulfil the EU directive 2001/110/EC: "Honey must, as far as possible, be free from organic or inorganic matters foreign to its composition".

Given that this claim is only deficiently being met, the residue problem nowadays is more current than ever. In the past, it was mainly analyses for antibiotics, such as sulfonamides, tetracyclines and streptomycin, that were processed. The "Chloramphenicol-scandal" in 2002 can be seen as the starting point for a significant extension of the range of analyses. The positive findings of nitrofurane metabolites, and later also of tylosin, in honey show that this caution was justified. The unclear legal background, a lack of analysis methods and the evaluation of the results caused the sensitiveness of all parties involved, and has effected a growth in the range of analyses, even without strong suspicion. Although regional and national focal points regarding the residue occurrence can be seen, they cannot be precisely limited because of the world-wide honey market.

On the basis of statistical data from the last 3 years, the current situation of the residue problem will be shown and questions such as, "In which countries do these problems occur? How has the situation changed or improved? What needs to be kept in mind in the future? What measures can be taken in order to deal with unforeseen problems?" will be answered.

CONTROL OF BEE DISEASES WITHOUT RESIDUES IN HONEY – PACKER AND CONSUMER NEEDS AND GOVERNMENT POLICY

No 115

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Honey packers and importers have suffered greatly in recent years from antibiotic and other residues in honey. Beekeepers will be under a strong compulsion to use some sort of veterinary medicine if they see diseased colonies. Antibiotics have been found beneficial to help colonies build up quickly in the spring in temperate

climates. On the other hand governments have been slow to put in place adequate legislation and inspection services. In many countries it is easy to obtain unapproved drugs. On the other hand consumers expect honey to be pure and natural. It is very difficult to get any significant movement on this issue. The ideal solution would be disease control measures that are cheaper than drugs but much more research is needed to investigate such measures.

THE RESIDUE FREE CONTROL OF BEE DISEASES

No 116

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Avoiding residues in the sense of preventive consumer protection must start from the beekeepers and the control of bee diseases. The best way is to avoid using medicaments as far as possible. But not all diseases allow this. Concerning varoosis it is often neglected that not all medicaments are suitable for colonies with brood. At the same time, medicaments should be used alternatively to avoid resistances and consecutive overdosing. Moreover, medicaments with substances of the group of organic acids and ethereal oils are available reducing the danger of residues significantly. In case of the American foulbrood, antibiotics are often used though they only mask this infectious disease. In consequence, the spores of the pathogen agent of this pest agglomerate in the colony and require treatment in smaller and smaller intervals. On the other hand, the alternative treatment of taking sanitary measures using artificial swarm methods, practised in some countries, is absolutely residue free. The success can only guaranteed on a long run if there is a simultaneous profound sanitation and disinfection of the hives and combs contaminated with the spores of the pathogen agent. There are similar correlations for other bee diseases.

RESIDUE FREE HONEY IN IRAN AND CANADA

No 117

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Iran: For many years the authors have combined the benefits of a pristine, mountain environment and the application of a nutritional and disease control supplement called Caspian Solution to produce a unique, residue free honey. The Damavand Mountain honey production region is located at elevations above 5,000 meters. Selection has created bees that are suited for life at high altitudes and the region offers many opportunities for isolated queen rearing. The bees are resistant to digestive and Chalkbrood diseases and they exhibit strong hygienic behaviour. The isolation and high mountain environment eliminates the risk of varroa mites. All of the nectar is from wild flowers and there are no herbicides, pesticides, fungicides or chemicals of any type applied in the region. Damavand Honey makes all of its own wax foundation to ensure the purity of the wax and honey. Damavand Honey uses Caspian Solution in nutritional supplement and disease control programs. Caspian Solution is a blend of royal jelly, pheromones and other natural ingredients. The quality and purity of the honey is supported by sampling, analyses and documentation.
Canada: Caspian Apiaries is pursuing the same residue free protocols in Canada. There are few high altitude meadows to exploit, but there are many isolated regions in British Columbia and the northern regions of Alberta. There are many opportunities for isolated queen rearing programs. Canadian beekeepers struggle with many of the pests and diseases known throughout the world, but Caspian Apiaries has successfully dealt with many pathogens through the use of Caspian Solution. The most obvious benefit of these pest and disease control programs is the dramatic reduction in the amount of medication used. In most cases the amount of medication used is lowered to 10 percent of the quantity suggested by suppliers, and Government Apiculturalists, and in some instances diseases are eliminated without using medication. It is clear from experience in two very different environments, that beekeepers can produce residue free honey if they adopt progressive management and disease control techniques.

DETECTION METHODS OF *PAENIBACILLUS LARVAE* SUBSP. *LARVAE* INFECTIONS BY SAMPLES HONEY AND ADULT HONEYBEES ANALYSIS.

No 118

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The method of choice for diagnosis of American foulbrood depends on whether clinical symptoms of disease are present or not. In the laboratory material from honey combs (diseased larvae), honey and adult honeybees can be investigated for the presence of spores Paenibacillus larvae larvae.
The aim of study was comparative diagnosis of American foulbrood using samples of both adult bees and honey from diseased and visually healthy honeybee colonies from apiary were AFB has been detected and from apiary were all colonies were visually healthy.
Both samples of the live bees and honey samples were collected from the brood chamber, from 2 honeybee colonies with clinical signs of disease and from 32 visually healthy colonies (apiary I) and from 13 colonies were clinical signs AFB not detected (apiary II).
Both materials were tested for the presence P. l. larvae

spores using microbiological methods which involved centrifugation, heat treatment of the sediment and culture on the BHIT-agar and MYPGP-agar plates.
Results demonstrate that in honeybee colonies with clinical symptoms of AFB (n=2) all samples (honey and bees) were positive for P. l. larvae. In 32 apparently healthy colonies from this same apiary, P. l. larvae was cultured from 24 of honey samples and from 19 bees samples.
In samples from apiary were not detected AFB signs (n=13), presence of P. l. larvae spores were detected in 7 bees samples and 3 honey samples.
Bacterial colony counts were higher in bee samples compared to honey samples.

IN VITRO INHIBITORY EFFECT OF HEN EGG WHITE LYSOZYME ON *PAENIBACILLUS LARVAE* SSP. *LARVAE* STRAINS ASSOCIATED WITH AMERICAN FOULBROOD DISEASE IN HONEY BEES

No 119

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American foulbrood disease (AFB) is a severe brood disease caused by Paenibacillus larvae ssp. larvae and is considered the most destructive of the brood diseases. The disease is distributed world-wide and can cause substantial economic losses. Increasing problems with antibiotic resistance of P. l. larvae have brought research attention on non-antibiotic methods for the control of AFB. In this study the inhibitory effect of hen egg white lysozyme on a number of P. l. larvae strains isolated from diseased larvae was investigated. A micro-broth dilution assay was used to evaluate the minimal inhibitory concentrations (MIC) of lysozyme against eight P. l. larvae strains in 96-well microtitre plates. The plates were inoculated with 105 CFU/ml of P. l. larvae from a fresh culture in Luria broth supplemented with 1 _g/ml of thiamine and the bacteria were tested with a gradient of lysozyme concentrations ranging from 0 to 1,000 _g/ml. The plates were incubated aerobically at 35°C for 48 hrs and the bacterial growth was measured by a change in optical density. The MIC of lysozyme against P. l. larvae strains was found to be between 2.0 _g/ml and 125 _g/ml. Lysozyme was also found to inhibit the growth of Melisococcus pluton and Ascosphaera apis. Therefore, there is potential to use lysozyme as an alternative to control AFB and other brood diseases of honeybees.

SHAKING CAN CURE AMERICAN FOULBROOD

No 120

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We wanted to evaluate the shaking method to cure honeybees from American foulbrood and investigate possible differences between double and single shakings.
We followed 60 shaken honeybee colonies for up to three seasons and measured the spore load of American foulbrood spores in the colonies. All colonies had clinical symptoms of AFB when they were shaken and the number of clinically diseased cells was estimated. All hive parts including frames with foundation, used in the new 10 frame deep Langstroth hive was bought brand new. Of all the colonies 21 where shaken twice and 39 were shaken once. Colonies that were shaken twice were left in their first hive for two days before they were shaken the second time. Live adult honey bees were sampled during shaking and then once a week for 4 weeks. After that sampling was done once a month during season.
When the last samples where taken 23 colonies remained. Of them 9 were shaken twice and 14 shaken once. The main reasons for loss of colonies are absconding and winter mortality. The data is being analysed and results will be presented
All colonies reduced their spore load significantly, to a level where it no longer can be detected. We found no difference between treatments, the single and double shakings reduced their spore load equally fast.
Further, the number of clinically diseased cells in the original colony did not influence the rate of spore load decrease or the survival time.
It seems that shaking, if done properly, can cure a colony that is infected with AFB and that it is a disease that is maintained by the beekeepers. Data from other experiments support this theory and will be presented during the meeting.

DISSEMINATION AND PERSISTENCE OF FUNGI TO CONTROL *VARROA DESTRUCTOR*

No 121

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In most countries the management of Varroa destructor is based on the use of chemical acaricides but increasing problems with the establishment of resistant mite populations now makes more urgent the development of alternative sustainable control strategies. Isolates of entomopathogenic fungi identified as potential microbial control agents have been selected on the basis of virulence against V. destructor, efficacy under colony conditions and low impact on beneficial, non-target organisms, including bees.
The transfer of fungal inocula between bees and to mites and their efficacy is being evaluated at increasing spatial scales; laboratory populations, observation hives

and nucleus colonies. Some of the problems that had to be overcome in attempting to undertake and quantify these relationships are presented with some of the results. The high temperatures and low humidity within honeybee colonies present a considerable challenge to the survival of fungal conidia. Studies to determine the longevity of conidia of fungal isolates stored at a range of temperatures were designed to measure both germination and the formation of colony forming units (cfu's). Some isolates stored at 5oC remained viable for a year.
The results obtained so far indicate that a fungal biocontrol agent for V. destructor could provide a valuable, environmentally benign contribution to an integrated programme of mite management, especially with the onset of acaricide resistance.

A COMPARISON BETWEEN DIFFERENT OXALIC ACID TREATMENTS IN OVERWINTERING HONEYBEE COLONIES AFFECTED BY *VARROA DESTRUCTOR* ANDERSON & TRUEMAN

No 122

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Four oxalic acid (OA) administrations were compared under winter continental (Modena, Emilia-Romagna) and Mediterranean (Siena, Tuscany) conditions in Italy. Each of two apiaries of 50 broodless colonies was randomly split into 5 groups. Sucrose (S) was added to solutions intended for trickling and the Varrox device was used to sublimate OA within the hives. Groups A, B and C received respectively 4.2%OA/60%S, 3.2%OA/60%S and 4.4OA%/30%S solutions by trickling (5ml/comb) and group D was treated by sublimation (1,4g of OA). Group E was left untreated and served as a control.
The tolerability was assessed by comparing initial and final number of adults and brood cells. At the time of administration, the colonies sized 8,840 and 10,530 adults in Modena and Siena, respectively, and had an average decrease of 20-35% and 8-27% by the end of the winter. At this age, the brood averaged 1,454 and 10,391 cells, respectively. The above population parameters did not significantly differ between groups and no evidence for a lacking tolerability was attained. In Siena, a low mite load did not allow the evaluation of efficacy. This could be made in Modena, where the natural mite mortality reached 13.6% and the efficacy was 87.7, 87.1, 70.3 and 91.0% in groups A-D respectively. This was somewhat lower than previous recordings and may be due to the low environmental and internal RH. The significantly lower mortality in group C stresses the need of a high sugar concentration in solutions intended for trickling. No significant differences occurred between the other groups, whose treatments seemed alternative on the practical point of view. The sublimation was time expensive and required heavier protections than the trickling.
The statistical analysis pointed out that, under the examined conditions, the natural mite mortality does not allow a reliable estimate the overall colony infestation (Squared R=0,501). Similarly, the number of populated combs depends on the actual number of bees to a limited extent (Squared R=0.507), although this does not necessarily imply an influence on the treatment performances.

BEE DISEASES ORIGINATE NOT ONLY FROM PATHOGENS – DISEASE PREVENTION IS BETTER THAN CURE

No 123

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Most bee diseases are considered to be of socio-economic importance and are significant to the international trade.The moment clinical symptoms of diseases are visible in a bee colony the natural defence mechanisms of the bee colony failed to suppress the disease under the threshold. Bee diseases originate not only from the pathogens. Environmental condition can favour the outbreak of the bee diseases. But adaptations to these changing conditions are difficult to achieve. However, the responsibility of the beekeeper as an adding factor in the multifactor causal chain often is neglected. Principals of "Best beekeeping practice" will be discussed.

BENEFITS OF THE FRECUENCY ANALISYS OF THE HUM OF AN APIS MELLIFERA SWARM, APPLIED TO THE HIVE INSPECTION

No 124

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Rational beekeping requires continuous following of the beehive conditions, but exhaustive inspection, that demands its opening, is aggesive and in many cases can be harmful. In this document we explain some experimental results we have obtained, that can be the seed of a new technique for hive inspection. This technique will offer relevant information of hive state avoiding its opening. Moreover, It can be made in any weather and in a very short period of time.
In those experiments, we have recordered the sound

produced inside the beehives by the swarms. Then, whith the aid of computers, we have made the analysis of the signals and have compared its frequency spectrums. From the experiments we have deduced that the frecuency analysis of the swarm hum inside the hive, offers applicable information in order to know its state. This method has showed differences among several beehives in the same visit, and also, the changes on the same beehive inspected in different dates.

PRODUCTIVITY OF BEEKEEPING DEPENDS ON THE SUNSPOTS ACTIVITY

No 125

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As it is known, the spectrum of Sun electromagnetic emission is varied with regards of sunspots activity. The Sun radiates the electromagnetic waves with the wide interval of wavelength but to the Earth surface reaches only the narrow interval of spectrum with the lengths: 3,200 Å – 11,000 Å. Other waves are absorbed by the Earth atmosphere. For the human eye are sensitive more narrow interval between 3,800 Å – 7,600 Å, which is more stable interval and almost do not depends on the sunspots activity. The spectrum 3,200 Å – 3,800 Å is the nearest ultraviolet waves. They are not visible for a man but they are visible for bees. Besides, ultraviolet and visible spectra are radiated from outer electrons transitions in molecules or atoms. Other part of Suns spectra reached to the Earth surface has the following wavelengths 7,600 Å – 11,000 Å are infrared waves, radiated from molecular vibrations. Both these intervals of electromagnetic waves, especially the first one have the peculiar meaning for hurrying up of chemical reactions in the cells of living creatures. Very often we observe that bees have all conditions yielding of nectar but, in spite of, they are very passive and the honey crop is very pure. We have been observed this phenomenon and conclude that when the sunspots activity is minima then the productivity is maxima in case of ability of the mellifluous. Here we suggest tree conjectures: 1. Due to variation of sun spectra (especially ultraviolet part) varies the possibility of metabolism, mellifluous may not separate the nectar. 2. In case of maxima of sunspot bees cannot use the eyes sensitive for ultraviolet waves. 3. The first and second reasons act simultaneously. According the up to date biology this conclusion must be justified. But the quantitative investigation of this interesting problem needs the more ability of data from different point of the world. Apparently, the quantitative investigation of this problem would be useful for preliminary evaluation of the beekeeping economical effect. A beekeeper would be able to define replace his apiary on new mellifluous or not. The prediction, of seven days before, of sunspots activity he could be able to find in internet

METHOD OF PRODUCING OF THE PURE BEE VENOM

No 126

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Usually there are used different kinds of collectors for producing of bee venom but collecting of pure production is very important problem. We collected the bee venom from different kinds of devices comparing their cleanness and have been concluded that the advantage has the collector with horizontal glass plate. It had been compared to the venom collected by device with vertical glass plate. Apparently, when bees separate the venom on vertical glass plate, after irritating by current impulse, they simultaneously separate the excrements which are mixed up to the venom. When bees separate venom on horizontal plate from below to above then the gravity force separates the pure venom from the excrements and on the plate surface we get the pure product.
In our system of bee venom collector and the impulse generator are assembled together in the each cassette and fed by the rechargeable battery also attached on the same cassette. This autonomy system of device is very convenient than the cassettes with common battery and impulse generator, due to the inevitability to connect them by cables in night times.
The quality and quantity of producing bee venom are depended also on the date of season and the mellifluous consisting. The quality of bee venom is depended also on the bee breed. The bees of Georgian - bees Apis Mellifera Caucasica gives a best quality of venom.

BEEHIVE DRAGOSLAVKA

No 127

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This new type of a beehive provides the bee colony better living conditions than all other well-known types, even than a natural beehive in the tree stem. That is the reason the bee colony is being developed faster, getting fewer diseases and the yields are better. A beekeeper is enabled to work and apply all well-known methods of beekeeping in a faster and easier way. Manufacture of those beehives is faster, simpler and cheaper. The beehive consists of three equal bodies with equal frames. External frame dimensions are 358 x 255 mm. Internal dimensions of one body are 372 x 372 x 265 mm. The volume of one body is 36,77 l in comparison to DB having the volume of 63,33 l and LR with 41,77 l. The volume of the brood chamber is 73,54 in comparison to DB of 63,33 l and LR 83,54 l. The volume of the whole beehive is 110,3 l in comparison to DB of 126,5 l

and LR of 125,3 l. The volume according to the cm of the height is 1,383 l according to DB of 2,043l and LR of 1,726 l. Beside the ideal volume, this beehive has also the ideal base surface of 1383 cm2 and LR of 172,6 cm2.
All types of modern beehives have some disadvantages. In addition to it, some constructors of those beehives did not know about today's methods of beekeeping and therefore, those beehives became outdated. That is why it was necessary to invent the ideal beehive.

GEOGRAPHIC INFORMATION SYSTEM FOR APIARIES MANAGEMENT

No 128

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Geographic Information Systems (GIS) are computer systems used for storing, processing and analyzing spatial phenomena. Therefore, it is a powerful tool for managing apicultural activities. This work presents the designing of a GIS applied to apiaries logistics for beekeepers of a Brazilian municipality. This GIS for apicultural logistics aims to supply the needs of a beekeepers association called APICAMPO – Beekeepers Association), and it is implemented in a Brazilian freeware software for GIS, called SPRING, developed by INPE – National Institute for Space Research (www.inpe.br). The logistics for beekeepers activities is based on information about apiaries characteristics, including their geographic location, and geographic information such as terrain relief, roads, railroads, settlements, hidrography, municipality boundaries and land use. The efficient manipulation of apiaries characteristics demands for a cadastre including the essential information for apiaries logistics. The cadastre data are related to every apiary and their beehives. The stored data for the apiaries are, besides their geographic location, owner name and address, and the data for their beehives are: quantity (total number of), spatial arrangement, types, wind direction, shade, and honey production. After storing the cadastre and geographic data, the second step is to generate the thematic information about the potential of apiculture pasture using the GIS tools. The definition of the potential of apiculture pasture depends on the information about the potential of honey production and the level of bee population, which is obtained from the apiaries cadastre and land use information. Using these thematic information and the cadastre data, make the diagnosis of the current situation of the apiaries possible for APICAMPO associates. This is an important step of a strategic plan that intends to establish the apiaries location based on the most efficient honey production on the APICAMPO geographic region.

NEW SOFTWARE FOR BEEKEEPING ADMINISTRATION ON TROPICAL COUNTRIES

No 129

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Apicontrol 1.0 is a simple and potent computer system developed for users in tropical conditions that completes all the possible requirements for beekeeping activities: detailed information such as location on different biogeographical positions, hive count, breeds information about queens. User will be able to keep up special date records. Apicontrol 1.0 was develop at Universidad del Tolima (Colombia), according to demand of beekeepers. Its fundamental objective is the integral administration of production system under tropical conditions and consider Africanized honeybee habitat. The software uses eleven specific modules: Installations on the farm, hives and it places, Queens, global productions (Honey, propolis, wax, pollen and royal jelly) and polinization. The tool makes possible elaboration, presentation of final reports, so administrate warnings of the pending tasks in automated way. The tasks are completely programmable and transparent for final users, make possible print reports and forms for the taking of data in the apiary, stores and it conserves the historical files of the exploitation on productive system, complete statistics of the beehive, copy of automatic security of the data and the exploitation. Apicontrol 1.0 used for the development of the software the programming package Borland Delphi 6.0, which is qualified as an environment of visual programming of high level, the base of this program is the language Object Pascal, the software is compatible with the operating systems Microsoft Windows 95,98, Me, 2000, Xp. It's the first administrative software for tropical conditions in South America useful for development countries.

INTENSIFICATION OF UTILIZATION OF SPRING HONEY FLOW

No 130

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The aim of experiment was to examine some means for bee stimulating on utilization of spring honey flow An experiment involving 6 treatments and 6 replications was conducted in 1996-1999. Colonies of all treatments were kept in one section, bee queens sisters of the same age were given to the colonies and were replaced every second year. 16-frame Dadant bee hives were used in the experiment. In all treatments, except for (C), we used Caucasian x Carniolan bee hybrids of the first

generation. In (C) treatment we used Carniolan bees of "Vangerog" line.
Bee colonies consume much food in spring for brood rearing and support of their lives, therefore honey production in 1996 from April 16 to May 8, i.e. during 22 days was less than 3 kg per colony, and "double" colonies consumed even their reserves. The year of 1998 was more successful, honey production over the period of 24 days was from 3.6 kg to 5.7 kg per colony. Most of the colonies efficiently used the spring honey flow in 1999: Carniolan bee colonies gathered 14.2 kg, "double colonies" – 7.6 kg of honey.
Annual honey production per check colony was on average 16.2 kg. Carniolan bees produced significantly more honey, i.e. 30.2 kg per colony and "double colonies" 25.8 kg. The other means of stimulation also had a positive effect on bee efficiency. In the treatment involving electrical heating honey production was 22.7 kg, in the treatment involving early feeding in the autumn - 22.0 kg, and in the treatment involving spring stimulation – 20.8 kg. Compared with the check colony, the treatments with Carniolan bees gave 52,6 more income per colony, the treatment involving early autumn feeding – 22.9 , the treatments involving electrical heating in spring – 21.4 , the treatments involving extra feeding in spring – 14.5 , and the treatments with two colonies in a beehive – 13,9 .

THE BEEKEEPER'S SOLUTION IN ARCHITECTURE

No 131

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Did you ever realise which kind of building beekeepers work with? Started in the cellar of their houses, the beekeeping processes crawl out into workroom, garage and hovel. Barracks are randomly added to their houses, later overgrown by a hall for the professional sector, but always decentralised, inefficient and troubling the family. My exam-work tries to solve this problem. The work is an architectural concept. It consists of a modul-based structure in building, a detailed information by a worldwide website and a financial definition of the costs and earnings down to a monthly balance. The basis of the whole concept is the necessity of a cheap but neat architectural solution for proffessional beekeepers, which allows to grow alongside the amount of beehives you have. In constructive means this worked out to be a system of frames for the static structure, and prefabricated wall- and roof-elements for the mapping, which create a room of at least 5 x 10 meters (i.e. 550 square feet), defined as one module. Modules can be arranged in the number they are needed, they can be equipped with the working-area wanted and surfaces can be designed from a large catalogue of samples. This way architecture can become a tool for the beekeeper to work with. In several ways rooms can be added, rearranged, rebuild or filled with other usage. There are possible working areas for all the functions needed in beekeeping. Architecture helps to optimize industrial processes with forklift and pallettes. Furthermore housing modules can be added to suit the beekeeper. These modules are divided by another ceiling to provide even more space for a whole family. And if the children have grown up, just take one module apart and save money for energy costs and time for room-cleaning. And if the beekeeping grows, just order more modules at www.beekeepers-house.org. Including full transparency on costs, great individuality in design and highest efficiency in erecting process. This whole concept is on the way to be realised. I would appreciate if I could explain it to you and all interested beekeepers on the APIMONDIA 2005 in Dublin.

PRODUCTION OF TOP-BAR HIVE AND FRAMES FROM CHEAP AND LOCALLY AVAILABLE MATERIALS

No 132

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Top-bar hives have been considered as an intermediate and an appropriate hives for low-income groups with low skills of bee management. However, the construction of the top-bar frames requires precision to keep the bee's natural inter comb distance (bee space), which makes beekeepers to depend on machines that might not be available in their vicinity. As a result, the adoption of top-bar hives by farmers' has been remained very low. The objective of this study was to construct and test an alternative and low cost top-bar hive and frames from locally available materials using hand tools only. For this study widely found materials like, Arundinaria alpine (bamboo) splits, Arundinaria donax (shambeko), Oxytenathera abyssinica (shimel) and Eucalyptus globules (Eucalyptus) round sticks with diameter of 31mm – 33mm were used as top-bar frames. Along with these, a machine made timber top-bars were also used for comparison. Molten beeswax was smeared at the midribs of each top-bar to be used as starter and also to guide the bees to build straight combs. For the construction of hive bodies, the same materials as top-bar frames were used.
A total of 15 honeybee colonies with uniform strength were transferred to each hive type with three replications and kept under similar environmental conditions for three years and data on bee space, brood comb thickness, comb spacing and cell depth were measured and recorded. Moreover, the honey yield data were collected and compared for four seasons. The experiment revealed the absence of statistically significant difference ($P > 0.005$) in bee space, brood comb thickness, comb spacing and cell depth among the top-bars produced from different materials and also with that of machine made one. The average honey yield (11.93kg) harvested from these hives was twice as much as the annual average yield of traditional hives. There

was no also statistically significant variation ($P > 0.005$) in honey yield among the materials used to construct the top-bar hive and frames. The experiment indicated the possibilities of utilizing the locally available materials for production of top-bars using hand tools without affecting the honey yield. It has been also calculated that the estimated average material costs required to construct a complete hive with the different test materials were five and eight times cheaper than the timber top-bar and the movable frame hives respectively.

APICULTURE RESEARCH IN UPPER EGYPT AND OMAN

No 133

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About 400 kilometers south of Cairo, situated Assiut. My research work in Apiculture in this district is extended from 1966 till now and during my work in Oman as Apiculture Specialist from 1984 to 1987 and from 1993 to 1995. The material of this report concerning my work in Apiculture research, pollinators and bee botany was published in 75 articles in UK, India, Saudi Arabia, Germany, Russia, Belgium, Canada, South Africa, Slovenia, Yemen, Jordan and Egypt. These articles were published throughout 30 years, from 1973 to 2003.

ALTERNATIVE MARKETING STRATEGIES FOR HONEY AND THE OTHER BEE PRODUCTS IN TURKEY

No 134

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Turkey is the fourth important honey producer country after China, USA and Argentina. The State Institute of Statistics (SIS) figures showed that 69.540 tons of honey and 3.130 tons of beewax from 4.288.853 hives owned by 150,000 beekeepers in 2003.
One of the most crucial problems in Turkish beekeeping sector is marketing. Beekeepers can undertake by working together in their technical and commercial activities. This means to establish a marketing cooperative. But the amount of honey marketed by cooperatives is very low. One common notion about the marketing honey and the other bee products is that it is likely to become more like other agricultural commodities. Marketing cooperatives are organizations comprised of farmers that collectively market their products. Farmer have the collective bargaining to bid up the price of products by using the cooperative a tool besides providing many services at cost. Cooperatives assist the members on the accession process from conventional beekeeping to organic beekeeping. This is an alternative way to undertake the marketing problem. Economical development for beekeeping in Turkey can be reached by an effective marketing, however, generally animal products' market structure in Turkey has a confusing chain. Beekeepers have kinds of alternatives to market their honey in Turkey. They may sell their honey: directly to consumers (in local market or roadside stand), to a honey cooperative, to a wholesaler, to a honey packer or dealer, to the export market. The length of this chain causes great differences between the producer prices and the consumer prices. At this study, it is important to examine the honey and the other bee products marketing channels in detail and marketing margins and defective aspects of this marketing margin must be revealed by both producer and consumer. Due to that, problems and defects of the honey marketing from the point of view of the producer and the other actors in the market are brought into light and suggestions are given to remove them.

NEW EDUCATIONAL MATERIALS FROM THE DANISH BEEKEEPERS ASSOCIATION

No 135

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For several years there has been a decrease in the number of beekeepers in Denmark. A campaign with the aim to change this negative development was started - and we have succeeded!
Throughout the last two to three years we have had a small increase in the number of beekeepers.
On a yearly basis, approximately 400 (or 10%) of our members do not renew their membership, while at the same time 450 new members are joining us. This means that we have to produce educational material suitable for the education of beginners. Some of our materials are also used in public education.
The educational materials include: Special issues of our journal (Tidsskrift for Biavl), Posters, a cd-rom and a dvd. Examples will be presented at the presentation.

BEEKEEPING IN UKRAINE

No 136

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Ukraine is one of the oldest leading in the world on bee breeding. Accumulation of considerable experience in the field of apiculture as well as its importance for agriculture were the cause of establishing of Ukrainian research and

echnological Apicultural Institute in Kiev in 1989. In honor of the great Ukrainian scientist, originator of scientific apiculture in the world practices the research Institute was given a new after P.I.Prokopovich. This institute is a part of Ukrainian Academy of Agrarian Sciences. P.I.Prokopovich Beekeeping Institute the main institution of Ukraine to resolve problems of apiculture. It s a scientific and methodical authority and coordinator of research activities of organizations, institutions and scholastic institutions, enterprises of different forms of property when they resolve scientific and technological problems and tasks of apiculture. In the Institute there are the Ukrainian Beekeeping and Apitherapy Associations, the National Beekeepers Associations of Ukraine "Ukrbzholoprom", the Found of P.I.Prokopovich.. Apicultural Museum is qualified to keep historical past and propagandize modern technologies of production of apiproducts. The Institute has a scientific library with scientific woks of home and foreign authors, textbooks, journal and reference literature on apiculture. The Institute to publish interministerial thematic scientific digest-"Apiculture" is a cofounder of journal-"Ukrainian Beekeeper," to cooperate of journal-"Beehive". Ukraine s member of international organizations-"APIMONDIA" and "APISLAVIA".

ECONOMICS OF HONEY PRODUCTION - THE HIDDEN BACKBONE OF NATIONAL ECONOMY.

No 137

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The paper focuses on the economics of modern beekeeping with the aim of showing the profitability of the business which can guarantee diversified agricultural product, optimise land use and minimise environmental pollution.
Problem Statement:
To a common man, it is very difficult to understand the real value of honey, the national honey need is not met, lesser attention is given to non-timber forest products (honey) – this has led to under utilisation of resources. However, honey production using modern beekeeping method is yet to be widely known and practised in Nigeria and some parts of the world, because of the belief that bee keeping is generally hazardous and should not be taken as an enterprise. Thus the knowledge and economic usefulness of honey is not growing well, the crude way of harvesting honey is still the major practise e.g. honey hunting and traditional bee farming. Few beekeepers are not aware of modern beekeeping methods and practise for optimum production and efficiency. It is therefore noteworthy that before honey production could attain its potential of increasing farmers incomes, improving standard of living, marketing of honey and other bee hive products, enabling environments and government support need to be given adequate attention and priority. The national resources may be destroyed if the bee hunters and traditional beekeepers are allowed to continue with their crude practise – This calls for the urgent need for enlightenment campaign around the world: **the main reason for the presentation of this paper**
General Objectives Of The Paper:
-To study the economy of honey production around the world
-To describe the socio-economic characteristics of bee keepers
-To assess the profitability of honey enterprise
-To examine the factor that militate against honey production
-To proffer solutions to the many problems of the beekeepers

"BKEEPING" A COMPUTER PROGRAM

No 138

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Introduction: "BKeeping" a computer program developed by a beekeeper for beekeepers to keep better records. It will be presented as a PowerPoint presentation which will demonstrate from the actual program.
Methods: The computer program has been developed using Visual Studio C++ and will operate on a windows 98 through to XP operating system. As this program has been developed using C++ it is totally self contained and has a small memory footprint. For the database it uses Foxpro DBF type files which are very efficient in storing information.
Discussion: There are 9 main areas of information:-
Site Details
Hive & Load Details
Queens
Disease
Production
Supplements
Weather
Each of these areas is expanded in information gathering to present a representation of your beekeeping operation.
Most beekeepers keep a tremendous amount of information in their head. This is fine for a short period but permanent records enable better beekeeping decisions in the long term.
Quality assurance programs are being requested by consumer groups and in Australia some packers are paying a premium price to a beekeeper who is QA audited. "BKeeping" keeps the information and enables print outs for the auditor.
There are many other areas in today's beekeeping wheret records are important for better profitable beekeeping.
All computer programs benefit from user suggestions

and I have no doubt this will be the case with "BKeeping". It is available for download for a 60 day trial so give "BKeeping" a go.

FACILITIES TO IMPROVE ORGANIC BEEKEEPING IN TURKEY; PROBLEMS AND SOLUTIONS

No 139

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Turkey possesses a huge beekeeping potential of 4 million honey bee hives and 70.000 tons of honey harvest annually. Turkey is placed among the countries where the density of beehives is the highest in the world. In recent years, significant increase in the amount organic products including honey has come into being in Turkey to meet the demand for organic products. In terms of the variety of melliferous plants, Turkey offers such a unique geography. As GMO planting is forbidden in Turkey, the ecosystem has not been ruined yet and is still favorable for the honey bee ecotypes. The present situation attracts the attention of EU countries since it has got the potential of producing "clean" hive by-products as a significant item.
As a result of positive improvements in recent years, organic beekeeping plays an important role in Turkish beekeeping. According to the data obtained from Agricultural Ministry for the year 2003, 192 beekeepers produced 1.100 tons of organic honey from 37.653 bee hives, and 109 tons of organic honey were exported to Europenion Countries, most of which was sent to Germany (64 tons). However, organic beekeeping sector is still facing serious problems. Low honey production per hive, mix harvest of honey, lack of the production of residue-free organic comb foundation and limited-use of organic acids against varroa are some of the problems facing the sector. The price difference in conventional and organic honey is not more than 10 % or 20 %. It is also said that Turkish government will continue its efforts to control the quality of organic honey and the other bee products.
Turkish organic beekeeping sector will take a better place in the world market, provided that governmental financial support, high quality management techniques, emphasizing the "clean and healthy" honey production are granted and that the customers are trained to be conscious consumers, that is, they should be ready to appreciate the difference between the organic and conventional honey.

CURRENT SITUATION OF THE MACEDONIAN APICULTURE – FACTS & FIGURES

No 140

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In 2004 the whole country area was subject of analysis with main objective to find out the current situation of Macedonian apiculture. For this purpose local beekeeping associations were visited and questionnaires were provided for managers of the local beekeeping associations (27) and for their members (433).
The results of the statistical analysis of the questionnaires show that the Macedonian apiculture has an impulse of new young beekeepers (27, 6% of the whole beekeeping population are between 20 to 40). Most of the apiaries are managed on hobby and semi-commercial basis (79,8%) which shows that beekeeping in Macedonia is good resource of additional income. The analysis of the data shows that 57% of the beekeeping businesses in Macedonia are traditional family businesses. The rest 43% of the beekeeping businesses are new. Beekeepers, according their experiences, are divided in two general groups such as: 9,3% not experienced (with 1 - 3 years experience) and 90,7% experienced (with 3 - 20 years experience).

HONEY QUALITY AS AFFECTED BY HANDLING, PROCESSING, CHANNELS OF MARKETING AND OTHER CONSTRAINTS TO BEEKEEPING

No 141

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We report the factors that affect honey quality in a pioneer study representing the national outlook. A total of 120 beekeeping households were randomly sampled in four districts, one representing each of the four geographical regions of the country, and a questionnaire was administered to each. Processed honey in both branded and unbranded forms was sampled across supermarkets, hawkers and stall markets along four transects across the capital city. Honey quality parameters assessed were moisture content (MC), free acidity (FA), diastase number (DN), hydroxymethylfurfural (HMF), and water insoluble solids (WIS), using recommended methods. Over half of beekeepers were 40 years and above, and across ages, males were predominant (77%). Honey was the major hive product

(93%) and was mainly for sale. Majority of beekeepers kept traditional hives. Pressing of combs, boiling and straining were the predominant honey processing methods. Beekeepers reported that honey quality was mainly compromised by harvesting immature honey, poor extraction and storage methods and contamination by extraneous materials. The main constraints to beekeeping were lack of appropriate equipment (52%), lack of transport and poor rural infrastructure, inadequacy in skills due to weak extension service, bad weather and vermin. Significant differences ($P < 0.05$) in HMF and DN were observed among the five honey brands. All brands met National and Codex Alimentarius MC and WIS standards while most failed in HMF and DN. For the European Union market, 40% of the brands would qualify in HMF and 20% in DN. Strong correlations were observed between HMF vs. DN ($r = 0.94$) and MC vs. FA ($r = 0.56$). Supermarket honey was more superior ($P < 0.05$) in DN (5.07) and WIS (0.1%) than stall markets and hawkers. Honey from all the retail groups qualified for all standards only in MC while DN and WIS were major tailbacks to quality. Diastase, HMF and WIS levels are all management related hence, farmer training and extension in proper honey harvesting, handling and processing should be strengthened. Quality monitoring at all levels especially processing, should be emphasized.

THE IMPORTANCE OF BEES AS GREENHOUSE POLLINATORS

No 142

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Greenhouse agriculture has spread considerably all over the world over the past decades, and the array of crops grown under enclosures is fast expanding as well. Whether it be to improve earliness, grow fruit and vegetables that simply cannot survive in the outside environment because of climate and/or pests and diseases, to isolate plants genetically for seed production, or provide the produce of superior esthetic quality that customers have gotten accustomed to, growing crops in greenhouses, taken here in their widest sense, is becoming a common practice everywhere. Many of these crops are strictly dependent on insects for their pollination. And though for others autonomous self-pollination and/or wind-borne pollen may provide adequate fruit and seed set in the open, the confined environment found in greenhouses with its reduced air movements and access for the outside fauna often highlights dramatically the essential role of bees as key greenhouse pollinators, as will be illustrated by a few examples such as tomato and strawberry.
Bees have thus become essential allies of man to pollinate greenhouse crops, though the need to introduce bees to assist pollination in enclosures is often still not fully appreciated. Indeed, the pollination of entomophilous crops in greenhouses remains more an art than a science as little scientific research has taken place to date to adress this area. Thus the use of bees to pollinate greenhouse crops can remain a challenge as the whole environment, both abiotic and biotic, is profoundly altered under greenhouses. Farmers usually think of their crops with little thought as to the requirements of the bees. And beekeepers are not always aware of the constraints that their colonies will face when placed in greenhouses and of their management options which could improve the pollinating activities of their colonies as well as their very survival. These constraints will be reviewed as will some essential points of honey bee colony management that have come to light recently to maximize the pollinating activity of bees in greenhouses.

THE EFFECT OF ENVIRONMENTAL CONDITIONS ON BEE POLLINATION ACTIVITY IN GREENHOUSES

No 143

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In modern agriculture many high cash crops formerly cultivated in open fields are now grown in greenhouses. This shift has occurred mainly to facilitate plant protection and to enable production out of season. Greenhouses have created a unique environment for bee activity, with the potential for detrimental or enhancing effects on pollination of these protected crops. We investigated flowers' rewards, bee pollination activity and the resulting fruit set in vegetables grown under greenhouse conditions. Carbon dioxide levels were found to affect the flowers rewards, and possibly bee activity in melons. Air-flow direction and level in respect to hive location affected bee pollination activity and fruit set in melon; this phenomenon is explained by the tendency of bees to fly up-wind. Enclosures limit the food resources of a colony to a specific area. This situation caused a rapid decline in colony strength mainly due to shortage of pollen as witnessed for sweet pepper and melon. The humidity in a greenhouse is easily controlled. Changes in humidity affected nectar composition of melon and hence, the flowers' attractiveness to pollinating bees. A new approach in greenhouses is to block UV radiation. In tomato greenhouses, reduced radiation interfered with the bees' navigational ability and thus reduced their activity. Overall conditions resulting from the assimilation of all the variables influencing the greenhouse environment must be considered in crop pollination management.

BEEKEEPING FOR SEED AND VEGETABLE PRODUCTION IN GLASSHOUSES

No 144

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For many crops, pollination is required to produce fruits or seeds. In the Netherlands, glasshouses are widely used to produce vegetables like sweet-pepper, egg-plant and courgette, and honey bees are placed inside to optimize pollination. Glasshouses are also used for seed production. Here 'male' and 'female' lines are often combined to produce hybrid seeds. Good pollination using honey bees is essential. Bees usually forage on the crop inside the glasshouse as long as pollen and/or nectar can be reached. Even when more attractive flowers are visited by flying through open windows, part of the bees stay foraging on the crop inside.
Glasshouses are a relatively hostile environment for bees. The use of pesticides may harm the bees, although nowadays many pests are controlled using natural enemies. Bees may get trapped in corners or structures inside the greenhouse, especially since orientation inside the greenhouse is probably difficult. Bees flying outside the glasshouse may get lost or find the windows closed when returning from foraging. Healthy colonies are therefore the key to success because the bees will continue to forage on the crop although colony size is gradually reduced. We use colonies housed in 8 or 10 frame hives for pollination inside glasshouses, most of which has been set up in the year before from two frames with a young queen. A large brood nest guarantees replacement of old and lost bees for several weeks. Hygiene and disease control warrant relatively long-lived bees

POLLINATION IN EXTRA-EARLY HORTICULTURE CROPS OF ALMERÍA GREENHOUSES

No 145

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An overview of the main extra-early crops cultivated in greenhouses in Almeria (Spain) is described, pointing out the economical importance of the pollination on the revenues of each crop. The main characteristics of the floral biology of each crop species concerning to pollination will be signalled, together with nectar analysis, pollinator attractions such as volatiles and other important traits for pollination.
Here they will be shown some results obtained by us on the pollination of sweet pepper. Also an advance of results of aubergine pollination trial will be described. Nectar dynamics and sugar composition in several sweet pepper commercial cultivars of the 'bell' type were studied during two years. Nectar volume per day was always small, depending on the cultivar and the time of collection. Differences in nectar production and composition were found between varieties and times of collection. One of the studied varieties did not produce nectar until the third month after blooming. Nectar volume decreased with flower age, being greater on the first day of floral anthesis, declining until the third day when it almost disappeared. Nectar from all varieties was hexose-dominated (glucose and fructose), although sucrose was identified in most samples. The sucrose to hexoses ratio was very variable, not only between varieties, but also within the same variety. That ratio varied among samples of the same variety, depending on the time of collection. The importance of nectar volume and sugar composition of sweet pepper is discussed from the point of view of pollinators' commercial application.
Some aubergine flower important characteristics for pollinators are described, such as pollen dimorphism, and an advance of results of a pollination trial in greenhouse by bumblebees will be discussed.

KEEPING ORCHIDS (CYMBIDIUM SP.) FREE FROM EXTRA-FLORAL NECTAR USING HONEY BEES

No 146

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Many plants produce extra-floral nectar. In Cymbidium orchids, produced as cut-flowers in glasshouses, nectar production is very high, resulting in nectar droplets at the base of flowers and stems. The flowers get sticky, and black fungi grow on the nectar droplets. In serious cases the flowers have to be cleaned manually before they can be sold. Bees are essential for pollination of many of our crops, where they transfer pollen from flower to flower. Their ability to forage on nectar sources is used to produce honey, but this ability may also be used directly. By placing a honeybee colony inside a glasshouse with Cymbidium orchids, bees can be used to remove all visible nectar on the flowers and growth of fungi is prevented. The main problem for the use of honeybees in Cymbidium are residues of pesticides. In ornamentals many persistent pesticides are used. Several months after spraying, forage bees may still get in contact with the residue and foraging on the nectar droplets will stop

after the first flights. Because glasshouses with Cymbidium are kept relatively cold and shaded, breakdown of pesticides takes longer than usual. In addition, Cymbidium grows very slowly, so months before bees are needed small flower stems are already present. Therefore, bees walking on the stems to forage on the nectar droplets are easily contaminated with residues. Cymbidium pollen is transferred in packages to large insects like bumblebees, and the flower is spoiled. Fortunately, honey bees are too small to spoil the flowers but this implies that they cannot forage on Cymbidium pollen. If they cannot forage outside, brood rearing is stopped and colonies have to be strengthened regularly. We do not provide alternative protein sources to the bees as this will increase defecation of bees on the flowers.

THE POSSIBILITY OF THE PLANTS' DETERMINATION POLLINATED BY *BOMBUS TERRESTRIS* L. AND ECONOMICALLY IMPORTANT SOLITARY BEES - *MEGACHILE ROTUNDATA* F. AND *OSMIA RUFA* L. ON THE BASIS OF PALYNOLOGICAL ANALYSES THEIR FAECES.

No 147

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Till now practical methods of determination wild bees food plants on the basis of pollen analysis depended on taking away collected by insects pollen. It was always connected with killing them or destroying their nests. The aim of research was to check if the pollen analysis of faeces will let to know about food plants of chosen insects species without the interference in their life. This method limits only to taking of samples faeces in which are residues of pollen grains in form of undigested external layer of the exodermis - exine which structure is the most important also in the pollen analysis of alive pollen grains. The pollen analysis of faeces can be used in the research of food plants protected species of solitary bees and bumblebees, nesting in the ground, for example in the case when taking pollen samples for analysis is impossible (inaccessible nests) or when it would be connected with complete devastation of nest, especially in protected regions.

THE USE OF HONEYBEES AND BUMBLEBEES AS VECTORS FOR THE DISSEMINATION OF ANTAGONISTS AGAINST GREY MOULD IN STRAWBERRIES

No 148

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Antagonists can effectively be applied against Botrytis cinerea in strawberry. They can be administered by spraying, but since Botrytis enters the plant through the flowers, the use of pollinating insects, already present for their pollinating service, for the dissemination of antagonists seems promising. The research in 2004 showed that two different antagonists could be effectively distributed to the flowers by bumblebees and honeybees, although the number of spores recovered per flower was not yet sufficient. In 2004 cellulose and talcum were used as a carrier for the spores.
The research of 2005 focuses on improvement of the dispensers used on the hives of the bumblebees and honeybees, and on testing and comparing different carrier substances, for instance bentonite, cellulose, talcum, quartz. A good carrier has to adhere to the bees' body surface, but needs also to be transferred to the petals and adhere to them. The results will be presented and discussed.

BECHBRETHA: THE ANCIENT IRISH BEE JUDGEMENTS

No 150

James Ryan

Bees played an important part in life in Ancient Ireland. Ireland was traditionally known as the "Land of Milk and Honey. Our ancestors produced a body of law tracts called Bechbretha which means The Bee Judgements in Irish. The text that has come down to us dates from the middle of the 7th century but is obviously from an oral tradition many centuries older. The text deals with the ownership of bees and how the honey was to be divided up among adjoining landowners; Injuries done to people by bees and the penalties for such injury; and the penalties for the stealing of bees. The laws also give details of the vessels used to measure honey. As well as the actual text of the laws the manuscripts that have been preserved have interesting comments written on the margins and these give a flavour of what beekeeping was like over the centuries

THE ISLE OF WIGHT DISEASE IN IRELAND

No 151

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The impact of the Isle of Wight epidemic on Irish beekeeping and the Irish honeybee population in the first half of the 20th century was explored. Isle of Wight disease, which is associated with acarine, caused by the

mite Acarapis woodii, was first discovered in Ireland in 1912 and, according to anecdotal reports, had a catastrophic effect on honeybee colonies across the country over the next 15 years. To assess the short- and long-term consequences of the disease, the records of the apiary examinations conducted by the bee inspector T. B. O'Bryen, issues of the Irish Beekeeping Journal, and other archival material held in the library of the Federation of Irish Beekeepers' Associations for this period were reviewed. The findings provide insight into the spread of Isle of Wight disease across Ireland, the immediate effects of the disease on honeybee colonies, and the long-term economic and psychological impact of the disease on Irish beekeeping. Most importantly, the results are of particular relevance to assertions that the Isle of Wight disease eradicated the Irish strain of the native dark European honeybee (Apis mellifera mellifera).

COMPARATIVE DNA ANALYSIS OF IRISH AND OTHER DARK EUROPEAN HONEYBEE SAMPLES.

No 152

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Mitochondria are present in the cytoplasm of eggs, but not sperm and contain DNA that is passed on by female parents only, providing long-standing molecular details that characterise individual queen lines. Comparative studies of two features of mitochondrial DNA reveal affinities and minor distinctions between different lines that allow construction of pedigree diagrams showing the descent and relationships of all queen lines.
The bulk of genetic information is carried on chromosomes within the nuclei of both eggs and sperm and transmitted by both sexes at fertilisation.
Chromosomal DNA can be characterised by details of a subfraction called "microsatellite DNA" which differs between individuals and is utilised in our own species for DNA fingerprinting. Study of microsatellite DNA in individual worker honeybees indicates the proportion produced by inbred matings and also reveals the extent of introgression of foreign DNA into that of native A.m.mellifera stocks, through mating of their queens with drones of exotic subspecies.
(This presentation is based on data developed in the laboratory of Prof. Bo Vest Pedersen at the University of Copenhagen.)

A NEW LOOK AT BEEWING MORPHOMETRY

No 153

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An Beachaire December 1993 published a study, by T.J. Carroll, on the racial identity and purity of Irish honeybees. He analysed bees from 110 colonies and found that 106 colonies were predominantly Apis m. mellifera. E.O'Sullivan, P.Lyne, and R.Mooney young scientists of 1996 presented their study "The Perfect Queen Bee". A large proportion of their project was a countrywide bee-wing-morphometric-survey, identifying strains of bees used by Irish beekeepers. They studied 684 colonies (an average of 30 right wings/colony were measured). Their overall conclusions confirm that most bees farmed in Ireland can be regarded as representative of A. m. mellifera strains. More recently (2002 – 2004) DNA of 50 Irish samples, studied by V.Pedersen (Denmark) confirmed that the Irish bees were in the main undiluted A.m.mellifera. The present study attempted to explore in greater depth relationships in wing venation. I used left and right wings of 30 worker bees from each of 40, out of the 50, Irish samples included in the above project. Computer software enabled the analyses of aspects of bee-wing morphometry which until now have been neglected. The following programme was used for measuring - Version 1.20.902.54 Beewings, designed and distributed by the Bee-Research-Institute in Dol (Czech Republic). For statistical analysis I used Genstat 5 Second Edition (for Windows) Copyright 1995 Lawes Agricultural Trust (Rothamsted Experimental Station). The importance of Normal-Distributions is emphasized.The distribution of means of the discoidal-shifts (DS) ranges from –5.076 to 1.531.The means of cubital indices (CI)range from 1.5 to 2.056 (i.e. A.m.mellifera). I found a positive correlation between the means of DS and CI. It emerged that in all the samples there is a negative correlation between the short and long arms of CI. A number of subgroups were found. I generated multiple-linear-regression-models for discoidal-shifts in 13 samples, using eight veins as exploratory variables. This again showed that DS and CI are not independent variables. Finally analysis of left and right wings was used to partition the phenotype into its genetic and non-genetic (e.g. environmental) components.

IMPROVING THE DARK EUROPEAN HONEYBEE

No 154

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Introduction: As members of the Galtee Bee Breeding Group we believe that Apis mellifera mellifera is best suited to Irish climatic conditions. Having first established purity of strain our next objective was to identify the more desirable behavioural characteristics and then propagate those.
Methodology: Over the past fifteen years Group members have based their selection procedure on monitoring five behavioural characteristics which were devised by our chairman Micheal MacGiollaCoda. These are Docility, Steadiness on the Comb, Brood Pattern,

Pollen Storage, Comb Building / Productivity – with priority being given to docility and brood pattern.
Selected genetic material must attain a 75% rating on the above five characteristics
Breeder material is made available to members to increase the desirable gene pool and for on going evaluation. Proven satisfactory breeder material is returned for inclusion in our Instrumental Insemination programme.
Conclusion: The results to date show an outstanding improvement in the quality of our stock. Comparisons show an improved mean rating from 51% at the start of our project to 75% at present.

QUEEN SUPERSEDURE IN *APIS MELLIFERA*

No 155

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Supersedure is the act of queen replacement without the act of swarming taking place. Looked at in this way, there is no more merit in the act than the replacement of a failing queen.
The most efficient form of this act is the one where the old queen and her daughter continue to live together in the broodnest for a while. It is efficient because there is no period of queenlessness. In other forms, the old queen may die (a) before any queen cells are built, (b) while there are queen cells only, or (c) while there is a new virgin queen in the hive.
During supersedure, there are only very few queen cells built, normally one or two, usually but not exclusively on the face of the comb.
However, supersedure in the right context rises to a new high level of importance. The strain of bee becomes paramount in this instance. The oceanic climate of Ireland and the United Kingdom is capable of producing years where non-swarming favours survival and only the non-swarmers manage to live to better times. The Irish farmer, for example, would talk of 'saving' hay while the rest of us 'make' it.
In a strain of bee with low levels of swarming, long-lived workers and queens, and a strong love of pollen, supersedure is likely to be an important characteristic. Such a strain, if selectively bred, could pass on this valuable characteristic with a consequent reduction in the necessary work involved in swarm control.

HONEY YIELD PRODUCTION PATTERN TEAGASC, CLONROCHE, IRELAND 1966-1999

No 156

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Records from the production apiaries at Clonroche over this extended period show that it is possible to consistently produce good crops of honey. The average honey yield over the 34 year period was 23.5 kg per colony. In the climatic conditions that prevail in Ireland this would be considered good. The principal source of nectar was the blackberry (Rubus fruticosus) with white clover (Trifolium repens) and other plants contributing. Beekeepers in areas where oilseed rape (Brassica napus) is grown would have a considerable advantage.

The type of bee was the dark race that prevails in Ireland. To exploit fully the available floral sources the beekeeper has to ensure that the colonies are managed skilfully. This means that attention to feeding, swarm control, queen replacement and elimination of disease is paramount.

A STRATEGY FOR GROUP BEE BREEDING IN IRELAND

No 157

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The Galtee Bee Breeding Group (GBBG) in Ireland represents a model for local honeybee improvement and conservation initiatives. The GBBG was established on December 30th, 1991, by a group of 4 beekeepers from the Galtee/Vee Valley of South Tipperary. The objectives of the group were the conservation of the dark European honeybee (Apis mellifera mellifera), the study and restoration of local strains of this bee, and the elimination from the locality of bees with undesirable traits, such as aggressiveness and an increased swarming tendency. Potential breeder queens were identified, and an isolated breeding apiary was established on the slopes of the Galtee Mountains. Using the so-called Dún Aonghusa system, the purity of breeder queens was ensured by surrounding the breeding apiary with successive rings of apiaries containing desirable queens. Over the years, the area covered by the GBBG was expanded to include much of the east of the province of Munster. In addition, the group's bee improvement and conservation philosophy was disseminated to other parts of Ireland by inviting interested beekeepers to join and by encouraging the establishment of other local bee-breeding groups. The GBBG has also set up an instrumental insemination program, organized morphometry and queen-rearing workshops, founded a quarterly newsletter, and established a beekeeping study group. The efforts of the GBBG have led to the development of a honeybee that according to morphometric and DNA studies is a pure strain of A. m. mellifera. In addition, there have been continuous improvements in the desirable characteristics of these bees, including docility and swarming propensity, with no concomitant loss of honey productivity.

THE ROLE OF BIBBA

No 158

Albert Knight, BIBBA Groups Secretary

The Bee Improvement and Bee Breeders Association (BIBBA) have over the past 40 years tried to make beekeepers aware of the importance of preserving the native bees of Britain and Ireland, Apis mellifera mellifera, the Dark European honeybee. Through the publication of books and pamphlets, workshops, lectures and conferences, BIBBA has shown how to identify this sub-species from other sub-species and their hybrids; advocating the formation of groups and describing ways of selecting and improving the sub-species by breeding.

This has resulted in the formation of numerous breeding groups throughout Britain and Ireland. Ireland as played a very significant role in the development of breeding groups and the Galtee Bee Breeders Group (GBBG) has become a role model for breeding groups elsewhere. It is therefore particularly appropriate that the founder of the Galtee Bee Breeders Group (GBBG), Michael Mac Giolla Coda, should be the President of BIBBA.

The GBBG has become the largest BIBBA group anywhere, and it has spawned other groups in Ireland. Another significant event in Ireland was the honeybee survey carried out by the three Irish schoolgirls that won the Young Scientist of the Year Award in Ireland, then going on to win third place in the European Young Scientist of the Year award.

In this talk I will go on to give more details of BIBBA's role in beekeeping.

APITHERAPY, IMMUNOLOGICAL ASPECTS,

No 160

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Medicine, like all other fields, is subject to trends. In recent years, trends towards "alternative healing" have emerged on top. Medicine has advanced so much that attempts to create medicines that are less harmful than synthesized medicines have resulted in this natural trend. One type of "alternative healing" is called Apitherapy. Apitherapy is defined as "the healing use of the products of the honeybee hive". Much of apitherapy is based on the properties of bee venom, though there are other byproducts (propolis, royal jelly, wax, honey and pollen) which have claimed to be beneficial.
Bee venom is composed of 78 different components, many of which are peptides that should provide an anti-inflammatory affect, as well as other agents which stimulate the body's immune system. Pure bee venom (Apitox) has been tested and found to be safe in humans and animals by the International Pain Institute.
The byproducts of honeybees seem to have a lot of potential for effective treatment of many medical conditions. Propolis is a sticky resin-like substance that bees collect from tree buds and bark i. It s much better antibiotic than chemical antibiotics because it only kills the harmful bacteria in the body activate macrophages by producing cytokines, antitumor activity, antifungal, antiviral, immune stimulant Royal Jelly is another compound that is supposed to have beneficial effects and have boosting energy to treating kidney disease, even boosting sex drive.

WHY AND HOW TO BUILD AN APITHERAPY DATA BASE?

No 161

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Any serious scientist/researcher/practitioner before starting a new study/project makes first his/her "homework" by searching if his/her kind of study has been already made by other people from other countries/institutions. Indeed it may be frustrating to invest a lot of time, energy and money to just re-invent... the wheel.
Why is important to build an Apitherapy Data Base (A.D.B.)?
Because in an A.D.B. you can easy and fast find:

- Similar papers/works/books written by colleagues from other countries/institutions;
- The whole "picture" of Apitherapy, thus orienting your work towards the real needs of Apitherapy and its development;
- Contact addresses of people having similar passions with your ones (the so called Apitherapy "Yellow Pages").

The main needed steps to be done in building an A.D.B. are:

- Contact the best specialists in bee products and Apitherapy you know, then collect all Apitherapy related information you find;
- Organize in your computer and in your own library the collected information on the following at least 5 big chapters:
- BEE PRODUCTS (honey, propolis, beeswax, Royal jelly, Apilarnil, bee bread, bee pollen, bee venom) and their origin, characteristics, composition, properties, indications, contra-indications, administration, preparations & products, quality, photos, general and specific uses.
- Medicinal and nectaro-poleniferous herbs.
- Human and Animal Diseases that can be treated through Apitherapy; group the diseases on Specialities like blood diseases (Haematology), skin diseases (Dermatology, etc.).
- Apitherapy and Apipuncture specific methods and

techniques.
- The Apitherapy "Yellow Pages", structured on "Countries" but also on professions like "Biochemists", Pharmacists", "Practitioners", etc.

Once you built your Data Base start sharing it with all people that need it, thus being able, through feed-back, to continuously update it!

THE "APITOX" PROGRAM FOR MULTIPLE SCLEROSIS TREATMENT AND REHABILITATION

No 162

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We've worked out the complex program "APITOX" for Multiple Sclerosis (MS) treatment. It is based on the usage of apitoxins and other apimedicines.
The effectiveness of the treatment have been traced due to the data of clinical observation and instrumental inspection (magnetic resonance imaging therapy, blood analysis and liquor analysis) with the frequencies of 1 week, 1 month, 6 months and 1 year after the treatment.
During 3 years 60 MS patients have been provided with treatment and observed, 32 women and 28 men are among them.
We've got the following results:
- 85 % of all patients have had the halt of the demyelinization owing to MSD-peptide, melittine and phospholipase.
- 73 % of all patients have had the remyelinization owing to the direct action of "the nerves growth" factor and maintenance of 18 indispensable amino acids in bee venom.
- 92 % of all patients had had the realization of the new physics opportunities (co-ordination included) owing to the activation of the system "hypothalamus-hypophysis-cortex of epinephros"; action of apamine and melittine; influence through the biologically active points, improvement of functional bonds between Central Nervous System; apikinesitherapy.
- Improvement of the functions of the pelvic organs: 63 % of all patients have had their trophic processes and reflecting influence improved.
- Rehabilitation of sensitivity: 95 % of all patients have had the improvement of microcirculation of tissues and the improvement of the nervous impulse leading and of reflective influence.
- Improvement of the psychic status and in the spirit; removal of anxiety – 88 %.

Thus, "APITOX" is:
- A complex approach to MS treatment.
- A therapy without any severe side effects and aftereffects.
- A set of impressive clinical results.

Most of up-to-date types of treatment and methods have really a narrow range. They don't cover all the pathogenetic spectrum at once, underestimate psycho-emotional factors and sometimes are mistaken in choosing physic rehabilitation.
The above and some other drawbacks are avoided in the "APITOX" program that allows achieving a new HQ level in the treatment of MS.

RELEVANCY OF BEE POLLEN IN HUMAN DIET

No 163

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Bee pollen as used in human nutrition is the male germ cell of a flower blossom which has been gathered by the bees and to which some nectar or honeydew and digestive enzymes from the bees have been added.
The main ingredients of pollen are carbohydrates, proteins, fibre and lipids beside a wide spectrum of different substances such as vitamins, minerals and trace elements. The composition of pollen depends largely on its botanical origin. There is a broad range of variation with respect to composition and quality of the main constituents and specifically in the numerous phytochemicals and polyphenols.
Pollen is most commonly traded in a dried form with water content up to 8%. Despite of its nutrient density pollen is considered rather a neutraceutical than a food product and its primary market is dietary supplement.
Beyond nourishing its focus is strongly on the functional properties based on the essential nutrients as well as on the minor constituents and their physiological effects.
For example plant metabolites such as flavonoids and other phenolic compounds for which pollen is a rich source, have demonstrated antioxidant and anti-inflammatory properties. In order to produce the desired effects a certain availability of the nutrients which are encapsulated in the pollen grain is to achieve. Thus the development of products with enhanced and well preserved functional properties is still a challenge for the food technology.
Modern analytical methods step by step unveil the secrets of pollen composition. And a growing number of clinical studies is adding to the scientific knowledge about the respective effects on human well being and health. However due to the immense variety of the raw materials some mystery will remain.
This review will concentrate on nutrition and well being. It will not cover aspects of apitherapy

HONEY FOR NUTRITION AND HEALTH: A REVIEW

No 164

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The main ingredients of honey (H), are the carbohydrates besides a wide spectrum of different substances: traces of the minerals Al, B, Ba, Bi, Ca, Cd, Cl, Cs, Cr, Co, Cu, F, Fe, I, K, Li, Mg, Mo, Na, Ni, Rb, Se, Si, Sr, S, Zn, V and of the vitamins B1, B2, B5, B6 C and K; amino acids, proteins, enzymes; acids; numerous phytochemicals, polyphenols and volatiles. The composition of H. depends on its botanical origin. First of all, H is a highly effective fuel. The Glycemic Index (GI) of H, varying from 32 to 87 and depending on H's botanical origin, is important for the evaluation of the nutrition effects of honey. H with various GI's can be useful for different nutrition purposes. It is beneficial for athletes, enhancing their performance and H with different GI can be ingested in order to optimise specific athletic exploits. H has a cyto-protective activity and prevents gastric damage in experimental nutrition studies. Infants fed on H gain more weight and have a better intestine flora than ones fed on sugar. H contains many oligosaccharides which might explain its effect as functional food. The intake of H enhances the development of Bifidus bacteria. It possesses antimicrobial activity against many pathogenic bacteria and its ingestion has a positive effect on bacteria-induced diseases such as bacterial gastroenteritis and gastric ulcers. H promotes rehydration and shortens the duration of acute diarrhoea. It has antioxidant activity due to polyphenols, flavonoids and other compounds, depending on its botanical origin. This activity probably protects against oxidative stress, chronic diseases, like coronary heart diseases and atheroscleorsis. H has a gene protecting effect and also immuno-protective and immuno-modulatating activity in animal and cell experiments, and can thus promote anti-cancer effects. It is used in many food applications: in beverage clarification; for enhancement of Bifidus bacteria growth, of browning, of food flavour and of food shelf life; for preventing of drinks browning; for coloration of food and as food extrudable. It is a valuable additive to many different foods: different milk and baker products, cereals, spreads, marzipan, caramel, nougat, juices, syrups, fries, pasta, snacks, salsas etc.

TRAVAIL DE LA COMMISSION À CUBA DE 1997 À 2005

No 165

R Domergo

Durant ces dernière années, la Commission d'Apithérapie a mené à bien un travail de recherche pré clinique et clinique avec l'accord des autorités cubaines. Au vu des résultats, des applications dans différents hôpitaux et en milieu rural ont eu lieu entre 2003 et 2005. Les pathologies approchées concernaient principalement des infections (en particulier sphères ORL, broncho-pulmonaire, digestive et ostéomyélites) ainsi que des problèmes de cicatrisation. Plus de 2.600 cas ont été traités et le pourcentage de guérison se situait entre 84 et 87%.

L'apithérapie a non seulement montré son efficacité en milieu hospitalier, mais plus encore, qu'elle était une médecine d'avenir, ses résultats étant dans de nombreux cas supérieurs aux traitements de synthèse des cas de comparaison. Pour finaliser le projet, la Commission d'apithérapie, en relation avec des instances apicoles et le Ministère de la Santé de Cuba a permis de mener à bien l'entièreté des dossiers des enregistrements comme médicaments (aromiels et proparomiels, mélange standardisé de miel thérapeutique et d'huiles essentielles chémotypées et/ou propolis standardisée) des produits utilisés à Cuba. Nous montrerons, lors de cette publication, aussi bien les résultats pré cliniques que cliniques inhérents à ce projets.

Mots-clé : apithérapie, aromiel, huile essentielle, propolis, infections, ORL, broncho-pulmonaire

Liste des publications et références sur demande

FROM CUBA TO BURKINA FASO

No 166

T Cherbuliez, President of the Standing Commission on Apitherapy, Apimondia Executive Council

In the last twelve months, the Commission has significantly pursued its humanitarian mission. The work done in Cuba for the last seven years has yielded the following results: in the course of four symposia we have trained more than 600 health professionals, physicians, pharmacists and nurses. Our preclinical work has demonstrated the safety and efficacy of our antiviral and antibacterial formulations. In close cooperation with the University we developed the first green medicine protocol for the treatment and bacteria infections together with the treatment of 2600 patients. Finally we have developed the tools and the technique allowing the treatment of hospital acquired infections. Two of our formulations have been officially registered as medications. All our formulations can be created from sources that are indigenous to the country and they all can be registered. In brief, Apitherapy has obtained a legitimate place: our project was declared to be of National Development by the Ministry of Health.
Our next humanitarian mission concerns Burkina Faso for which we have developed an Apitherapy project. It includes four distinct components: Apiculture, Agro-forestry, Pharmacy and Medicine. Having successfully conducted a feasibility study, we were able to show de work done in Cuba to Burkinabé experts. From their reports the Minister of Health declared the program of Apitherapy to be of national interest and asked the United Nation Development Program for support . UNDP in turn pledged its support in finding funding. This development show that Apitherapy has been legitimized by both Burkina Faso and the United Nations.

THE BEHAVIOUR OF ADULT SMALL HIVE BEETLES TOWARDS HONEYBEE WORKERS AND DRONES

No 167

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Small hive beetles [SHB] are honeybee, Apis mellifera, parasites and show a series of behavioural interactions with their hosts, ranging from defence to offensive behaviour. Previous studies show a high degree of flexibility in the behaviour of adult SHB from defence posture to attack on adult bees. This indicates that SHB are able to adjust their behaviour. Here we test for the potential of behavioural shifts in SHB behaviour using groups of adult honeybees with different levels of defensiveness. Mature workers and drones (N=80 each) and callow workers and drones (N=80 each) were tested against SHB which were either caught in field colonies or reared in the laboratory. For each test group (N=4), the interactions between 20 honeybees and 10 SHB were observed for 50 minutes. The individually labelled SHB were observed for 5 minutes each and all behavioural interactions between the SHB and the bees were recorded. The results show that there are significant differences in the behaviour of the SHB towards the different groups. The data suggest that adult SHB are probably able to make tactical decisions according to the defensiveness of the host.

REVIEWING THE CONFINEMENT OF SMALL HIVE BEETLES (*AETHINA TUMIDA*) BY WESTERN HONEYBEES (*APIS MELLIFERA*): LIFE IN THE PENITENTIARY

No 168

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Although only scavengers in honeybee colonies in their native range of sub-Saharan Africa, small hive beetles (Aethina tumida) can cause considerable damage to colonies of European honey bees in Australia and the southeastern United States. Early research on the beetle focused mainly on its biology and control although there has recently been a shift towards studying its intra-colonial behavior. Researchers have demonstrated that when small hive beetles enter a bee colony, a cohort of guard bees confines them to the nest periphery (a bee response that limits beetle reproduction).
As bees pass through their normal sequence of age-dependent tasks, they begin guarding small hive beetles at 18 days of age. Behavior of guard bees at confinement sites includes biting (extending head and lunging towards beetle with open mandibles, or attacking beetle), antennal contact (touching beetle antennae), trophallactically feeding confined beetles, and biting the area around beetle prisons (chewing at prison walls with mandibles). Despite a myriad of bee defensive behaviors that culminate in beetle confinement, the beetles are able nevertheless to dupe their honeybee guards into feeding them. In addition to soliciting trophallaxis, beetle behavior at confinements sites includes resting (not moving), antennal contact with guard bees (touching prison guard bee antennae with their antennae), and mating.
The confinement behavior of African and European honeybees appears unique among social insects; if the behavior is present in other social insects, it has not yet been discovered. Indeed, confinement behavior may be one reason that nest inquilines are relatively rare in honeybee colonies. Small hive beetles (and other small nest intruders in honey bee colonies) may exert selection pressures on their hosts that are unique among social insect inquilines; hence, the confinement scheme may be unique to honey bees. In conclusion, we may consider confinement behavior a superorganismic immune response of honeybees to small nest intruders.

TRAPPING SMALL HIVE BEETLES, *AETHINA TUMIDA* MURRAY

No 169

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The small hive beetle, Aethina tumida Murray, is a newly introduced honeybee pest in the Western Hemisphere where it has become established in Australia and the United States. Various control measures have been developed, but other effective and safe methods are needed to control this pest without fear of hive product contamination. Various traps for small hive beetles have been investigated that seek to control this pest without the use of chemicals. Traps placed in the apiary outside of colonies have been inefficient primarily due to competition with hive odors making colonies more attractive to flying beetles. Other inside-hive traps have been developed that require modification of the hive (Hood 2004), but few have been field-tested.
Since 1998, we have been developing an inside hive trap for small hive beetles that can be placed in the bottom or top of an infested colony. The trap (152x80x25 mm) is manufactured of transparent plastic and can be attached by two screws to the bottom bar of a hive frame. The frame containing the trap can be placed in a hive body or a honey super in frame position one or ten. We have tested various modifications of the trap lid in an effort to develop a lid that deters beetle escape. The trap is made of durable plastic and should last for many seasons. We continue to test various food grade materials that are placed in the trap to attract beetles and result in reducing the pest population. One goal of the project is to produce a trap that can be placed in a beetle infested hive that will attract and kill over-wintering adults which is the predominant life stage present in winter.

SUB-LETHAL EFFECTS ON BEES OF SYNTHETIC VARROA ACARICIDES

No 170

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Applications of synthetic acaricides such as fluvalinate and coumaphos are routinely used to control Varroa destructor. Although these chemicals have low acute toxicity to bees, there is mounting evidence that they are not harmless to the insects they are designed to protect. So far, published reports of this troubling evidence have been limited to their effects on developing queens and drones. In conference we plan to report results of a 2005 experiment designed to detect sub-lethal effects of label rates of fluvalinate and coumaphos on brood and bees, including effects on bee population, brood production, honey production, colony foraging rates, brood survival, worker longevity, and age-related worker bee tasks. The work involves field observations, incubator lab tests, and observation hives. The work is scheduled to begin spring 2005. An apiary of thirty-six standard, 10-frame experimental colonies will be set up, each colony receiving one of three treatments (12 replicates): (1) two strips of CheckMite™ (coumaphos) inserted between frames 4/5 and 5/6 for 42 days (2) two strips of Apistan™ (fluvalinate) inserted between frames 4/5 and 5/6 for 42 days; (3) no treatment. This work has the potential to increase our understanding of the complicated cost-vs-benefit ratio of pesticide use in beekeeping.

THE REPRODUCTIVE BIOLOGY OF VARROA DESTRUCTOR ON AFRICANIZED HONEY BEES UNDER THE TROPICAL CONDITIONS OF COSTA RICA

No 171

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Varroa destructor is a worldwide ectoparasite of serious economic importance for beekeeping. Severe colony mortality is routine in parasitized European honeybees (EHB) colonies in Europe, Asia and North America. Nevertheless, regional differences in season length, weather conditions and bee and mite genotypes make it difficult to characterize the mite reproduction over a widespread area. In Costa Rica, some beekeepers have reported loss of hives and reduced production of honey as a consequence of V. destructor introduction, but other beekeepers believe that varroa is not a real problem and they have not applied a strict control program. Therefore, the real impact of varroa on Africanized honeybees (AHB) in Costa Rica is not clear.
The study was carried out in Heredia in the Central Valley of Costa Rica. The area has a tropical climate; February through April are dry months, and May through July are rainy months. The reproductive ability of varroa mites was determined in 19- to 20-day-old worker brood from 318 cells in AHB and 307 cells in hybrids (HF1). Several variables were measured for foundress female mites: fertility (defined as the successful production of offspring); production of a mature female mite (i.e., a potentially reproductive offspring); fecundity (number of progeny); production of only immature offspring; and production of only female or only male offspring.
No significant differences were found between AHB and HF1 in the percentage of fertile foundress mites (AHB=69.8%, HF1=76.5%), the percentage of foundress mites that produced mature female offspring (AHB=28%, HF1=25.4%), the mean number of offspring per foundress (AHB=3.4, HF1=3.5) and the percentage of foundress mites that produced only immature stages (AHB=17.3%, HF1=18.2%). Nevertheless, the percentage of foundress mites that did not reproduce at all tended to be greater in AHB than in HF1 colonies (AHB=30.2%, HF1=23.5%; P=0.06). In both groups of bees, the number of fertile varroa mites was higher than what other studies have reported for AHB in Brazil (49-55%). Furthermore, the percentage of non-reproducing mites was greater than the percentage reported for mites in EHB and lower than the percentage reported for mites in AHB in Brazil. Thus, the AHB population we monitored in this study may be less tolerant to varroa than AHB populations in Brazil.
In conclusion, mite fertility in worker brood cells was similar between AHB and HF1 colonies. Factors that limited varroa population growth included non-fertile female mites, foundresses that produced only immature stages, foundresses that produced only one adult sex, and mortality of emerging mites. The combined effects of these factors results in less than 30% of the foundress mites producing viable female offspring during one reproductive cycle in both AHB and HF1 colonies.

DELAYING VARROA ECONOMIC THRESHOLD WITH INTEGRATED PEST MANAGEMENT

No 172

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In many parts of the world, non-chemical Varroa control practices rarely can singly or indefinitely keep mites at non-damaging levels. Under these situations it seems most practical to think of IPM as a means to delay, not eliminate, chemical treatment. If a beekeeper can prolong the inter-treatment interval as long as possible this not only reduces net chemical use and its attendant hazards to bees, honey and the environment, but also enables mites through genetic recombination and reproduction over time to conserve their chemical susceptible genes, thus prolonging the useful life of an acaricide. In conference we report on two independent, long-term (17 months and 87 weeks) studies designed to

appraise the effects of published integrated pest management practices on colony varroa mite levels, length of time before onset of economic threshold, and other measures of colony productivity. Screen hive floors tended to reduce colony varroa mite levels (24-hr sticky sheet counts), sometimes significantly. Resistant queens tended to reduce colony mite levels, sometimes significantly; number of mites on sticky sheets decreased as the percentage expression of hygienic behavior in a colony increased, and on the majority of sampling episodes the number of mites retrieved on sticky sheets was numerically lower in colonies with queens expressing suppressed mite reproduction (SMR). Time until achieving economic threshold was significantly delayed in colonies with SMR queens (ca. 72 weeks) compared to non-selected queens (59). In one experiment stored honey was higher in colonies with screens (4 frames) than solid floors (ca. 2), but the reverse was true most sampling weeks in the second experiment. Moreover, stored pollen was also lower in screen colonies (0.9 frames) than on solid floors (1.3). Finally, SMR queens tend to have reduced brood production, sometimes significantly. The effects of apiary isolation were shown to be virtually non-significant in any variable of interest.

THE EFFECT OF OXALIC OR FORMIC ACID TREATMENT ON LARVAE IN A HONEYBEE COLONY

No 173

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Honeybee larvae experience various chemical stresses. The chemicals that are most often encountered are acaricides against the Varroa destructor parasite. We tested whether different treatments of honeybee larvae with "alternative" Varroa control substances such as oxalic and formic acid cause cell death. We have attempted to study the distribution of cell death in treated honeybee larvae.
The effects of oxalic (OA) and formic acids (FA) on honeybee larvae in colonies were assessed and evaluated. Cell death was detected by the TUNEL technique for DNA labelling. In 3- and 5-day-old larvae exposed to OA, cell death was found in 25% of midgut epithelial cells 5 hours after the treatment, using an 'In situ cell death detection kit, AP' (Roche). The level of cell death had increased to 70 % by the 21st hour and the morphology of the epithelium remained unchanged. Fifty hours after the application, cell death was established in 18% of the epithelial cells of the 3-day-old larvae and had increased to 82% in the 5-day-old larvae. A "DeadEnd" apoptosis detection kit (Promega) showed sporadic cell death mainly in the larval fat body 5 hours after treatment. Twenty-one hours after the OA application cell death was found in 4% of the larval midgut epithelial cells. Evaporated formic acid induced extensive apoptotic cell death in the peripheral, cuticular and subcuticular tissues that preceded the cell death of the entire larval body.
Quantification of cell death could be used in effectively monitoring the effects of organic acids on larval tissue, when applied to larvae in a honeybee colony. Used methods are thus useful for evaluating the detrimental thresholds of larval tissue. Further clinical field tests to determine larval and/or adult bee death are needed to evaluate the full effects of substances used in bee colonies.

CONTROL OF *VARROA DESTRUCTOR* USING DIFFERENT INTEGRATED PEST MANAGEMENT STRATEGIES

No 174

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The economic impact of the bee parasite Varroa destructor has been and still is a major concern for many beekeepers around the world. Our research has been dedicated to the development of an integrated pest management (IPM) strategy based on the use of screened bottom boards and organic acids such as oxalic acid and formic acid.
Beekeeping characteristics of our region can be summarized by short harvesting periods and long winters (5 to 6 months) during which bees must be protected from cold. All our bees are kept in typical Langstroth hives.
One hundred selected colonies where distributed during spring 2004 in different experimental groups (three) and a control group. The experimental model has three independent variables: three different IPM strategies, two wintering strategies (one or two hive bodies), beekeeping sites (four); and various dependent variables: exponential varroa population growth during summer, honey production, varroa and honeybee population before and after wintering. Statistical analysis of data is accomplished by using the GLM procedure (SAS system) and a t test LSD for the comparison between different groups.
Results show that IPM strategies are an efficient way to control varroa populations and will help to assure economical viability of commercial beekeeping in our northern regions. Best results are obtained when the IPM strategy uses bottom boards to trap naturally falling varroa mites and when bee colonies are wintered in single hive bodies.

BREEDING FOR TOLERANCE AGAINST VARROOSIS - FACTORS INFLUENCING COLONY SURVIVAL WITHOUT TREATMENT IN A LONG-TERM SURVEY

No 175

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In 2004, a long-term breeding project was started in Germany with the aim of selecting bees on tolerance against varroosis. The project follows a two-step strategy: in a first step more than hundred beekeepers in whole Germany collect data from about 1,800 test colonies on Varroa infestation levels and hygienic behavior of the bees. In a second step a preselected group of colonies is tested in a viability test without treatment. During this test, data on colony development, the infestation of bees and brood, Varroa reproduction and virus infections are collected. The correlation between these parameters and the colony survival will be evaluated. The bee population decrease during winter serves as an important criterion for the selection of the next generation of breeder colonies among the untreated population.

DEVELOPMENT OF BIOASSAY FOR HYGIENIC BEHAVIOUR AGAINST BROOD MITE, *TROPILAELAPS CLAREAE* IN *APIS MELLIFERA* COLONIES

No 176

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The studies on bioassay for hygienic behavior and screening of mite resistant colonies were conducted in the colonies of European honeybee, Apis mellifera maintained at the apiaries of University of Agricultural Sciences, Bangalore, India. The observations clearly indicated that, among the bioassays developed with reference to removal of introduced dead brood, the workers showed similar tendency in removing the freeze killed dead brood in queen right, queen less, full sized and nucleus colonies. The mean minimum and maximum time taken for complete removal of the freeze killed brood were 1.94± 0.62 and 2.40± 0.75 in full sized and queen less colonies respectively. However, healthy colonies removed the dead brood in a faster rate than mite infested colonies. Similarly, the honeybee colonies were tested for hygienic behaviors in the apiary by introducing freeze killed and pin killed sealed brood. Comparatively, the worker bees removed pin killed brood in a faster rate than freeze killed brood. Out of 11 colonies tested, 7 colonies removed the dead pin killed brood with in 48 hrs. However, did not remove the dead brood completely with in 48 hrs. The mean minimum time taken for complete removal of the pin killed and freeze killed brood were 1.10 ± 0.26 days and 1.27± 0.40 days respectively. The maximum time taken were 2.91± 0.84 days and 3.78± 0.94 days for pin killed and freeze killed brood respectively. Similarly, the worker response to pin killed sealed brood was positively correlated (r =0.952) with freeze-killed brood.

MULTIFACTORIAL PROSPECTIVE SURVEY ON BEE TROUBLES IN FRANCE

No 178

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In 2002 a field survey has been initiated on French apiaries in order to monitor weakness of honey bee colonies (Apis mellifera L.).
Studied apiaries were evenly distributed in five counties located on continental France. In each county five apiaries were chosen to represent different environments. Five colonies were randomly selected in each apiary leading to a total of 125 studied honey bees colonies. During a three years (starting in autumn 2002) colonies were visited four times per year: after wintering, before summer, during summer and before wintering. At each visit, adult and larval bee population was estimated as well as adult bee mortality and colony mortality. Any clinical symptom or abnormality was noted. Broods showing disease symptoms were sampled for further analyses. Different matrix samples were collected depending on the season: pollen from traps, adult bees, foundation wax or honey. Any medical treatment reported by the apiarist was also noticed.
Surveyed pathologies were acarapisosis, nosemosis, varroosis, American foolbrood, European foolbrood and chalkbrood. Brood and adult bees were also analysed for six viruses during the first year of sampling. Studied viruses were the Chronic Bee Paralysis Virus (CBPV), the Acute Bee Paraysis Virus (ABPV), the Deformed Wing Virus (DWV), the Sacbrood Bee Virus (SBV), the Kachmir Bee Virus (KBV) and the Black Queen Cell Virus (BQCV). Specific and multiresidue analyses were performed on foundation wax, adult bees, pollen loads and honey to research residue of 43 different molecules. Fipronil and metabolites together with imidaclopride and metabolites were searched in pollen and honey during the first year of sampling, and in adult bees during the second year of survey.
An environmental survey was also conducted on studied apiaries. Every agricultural parcels within a 1.5 km radius around the apiary were monitored. The type of crop cultivated on parcels (time of sowing, varieties) and chemicals treatments were recorded and mapped. These data will be correlated with results from palynological analysis of pollen from traps.

MONITORING OF BEE COLONIES IN GERMANY

No 179

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In autumn and winter 2002 /2003 there has been a tremendous loss of bee colonies in Germany. Beside Varroosis, many other causes like other bee diseases especially secondary infections, supply of melliferous flora, pollen shortage, weather conditions as well as lethal and sub lethal effects of pesticides have been discussed. A monitoring of bee colonies in Germany is the result of several common meetings with representatives of beekeeping associations (DIB, DBIB), agricultural organisation (DBV), German Ministry of Agriculture, bee institutes and chemical industry.
In this monitoring project colleagues of the bee institutes are in charge of the involved beekeepers. Data of 150 apiaries and 1,500 bee colonies will be captured by the bee institutes. A wide range of parameters in the subject fields' location of the apiaries, apicultural practice, development of bee colonies, residues of pesticides and diagnoses of bee diseases should be monitored and recorded several times in the next years.

PRELIMINARY RESULTS ON BEHAVIOUR OF APIS MELLIFERA LIGUSTICA (SPIN.) COLONIES SUBSEQUENT TO THE APPLICATION OF THE SPAZIOMUSSI® TECHNIQUE

No 180

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Abstract
The study was carried out to evaluate the effectiveness of a biotechnique called "Mussispace®", used for the control of the varroa mite. The increased space between combs (9 vs. 10 combs) facilitates the grooming of worker bees. The biotechnique (Thesis A), was compared with treatments with oxalic acid on hemicellulose strips (Thesis B) or thymol (Thesis C). The number of mites that died when the "Mussispace®"was applied, was similar to that obtained with the oxalic acid treatment but was much lower compared to the thymol administration. In February the number of fallen mites was high after oxalic acid was dripped between the combs. The "Mussispace®" biotechnique should be integrated with a soft pharmacological treatment.

Key words: "Mussispace®", bee "colony system", Thymol, Oxalic acid

The control of Varroa destructor (Anderson & Trueman) infestations is still a serious problem because substances have not been found that are effective against the mite but which do not have negative collateral effects on the life and behaviour of Apis mellifera colonies (Calis et al., 1997; Gardi et al., 2001).
Initially, the use of chemicals was efficacious for maintaining the mites at levels which were compatible with colony survival and production. However, this situation was short-lived, due to the appearance of acaricide resistance, as well as to increasing awareness of the risk of bee product contamination. These negative aspects have led to increased interest in alternative control strategies, such as the use of environmentally-safe substances and the application of suitable biotechniques (Dung N. V. et al., 1997; Manino et al., 1996). In addition, there is a growing need to preserve the genetic purity of Apis mellifera due to the frequent introduction of non-native queen-bees and swarms into areas where their biological characteristics are unsuitable for profitable apiculture.
In Italy, programs for the conservation and genetic selection of Apis mellifera ligustica (Spin.) have been carried out for a long time (Ruttner, 1993; Bernardini et al., 2001). Their main objective has been to safeguard and improve the performance of local ecotypes of this breed (Cagnus, 1995; Piacentini, 1993). The control of pathologies, particularly the destructor mite, is fundamental to such programs and the use of environmentally friendly methods is preferred. To date neither "soft" chemiotherapy nor the most common biotechniques, such as the use of a trapping comb or queen confinement, have given satisfactory results. The use of synthetic chemicals is discouraged because persistent residues may accumulate in the honey and, particularly in the wax (Bernardini et al., 2001).
While the long-term negative effects of such substances on the bee "colony system" are unknown, it has been shown that some insecticides have a genotoxic action. Other efforts have therefore been made to find more suitable biotechniques. One example is the use of a suitable space beetween the combs, called "Mussispace®", which according the inventor Francesco Mussi, makes it easier for the bees to groom.
In an attempt to verify the effectiveness of this technique, the Faculty of Agricultural at the University of Perugia and the Italian Beekeepers Federation (F.A.I.) planned, with the approval of F. Mussi, a Project to verify the scientific validity of the "Mussispace®" biotechnique applied in genetically pure Apis mellifera ligustica (Spin.) colonies.
The objectives of the study are:

- To evaluate the scientific validity of the "Mussispace®" technique in order to safeguard Apis mellifera ligustica (Spin.) from the destructive action of the Varroa mite;
- Define guidelines for beekeepers that emphasize the positive characteristics of Italian bees and improve the "colony unit", in order to obtain safe, quality honeys and improve Italian and European apiculture.

The Project started in August 2004 and will continue until the end of 2006.
The results obtained from August 2004 to February 2005

have shown that the application of the "Mussispace®" biotechnique alone did not keep the number of mites at an acceptable level, at least under the conditions within the ecosystem considered. However it should be noted that an integrative pharmacological treatment could be administered in October when the colonies are broodless. In this case, the overall results should be better.
Further the beekeeper reported that in March the conditions of the A thesis colonies were better than those of the other two theses with respect to brood quantity and quality.
In addition the A thesis colonies had a greater supply of honey and appeared to be more docile.
These results are preliminary. Data will continue to be collected through December 2005 after which a more complete evaluation of the effectiveness of the "Mussispace®" biotechnique will be possible.

CURRENT EFFECTIVENESS OF AMITRAZ AGAINST VARROA IN PORTUGAL

No 181

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The varroa mite (Varroa destructor) was first detected in Portugal in 1986. Since then, there has been a frequent use of amitraz (Apivar, Acadrex) in the attempt to cope with it. Following (i) various credible international reports of increased varroa resistance to amitraz and (ii) regular claims, by national beekeepers, of poor efficacy of Apivar treatments, a large screening project was setup (2003/2004) for trying to identify honey bee colonies hosting varroa populations resistant to amitraz in continental Portugal. As a first step, approximately 1.200 beekeepers were enquired nationwide, with a view to building up a rank of apiary-specific probability indexes of varroa resistance to fluvalinate. From those beekeepers, approximately 4.000 colonies were field-tested in a similar way to the "British National Bee Unit" field testing methodology for fluvalinate, and compared to blank control tests (same kits and methodology, but without using amitraz). From those investigated colonies, 1.579 allowed conclusive testing (i.e. where 3 or more varroa per honeybee colony were submitted to the action of amitraz). Approximately 17% (272) of these colonies were considered to host varroa populations resistant to amitraz (using, as border line, 80% of amitraz induced varroa mortality). Furthermore, the efficacy of amitraz in the field tests carried out on those 272 colonies only reached an average of 60.1% (s.e.m. = 1.2%).

THE MONITORING TECHNICS OF VARROA RESISTANCE AND ROTATION OF THE VARROA TREATMENTS

No 182

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Since several years, the distribution of varroa resistance to the active ingredients of treatments against Varroa destructor has been indentified and monitored especially in Western Europe.
The different techniques used for laboratory or field tests, and for the different active ingredients used against the varroa are described. The different techniques used are discussed for their accuracy and their role for the monitoring.
The evolution of the intensity of varroa resistance in relation with the types of treatments used against the varroa mites are described. The ideal rhythms of rotation with the different active ingredients are discussed.
The example of reversion of varroa resistance to the pyrethroids in Europe will illustrate the different aspects of the rotation strategy.

HOW RESISTANT TO FLUVALINATE ARE VARROA POPULATIONS IN PORTUGAL?

No 183

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The varroa mite (Varroa destructor) was first detected in Portugal in 1986. Since then, there has been a widespread use of fluvalinate (Apistan, Klartan) in the attempt to cope with it. Following (i) various credible international reports of increased varroa resistance to fluvalinate and (ii) repeated claims from national beekeepers of poor efficacy of Apistan treatments, a large screening project was setup (2003/2004) for trying to identify honeybee colonies hosting varroa populations resistant to fluvalinate in continental Portugal. As a first step, approximately 1.200 beekeepers were enquired nationwide, with a view to building up a rank of apiary-specific probability indexes of varroa resistance to fluvalinate. From those beekeepers, approximately 4.000 colonies were field-tested according to the "British National Bee Unit" field testing methodology, and compared to blank control tests (same kits and methodology, but without using fluvalinate). From those investigated colonies, 1.536 allowed conclusive testing (i.e. where 3 or more varroa per honey bee colony were submitted to the action of fluvalinate). Approximately

57% (878) of these colonies were considered to host varroa populations resistant to fluvalinate (using, as border line, 60% of fluvalinate induced varroa mortality). Furthermore, it is alarming that the therapeutic efficacy of fluvalinate in the field tests carried out on those 878 colonies only reached an average of 26.4% (s.e.m. = 0.6%). Brood samples were later collected for laboratory reassessment of populations of varroa that had been flagged, by the field tests, as resistant to fluvalinate. In most cases, the laboratory tests confirmed the results the field tests had suggested.

CONTROL OF PYRETHROID AND COUMAPHOS-RESISTANT MITES IN NORTH AMERICA USING APIGUARD.

No 184

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Varroa mite infestations have increased in The United States over the past few years due to mite resistance to treatments currently in use. Varroa in some areas have become resistant to pyrethroids as well as to organophosphates (coumaphos or Check Mite+ Strips). Beekeepers relying solely on these products for control of varroa have lost many colonies because of insufficient control levels.
The slow-release gel, Apiguard, containing thymol has been developed especially to control pyrethroid, amitraz and OP- resistant mites; it has a different mode of action to these pesticides. Apiguard is registered and used by beekeepers in many countries and has been trialled in several sites within the USA, prior to registration.
Results are reported here from trials conducted in several States and show that the product can be used successfully under a variety of environmental conditions.

EVALUATION OF FLUVALINATE, COUMAPHOS, THYMOL, OXALIC ACID AND FORMIC ACID AGAINST *VARROA DESTRUCTOR* IN EASTERN CANADA.

No 185

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Summer and fall studies to control Varroa destructor were conducted in Québec, Canada to evaluate the efficacy and safety of 1) two early-July treatments (n=30/treatment) using either oxalic acid (OA, 4%, 100ml by dripping one appl.) or formic acid (FA, 65%, 35ml Mitewipe evaporating pad one appl.) in hives with two honey supers and 2) four mid-September treatments (n=48/treatment) using either: A) formic acid (65%, 3 appl., 5 days apart, 35ml, Mitewipe evaporating pad); B) thymol (TH, 1 Thymovar® wafer, 30 days); C) fluvalinate (FV, 2 Apistan® strips, 42 days) or D) coumaphos (CM, 2 Check-Mite® strips, 42 days), each coupled with a single OA treatment (4%, 100ml by dripping) in October, November or December on hives with one brood chamber. Data from the summer study show no adverse effect of the treatments on honey production and brood rearing. Although OA increased mite drop following its application, none of the treatments resulted in a lower mite population in September ($p>0.05$). Higher FA honey concentrations were measured in the FA-treated hives (24-64mg/kg). Data from the fall study show that TH, FA and CM treatments coupled with OA in late fall or early winter achieved a similar efficacy (TH=95.2%; FA=98.1%; CM=95.5%) with less than 50 mites per hive remaining by April 2004. FV treated hives had the lowest efficacy (91.2%, $p<0.05$). Colonies that had a natural daily mite drop over 50 in September had a mortality rate of 50% and more during the winter, regardless of the treatment combination used.
In conclusion, data from the summer study show that one application of FA or OA in July was safe for the bees but did not succeed to reduce varroa populations in fall; and fall data show that a combination of either TH or FA in September coupled with OA applied when no brood is present was as efficient as CM.

A STUDY ON INCIDENCE OF TRACHEAL MITE (*ACARAPIS WOODI*) IN HONEYBEE COLONIES (*APIS MELIFERA*) IN CHAHARMAHAL AND BAKHTIARI PROVINCE

No 186

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Introduction: Acariosis is an important contagious parasitic disease that is caused by Acarapis woodi . Pathogens attack to trachea of bees and they establish disease in this way.
Today one of the problems of beekeepers in some of the countries is Acarapis woodi. Iran is one of them. Acariosis reported in England for the first time in 1904. In fact IBRA (International Bee Research Assosiations) pronounced Iran without Acarapis woodi until 1983. But some years later, in 1994, Mosadegh & Bahreany during their studies announced presence of mite Acarapis woodi in 18 provinces among 22 of Iran, which they choosed. For this reason, a survey of honeybee colinies for presence of Acaroids woody mite was started from September 2002 to April 2003 in Chaharmahal and Bakhtiari province.
Methods: Province divided to six areas, in each area ten apiaries were selected. In each apiary 10 percent of colonies were randomly sampled. Samples of (50-100) adult bees per hive were taken from the hive entrance and when available 50 dead bees from the ground in front of the same hive.

Each sample was kept in a separate jar containing 70 percent ethanol.
Live and dead bees from each hive were sectioned separately and kept in 10 percent (KOH) at room temprature (20-25c) for 24 hour.
The cleared thoracic discs were examined under a microscope (40-100x) for the presence of mite in tracheae.
Results: The results of test of 5,470 samples collected from 83 apiaries in Chaharmahal and Bakhtiari province showed no Acarapis woodi in honeybee colonies.
Discusion: IBRA reported Iran without Acarapis woodi until 1983. But Mosadegh and Bahreany in 1994 by studying the colonies of 22 province in Iran reported the disease in 18 provinces.
At this time, the most prevalence of this mite is in two provinces;Golestan and Gillan.
Billy believes this disease in areas with long winter (such as Chaharmahal and Bakhtiari), will be control because contaminated bees don't survive during the winter, so they can't transport contamination to young bees in spring. But because of transportations of hives between provinces, in different seasons is usual, the probability of observation of this disease in this province isn't so far from mind.
Therefore the annual investigation in order to diagnosis and control of the mite (Acarapis woodi) is seems to be necessary at time.

THE PRESENT STATUS OF THE USE OF GM CROPS AND IMPACTS ON POLLINATORS

No 187

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Pre-release tests of current commercial varieties of genetically modified (GM) plants, expressing Bt toxins or tolerant to herbicides, indicated that these crops would not directly affect honeybee health. Field experience thus far has borne out this prediction, although there may be some indirect effects on bees resulting from farming practices associated with the use of some GM crops. Future GM crops will express a wider range of traits, some of which could affect bees directly, particularly if the transgene proteins are expressed in pollen, nectar or sap. Bioassays have now been conducted with a several classes of candidate transgene products: protease inhibitors, a chitinase, a gluconase and a biotin-binding protein. These assays have measured not only toxicity to adults and larval bees, but also sub-lethal effects: on development, food consumption, digestive protease activity, hypopharyngeal gland development, flight activity, olfactory learning responses and foraging behaviour. Current research seeks to improve the "eco-realism" of lab tests, to include solitary bees and other pollinator species, and to further assess impacts of GM agriculture on pollinator biodiversity in the field.

MPACT OF TRANSGENE PRODUCTS ON HONEYBEE LARVAE

No 188

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In order to assess the impact that transgenic plants pose on larvae of the honeybee, Apis mellifera, several aspects of bee life history are important: (a) Information on pollen consumption is needed as this is the only direct route of exposure of toxins expressed by transgenic plants, (b) the effects of transgene products on development of the hypopharyngeal gland of adult worker bees have to be assessed because they are producing the jelly necessary for rearing of the brood and (c) this jelly has to be checked for the presence of transgene products which may be passed on to the larvae.
We conducted experiments in which small queenright colonies of about 1,000 bees were kept in field cages (8 x 14 m) containing only flowering maize plants. Fully grown worker larvae that were fed no other than maize pollen were dissected and the number of maize pollen grains counted. We could show that honeybee larvae ingested only about 2mg of maize pollen, indicating that protein provided directly to the larvae via pollen contributes less than 5% of the protein required for larval development.
The effects on the hypopharyngeal gland experiments were tested in small cages in a climate cabinet. Freshly emerged worker bees were added to small experimental hives, containing about 200 workers and a queen. Bees were exposed to Bt-maize pollen (event MON 810), Bt-toxin (Cry1Ab, 0.0015%) and to a Protease inhibitor (Soybean Kunitz trypsin inhibitor, SBTI) at 0.1% and 1% concentration. While the Bt treatments had no effect, the SBTI treatments significantly reduced the size of the hypopharyngeal gland of adult worker bees. ELISA tests did not detect any Cry1Ab Bt-toxin in the hypopharyngeal glands in the Bt pollen treatment while traces (close to the quantification level) were found in the Bt toxin treatment. These results are of high significance to conduct realistic bioassays especially for honeybee larvae.

WILD BEE ABUNDANCE AND POLLINATION IN TRANSGENIC HERBICIDE TOLERANT AND NON-TRANSGENIC CANOLA IN ONTARIO, CANADA

No 190

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Wild bees are important pollinators of many wild plants and cultivated crops and are highly dependent on floral resources for food and habitat necessary for their survival. Transgenic herbicide tolerant (THT) crops may have long-term effects on these floral resources or weeds, and therefore, it is unclear how these crops may affect wild bee populations and the important pollination services they provide. To address this, we measured wild bee abundance and pollination deficit (difference between potential and actual pollination) in THT canola and a comparable non-transgenic variety in Ontario, Canada. Bee abundance was measured in each field as well as in adjacent hedgerows during canola flowering. Pollination deficit was measured by comparing the number of seeds produced from supplemental and open pollinated canola flowers. Wild bee abundance in THT and non-transgenic canola did not differ in 2003 and 2004, and was similar at all distances into the field where collections were made. Non-transgenic canola flowers produced significantly more seeds per pod than THT canola flowers, however pollination deficit was similar in both THT and non-transgenic fields and did not differ with distance into the field. Pollination deficit in THT and non-transgenic canola was low, suggesting that the canola flowers were well pollinated, and was not significantly correlated with bee abundance. Our study suggests that in southern Ontario, where canola fields are relatively small and have surrounding hedgerows, THT compared to non-transgenic canola, did not affect wild bee abundance or pollination. This research is part of a national project examining the effects of THT canola in three different agro-ecosystems throughout Canada ranging from intensively to newly cultivated cropland. This study provides an important link between ecosystem structure and function in that bee abundance was quantified while simultaneously assessing the subsequent effects on canola pollination.

BEE-MEDIATED GENE FLOW BETWEEN OILSEED RAPE CROPS AT A LANDSCAPE SCALE

191

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With the advent of GM crops, concern has grown over issues concerning the purity of harvested crops. Although impurity, whether GM or not, can arise through routes such as impure sown seed, contaminated farm machinery, and dormant seed in the soil from previous crops, the issue of cross-pollination arouses great interest due to the difficulty predicting and controlling this source of unwanted crop types. Each crop species has a unique breeding biology and differing abilities to cross pollinate aided by different combinations of pollen vectors. Oilseed rape (Brassica napus) is a widespread temperate crop, available in GM forms, which is capable of pollination by a wide range of insect vectors as well as via airborne pollen.

This presentation will describe experiments which determine that insects, predominantly honeybees and bumble bees, are responsible for this cross-pollination. In a series of field experiments in E Scotland, male sterile plants of oilseed rape were used to detect the potential for cross-pollination over a wide range of distances and in a wide range of environments. The patterns of pollen dispersal and cross-pollination on the landscape scale in these experiments have permitted predictions of cross-pollination levels in different situations. Using the opportunity provided by GM field trials together with the ability to discriminate this pollen type, the patterns and levels of cross-pollination across the landscape have been verified. Both wind and various insects are capable of acting as pollen vectors in oilseed rape, and experiments which discriminate between the various vectors will be presented. The routes taken by pollen moving over the landscape will be considered, and the different patterns of dispersal expected from different insects summarised. Bees, both honeybees and bumble bees, form the most important group of pollen vectors in this crop, and the implications of this for managing and predicting cross-pollination from oilseed rape fields will be discussed.

POLLINATOR POPULATIONS IN HERBICIDE TOLERANT GM CROPS

No 193

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Herbicide tolerant oilseed rape (Brassica napus), sugar beet (Beta vulgaris) and maize (Zea mays) were the first genetically modified crops to be evaluated at the field scale in the UK. Pollinator populations (bees and butterflies) were considered as part of the high profile "Farm Scale Evaluations" of the effects of GM crop management on biodiversity compared with the management of conventional crops. These trials took place over four years at more than 200 sites. The results demonstrate that the management of these herbicide tolerant GM crops leads to clear differences in weed populations and, in some crops, this can have a knock-on effect on the number of bees and butterflies visiting the fields and field margins. The number of pollinators visiting a GM crop, together with the behaviour of the insects on individual flowers, will influence the level of pollen movement within and between fields. Experiments designed to measure the spatial patterns of cross pollination within and between fields of oilseed rape will be discussed.

TRANGENIC SOYA BEAN

No 194

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The global hectarage planted with genetically modified (GM) crops increases consistently since the beginning of the commercialisation in 1996. One of the principal GM crops is soya, now occupying >50% of the total soyabean area in the world. The dominant trait is herbicide tolerance (HT), mainly to glyphosate-weedkillers. Resistance is conferred by the epsps gene which is part of a p35S/CTP insert. The gene construct can be used as target for a PCR-based detection assay for GM HT material as it had been done in this study. Soyabean flour is used for the production of pollen substitutes. Thus it appears conceivable that GM soyabean material might enter bee feed and bee products. We assessed this assumption on German pollen substitutes and German honeys harvested in 2000.
In 2000 we checked 11 pollen substitutes. Soyabean material and the synthetic P35S/CTP construct was detected in 4 products. Recently in 2005 we checked another 10 samples of 6 brands. Three products (5 samples) contained minor amounts of GM HT material which did not exceed 1% as tested by real time PCR. Sediments of 389 honey samples from a local honey show in 2000 were examined by light microscopy. "Fish scale-shaped" fragments were recognized in 23 samples (i.e. 5.9% of all samples). This shape can be characteristic for crashed soya beans. 19 of the 23 samples were checked by PCR for soya and for GM material. The PCR assay found soya fragments in 17 samples thus largely confirming the microscopic results. GM HT material was detected in 11 honey samples. The beekeepers whose honeys were checked in the PCR assay had been interviewed individually by telephone. The use of pollen substitutes had been reported by 17 beekeepers. 15 of them had yielded honey with soya residues. The 11 honey samples containing GM material came from beefarms having used the brand of pollen substitute in which we detected transgenic herbicide tolerant material. Our data suggest that pollen substitute might be the origin of the soya residues and the HT material detected in some samples.

EFFICIENCY OF THE AFRICANIZED HONEYBEE APIS *MELLIFERA* IN THE TRANSFER OF POLLEN OF SOY (*GLYCINE MAX.* L. MERRIL) ROUNDUP READ™ VAR. BR 245 RR

No 195

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The genetically modified soy has been cultivated more and more due to the smallest production cost. In Argentina 75% of the planted soy it is transgenic, followed by the United States with 52%. Brazil occupies the fourth position with 10% of the production composed by transgenic soy. The structure of the soy flower ensures for the honeybee the foraging, favoring the transfer of the pollen and increases the production (Erickson & Garment, 1979). This research was carried out to evaluate the efficiency of Africanized honeybee Apis mellifera in pollen transfer of transgenic soy Roundup Read™ (Glycine max. L. Merril), var. BR-245 RR – and conventional BRS-133. It was established three treatments: covered area with Africanized honeybee colonies with three brood combs and two with honey + pollen; covered area without honeybees and in uncovered area. Each treatment was constituted of six replications, 24 m2 each, and, the planting of the soy was performed in eight inserted lines, two to two with the tested varieties. In covered areas, pollination cages were installed, made in nylon screen with mesh of two millimeters, supported by pipes of inch _ in PVC, forming cages in semi-arch, with four meters of width, six meters in length and two meters of height in the highest part. The culture of soy was monitored during the whole period, mainly the blossoming, that had beginning on December 31, 2003 and it extended to January 28, 2004. The harvesting was accomplished line by line of the replication. A thousand seeds of each conventional line were planted. The pollen transfer percentage was obtained through the resistant plantlets to the application of Roundup™. The data were submitted to the NPARWAY WILCOXON procedure using the SAS software. There was no difference in the percentage of pollen transfer ($P>0.05$) among the treatments uncovered area (1.659 ± 0.222) and covered area with honeybee (1.597 ± 0.274). However, these treatments differed ($P=0.0001$) from the covered area without honeybee (0.197 ± 0.074). The honeybees were responsible for 96.26% of the pollen transfer from the transgenic soy - Roundup Read™ var. BR-245 to the conventional variety, BRS-133.

FAST REARING OF QUEENS

No 197

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A man, being involved into beekeeping, has specialised in the artificial rearing of queens.

This is characterised by new methods of rearing of queens. First of all, obtaining three mated queens from one mating nook in a month and in two ways, by newly brooded queens and old unmated ones. The result of this way of rearing of queens is that there always were two queens in the brood, one involved in brooding and the other in adopting.
Then, the application of the method of parent-starter-builder colony. With this method, the queens are reared in one colony having three functions, as the name itself says, and that in the presence of mated queen of such colony. The queen is only taken when starting of larvae and is brought back to the colony after 24 hours.
The research about extinguishing the sexual heat is also interesting, with unmated queens where the moment, the sexual heat is extinguished was proved, how long it could be inactive and how long the unmated queen could spend in the cage without any harmful consequences.

MINI-SYRINGE FOR MULTIPLE INSTRUMENTAL INSEMINATIONS OF QUEEN HONEY BEES

No 198

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The techniques of instrumental insemination of Apis mellifera queens are today, very important in both, apiculture and research with bees, especially in programs of selection and genetic improvement, by allowing the total control of mating. With the advances of the instrumental insemination technique a lot of changes have been made in the apparatus to make the insemination easier and quicker, since the collection of semen from the drones is the most time-consuming procedure. Thus, in this work we developed a mini-syringe capable to make multiple inseminations. The new model consists of a plastic insulin syringe with a tip that is a glass capillary tube, attached with silicone tubing, what decreases the costs of construction and maintenance of the apparatus. There is also a stainless steel base and holder. We tested the mini-syringe in several queens. Almost 95% of them survived and started to lay eggs a few days after the insemination. The whole process became faster, easier and more efficient. The construction using inexpensive but durable material is another advantage. The new mini-syringe also allows us to inseminate queens with stored semen in glass capillaries, by just changing the insemination tip for another pointed capillary with stored semen.

A MINI-STARTER FINISHER HIVE MODEL THAT FACILITATES QUEEN REARING

No 199

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The queen rearing is a very important practice for both beekeepers and researchers. In Brazil, the most common way to rear queens is to use queenright queen rearing colonies. These colonies consist of two Langstroth hives superposed and separated by a queen excluder. However, these colonies are heavy, hard to manage and need large bee populations to attain good results. We developed a new model of mini-queen rearing hive called "Ribeirão Preto mini-starter finisher hive model" that consists of a five frames mating nucleus placed over a 10 frames Langstroth brood chamber. The bottom of the nucleus is adapted with a queen excluder to avoid the passage of the queen to the upper hive. Tests were made comparing grafted larvae acceptance and the weight of newly-emerged queens in six trials made with three types of hives: a four frame upper queen rearing nucleus, a five-frame upper queen rearing nucleus and a traditional two-hive-body queen-rearing colony. The five-frames mini queen-rearing colony gave results as good (in terms of percentage grafted cells that reached the adult stage) as the two-body-hive model and the four frames mini-queen rearing hive, with the advantage of needing a smaller bee population and is easier to manage than the traditional model. The mean weight of the virgin queens reared in the five-frame queen rearing devices was greater (208mg, n = 120) than those reared in the larger, two-hive-body colonies (193mg, n = 115) or in the four-frame queen rearing box (182mg, n = 104).

METHODOLOGY FOR SUCCESSFUL QUEEN REARING

No 200

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Queen rearing is the most important key to successful beekeeping.
There are three main problems in raising good queen cells: providing poor nutrition, using old larvae, and using dry larvae. In this situation, most of the queens will be small, weak, and unable to produce enough pheromone. The queens produced in these conditions will have a weak immune system and be vulnerable to chalk brood disease; and the colony will supercede the queen at the first opportunity. Methodology for making large amounts of worker jelly (for 1 day old larvae): A- We feed 2 litres of liquid protein (Caspian Solution*), to 4 frames of population; B- 48 hours later we introduce 1 frame of eggs to the 4 frames of population; C- When the larvae are full of worker jelly, they are ready for grafting.
The best way to gauge the nutrition of any colony is to

look at the amount of worker jelly that the one and two day old larvae are being given. Queen raisers report that the size of their queen cells change with the different seasons and this seasonal variation is most certainly linked to the protein (pollen) resources available from the environment.
We grafted 30-45 larvae, and gave it to 6 - 8 frames population, and we had more than 97% accepted queen cells, and all being very large and the same size. The secret was providing 6 to 10 litres of liquid protein (Caspian Solution*) 2 days prior, up until 5 days after larvae introduction.
*Note: Caspian Solution is a liquid protein diet rich in royal jelly that contains a pheromone. Available from Caspian Apiaries in Canada.

PLANT BASED ATTRACTANTS FOR HONEYBEES IN INDIA

No 201

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Introduction: Attractants for honeybees in India were not studies till mid eighties. Study of Nasonov gland pheromone led to the dedvelopment of the pheromone based lures. Lures for Apis florae were also subsequently developed. However, preparation of these lures was difficult for the common beekeeper. It was, therefore, thought worthwhile to investigate the attractive properties of certain plant materials.
Methods: Plants, frequently visited by the bees, were collected after consulting the beekeepers. Extracts of the plant materials were obtained. Formulations of the extracts in liquid paraffin were made by the standard methods. The attractiveness of each formulation towards Apis cerana, Apis florea and Apis mellifera (maintained in India) was determined by the standard rotating table bioassay. Data generated were graphically and statistically analysed.
Results: The attractive properties of the formulations towards the honeybees maintained in India were clearly brought out by the graphical analysis. Moreover, it was found that the attractive properties did not get reduced at higher concentrations. Even the 'neat' extract also possessed the attractive properties. Statistical analysis by the Kruskel Wallis test indicated the data to be significant.
Discussion: The observation that the attractive properties are shown even at the higher concentrations makes the plant based attractants superior to the pheromone-based attractants. Moreover the easy availability of the plant material makes these extract cheap.
Utilization of such plant based lure may be useful in invreasing the efficiency of pollination. Such extracts can also be employed for the procurement of Unifloral honey.

EARLY SPRING DIGESTIVE PROBLEMS IN COLD CLIMATES

No 202

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Disease and the Cause: If there is a period of unseasonably mild winter weather, as has occurred this year, a queen will start to lay eggs despite the fact that there is no pollen available from outside of the hive. The bees must respond to the new brood by using the protein potential from their bodies and pollen stored in the comb to make jelly for the larvae. Inevitably cold temperatures return before the brood emerges and the bees will be unable to go out of the hive to get water for the new generation. The emerging bees will need pollen and water for the first three days. When the bees cannot fly out of the hive they will use water that has condensed in the corners. For larvae to grow the temperature in the hive must be maintained between 32 and 37 degrees Celsius, but in cold weather the corner temperature will be as low as 25 Celsius. Stagnant water held at 25 degrees Celsius is a perfect breeding ground for protozoa such as Nosema Apis, the cause of Nosema disease, and Malpighamoeba mellificae, the cause of Amoeba disease. Protozoa and other micro-organisms cause diarrhoea and diarrhoea amplifies the severity of the disease. In some colonies that have experienced a mild spell that caused the queen to lay eggs if the temperature turns cold the bees cannot defecate and they will become constipated. These bees will have fat (bloated) abdomens. When the abdomens of these bees are squeezed dry pollen will come out. This problem can be fixed with a mixture of: 70% hot water, 25% honey and 5% lemon juice. Spray 100 grams of this solution for each single box of population on a sunny day at mid-day. For prevention and treatment we use high protein nutrition with acids from fruit, hygienic bees and providing minimum amounts of medication.

DO GENETICAL ORIGIN OF HONEYBEE DRONES AFFECTING THEIR LONGEVITY, PERFORMANCE, AND QUALITY OF THEIR SEMEN?

No 203

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Drones produced from four different genetical sources of bees (Carniolan, Italian, first hybrid Carniolan, and Egyptian) were evaluated through determination of their weight, longevity, flight performance, and quality of their semen. Data showed that drones of Carniolan bees and its first hybrid recorded the heaviest weight, while

Egyptian drones were the lightest individuals. Also, Carniolan drones lived the longest period (31.00 days), in comparison to the drones of other tested races (17-26 days).
Concerning flight performance, Egyptian drones showed a highest flight velocity (6.12 meter /second), however the lowest velocity (5.46 m/s) was recorded for Carniolan drones. Counting sperm content of different drones revealed that Carniolan drones produced the highest number, followed by Italian drones, however Egyptian drones produced the lowest number. Sperms of Egyptian drones showed a highest and longest viability.
Artificial insemination with different sperms proved that sperms of Egyptian drone migrated to the inseminated queen's spermatheca in a largest number and their fertility was the highest level. These findings confirmed the high comparative reproduction potential of Egyptian drones, in spite of their reduced weight and small number of their sperms. It can be predict that existence of Egyptian drones in a particular area may result in inheritance and dominance of Egyptian bee's char

STUDIES ON SOME FACTORS AFFECTING DRIFTING AND ACCEPTANCE BEHAVIOR OF HONEYBEE WORKERS

No 204

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Effects of three factors (time of the year, distance among the hive entrances and races of bees) on drifting behavior of honeybee workers were studied. While acceptance of these drifted workers was investigated through studying the influence of the internal conditions (queen age, the area of brood honey, and pollen) of the receiver colonies and state of the drifted workers.
Results revealed that the highest percentage of the drifted workers was recorded during January and July while the lowest one was found at September and December. Italian bees showed more attendance for drifting than Carnolian bees. Also keeping the hives entrances at a distance of 80 cm. or more contributed in drifting avoidance.
On the other hand, results indicated that the orphan bees or these colonies having old queens accepted easily the drifted bees for a long time. Also, existence of a large area of brood seem to encouraged bees to accept more introducer bees, while either of honey or pollen area did not show a notable effect on acceptance of these individuals. Pollen carrier workers were easily accepted but also disappeared in a short time.

SOME INITIAL SUCCESS OF APPLYING INSTRUMENTAL INSEMINATION IN BEE BREEDING OF *APIS MELLIFERA* IN VIETNAM

No 205

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Today, the use of instrumental insemination, in Vietnam, is practical and highly successful in Apis mellifera. Virgin queen (at 6 days old after emerged) was inseminated with 8 mm^3 semen collected from 10-20 sexually mature drones had 3.87 million spermatozoa in her spermatheca and the early queens started laying her first eggs in 10.3 days after emerged.
Our mating designs and practical field selection methods offer an auspicious and exciting future in honeybee stock improvement.
A. m. ligustica was introduced to Vietnam in beginning of 1960s with small number of about 200 colonies and in 1980s. A.m. caucasica & A.m.carpatica were introduced but not successful. Developing from a small population so Apis mellifera in Vietnam shown up inbreeding: low egg laying number, high number of diploid drones and low honey yield therefore it needs to be improved. From 2001 we imported queens from Germany, New Zealand, Austria and Italia to improve our gene pool and to research in hybrid by using artificial insemination to control cross-breeding. After four years selected, we have had some pure-bred lines from imported queens such as some lines from A. m. carnica, A. m ligustica. Comparative tests of hybrids have shown their superiority with these desirable characteristics: fast spring build-up, intensive honey production, and good handling qualities. Selected hybrids increased honey production from 59.5% to 72% compare to Vietnam A. mellifera, number of diploid drones reduced and ranging from 1.2 to 1.7 percent.
Artificial insemination is an essential skill. The ability to control the breeding stock will open new opportunities to develop and maintain selected lines.

NESTING BEHAVIOR OF GIANT HONEYBEE (APIS DORSATA)

No 206

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A study was carried out to investigate the nesting behavior of giant honeybee Apis dorsata in Nepal from September 2002 to March 2005. More than five hundred nesting sites of A. dorsata colonies including old and new located at different parts of the country were visited and studied for the nesting behaviour. Combs of broods

and honey were collected from different nesting sites of A. dorsata and studied. A.dorsata bees built single comb as nest to rear broods and store food. The bees preferred more to build the nest on tall and safe buildings followed by on trees and rarely on rocks. They gave highest preference to the strong-cemented water tank and then to residential buildings having flat slab made out of bricks, iron and cement for making their nests. In absence of such buildings, the bees built the nests preferentially on the strong live big branches of simal (Bombax ceiba) and rarely on other tree species. They never built the nests on an old and weak buildings and dead trees that were not strong enough to support the load of the nest. The bees built the single comb at an elevation of 2m to 50m from ground level towards the sunny, open and undisturbed area. Highest preference was given to the same spot of previous year's nest to rebuild their nest. The bees never rebuilt their nests on the spot of previous nest if it was burnt on fire or treated with chemical(s) or washed or painted with paints. Several colonies lived friendly together very close to each other sometime touching each other's nest. The size of the nest varied from 5cm to 150cm in length, 4cm to 15cm in breadth and 10cm to 50cm in height with a shape of mostly conical at the beginning and elliptical with the growth of comb. The elliptical shape of the comb is plain, bent, curved or angular depending upon the nature of the nesting sites. Bees did not rebuild the brood comb after cutting. Honey and pollen is stored at one of the upper most corner of the nest providing beneath more area for brood production except at the center in one nest. Worker and drone broods are reared on the same size of hexagonal cells raised over the thick and strong foundation. The length of each side of worker and drone cell is 3.0mm with a depth of 15mm. The shape of queen cell is round with a diameter of 9.0mm at the top. The wall of queen cell is thicker (up to 2mm) than that of worker cells (>0.5mm). Honey and pollen store are the combination of horizontally extended long, soft and thin cylindrical cells measuring up to 10cm in length built to both sides in the thin foundation. The cells at the comb attachment point are very hard to press used to store pollen and honey measuring up to 5cm in length and 1mm in thickness. The giant honeybee A. dorsata has specific preferences for selecting the site to build the nest and live many colonies friendly together. They leave the nest and fly away in search of food and better nesting sites when food becomes shortage or weather becomes unfavorable or are disturbed frequently by any means. Several colonies of A. dorsata can be attracted every year to man made buildings and retained for longer duration for the production of honey, bee bread, bee wax and various other purposes through better management.

Key words: Apis dorsata, Nest, Behavior, Building, Tree

VOLATILE COMPOUNDS FROM AFRICAN, MITE-RESISTANT AND NON-RESISTANT BEE LINES AS DETECTED BY SPME (SOLID PHASE MICRO-EXTRACTION).

No 207

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Solid Phase Microextraction (SPME) techniques were used to collect unique volatile compounds from five strains of honeybees. These strains were chosen to determine the differences between the mite resistant and susceptible strains of bees. For the mite-resistant strains, a hygienic line from a commercial queen breeder was used, and the Russian and SMR lines from the USDA-ARS Honey Bee Breeding, Genetics & Physiology Laboratory (Baton Rouge, LA). Control was a strain unselected for mite resistance from Hawaii. Local African bees were also compared. We have examined workers and drones, in all life stages of the bee, egg to adult, to ascertain the presence of volatile chemicals emanating from these stages and analyzed them by GC/Mass Spec. We found some volatile compounds varied with the age of the bee and between strains. The greatest differences were between the AHB and the EHB lines.

LYSOZYME OF HONEYBEE'S HYPOPHARYNGEAL GLANDS AT DIFFERENT PROTEIN NUTRITION

No 208

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The development of hypopharyngeal glands is known to depend on protein presence in honeybee's food. In this connection the influence of protein food quality on producing lysozyme by these glands was studied. Sample colonies were formed from 1-day aged bees which were maintained in conditions of isolation. The bees of the control colony received natural food: honey, bee bread and water. The bees of the second colony were given dry pollen load, honey and water. The bees of the third colony were fed only with sugar syrup and water. Hypopharingeal glands in 1, 5, 12, 19, 26-day aged bees were studied to determine lysozyme activity by using cap-agar diffusion test. We found that dynamics of producing lysozyme by hypopharingeal glands was similar in all tested variants. The glands are able to produce lysozyme both with protein food of full value and with protein deficiency in food. Lysozyme level significantly varies during 1-26 days of life of the bees carrying out different functions in the hive. Lysozyme reaches its maximum level in the glands of 12-day aged

bees, engaged in feeding larvaes. Moreover the dynamics, shown in small colonies in conditions of isolation, repeats the dynamics that is typical for standard colony. At the same time the quantity of lysozyme, produced by hypopharingeal glands, depends on availability and quality of protein food. The lowest lysozyme content was found in bees, deprived of protein food. In this case its level made on the 5th day - 65.7%, on the 12th - 82.8%, on the 26th - only 44.1% of the control. In the glands of the bees received such protein food as pollen load, lysozyme level appeared to be the same as with protein deficiency in the food. This evidences that pollen from dry polien load that has not been changed into bee bread, does not contain available components necessary for producing lysozyme by the glands. So, both protein deficiency in food and change of protein food quality, in particular substitution of bee bread to pollen load, can infringe the ability of hypopharingeal glands to produce lysozyme – one of the main factors in honeybee's immunity. Beekeepers should always remember this and provide bees with the protein food of full value – bee bread.

ESTIMATING THE POPULATION PARAMETERS OF THE BEE COLONY ON THE BASIS OF THE MATHEMATICAL MODELING

No 209

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In modern scientific studies of the biology of the bee colony and technology beekeeping the methods of mathematical modeling and to population ecologies are not used enough.
For study population-dynamic features of the bee colony the basis models of Exponential growth with continuous breeding, Geometric growth with discrete generations, Logistic population growth age structured population growth and the other (Forrester, Lotka, Leslie, Verhulst-Pearl) have been used, as well as computer modeling based MS Excel, Statistica, VB.
On the bases of constructed mathematical model of the development and vital activity of the bee colony, the following population parameters have been determined: per capita instantaneous growth rate to bee colony, it life table and fecundity schedule, stable age distribution by bee in colony, average generations length, imago's basic reproductive rate and other to population factors. So the growth rate (r) decreases from beginning to the end of the season from values r=0,3-0,02 in spring period (the exponential growing to colony) to values r=0,02-0,005 in a period of the deceleration of growth of the colonies and up to r= –0,01 in autumn period. The analysis r done with the help of Markov's processes has shown the following: the higher averages value of r in a period of exponential growth of the colonies the more probability of swarming. The maximum parameters of survival has been noticed in the colonies with an average number of bees, in contrast with the colony with low and high number of bees (P=99%), particularly in periods after and before the winter. The survival depends on the amount of brood in colony, this correlation in spring time and autumn is negative (the correlation coefficients – (0,7-0,93). This dependency is positive (the correlation coefficients 0,86-0,92) in summer.
Population-dynamic parameters and mathematical models of the colony can be use for study of the biology of the bees, for analysis and for the improvements technology of keeping and reproduction of bee colony.

DISCUSSION AND EVALUATION OF THE STRATEGIES FOR PROTECTION OF THE BLACK BEE *APIS MELLIFERA MELLIFERA* ON LÆSØ.

No 210

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The isolated island of Læsø was declared a conservation area of the black bee, Apis mellifera mellifera in 1993. Only black bees should be allowed on Læsø, and no imports were permitted.
A few beekeepers questioned the legal background of the regulation and obstructed the conservation. Legal battles took place through several years until the European Court and local courts finally declared the conservation area legal. Change of government in Denmark gave new momentum to the battle against the conservation area.
The new minister of Agriculture, Fisheries was basically against the conservation. The Ministry made report on the rationale behind the conservation area. The conclusion was the conservation of the black bee was justified. But for political reasons the report gave several solutions to solve the problems.

- To keep Læsø as a conservation area.
- To make a protected mating station for the black bee in the very eastern part of Læsø and allow other bee races on other parts of Læsø.
- To suspend the conservation of the Black Bee for some years, but keep a mating station on the eastern part of Læsø.
- To abolish the protection of the Black Bee totally.

The ministry took steps to implement the solution 2. With the limitations that the area is only protected until 20 July each year.
The Danish Beekeepers Association propose to the ministry:
1. All other bees except black bees must be removed from the island.
2. Beekeepers with Black Bees should receive a small grant to stimulate all the beekeepers of Læsø to have Black Bees.
3. Marketing of honey form the Black Bee of Læsø as a unique product.
4. The authorities must keep former agreements about

the conservation.
The goal is to preserve the black bee and tomake beekeeping with Black Bees on Læsø more profitable. The Black Bee does not survive unless beekeepers care for it.

THE ACTIVATION OF BUMBLEBEE QUEENS UNDER LABORATORY CONDITIONS

No 211

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There are several methods for the activation of laboratory reared bumblebees. Ethanol extracts of female and male larvae, pupae, whole cocoons and adult queens of bumblebee were prepared and tested in this work as a possible means of support and accelerate bumble-bee queens oviposition.
Experiments were performed during 3 years, in time of biological inactivity of bumblebees, i.e. September – March. Queens Bombus terrestris were placed separately into plastic cages supply with sugar solution and pollen as a food and lure of cocoons ("pseudococoons") treated with mentioned extracts. We found extract from the male bumblebees cocoons (pupaehe most active. There were compared two groups, together 90 treated queens and 90 control queens. Queens in treated cages started egg laying in 50% during two months, and in 24% by control group. The only differences by using extract of male cocoons were significant.
Results give us further possibility use this stimulus for better start of bumblebee nests in laboratory.

POSITION OF BEE COLONY IN THE BEE YARD

No 212

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The position of the colony in the bee yard may be: permanently good, temporary good, permanently bad and temporary bad.
Permanently good position is when the bee colony has good microclimatic living conditions at the position it was located throughout the year. So for example, bee colony located under a deciduous tree has permanently good position in the bee yard.
Temporary good position is when the bee colony has good microclimatic living conditions during a short time period of the year, and mostly bad. As an example for such position, a bee colony located under a coniferous tree or under the penthouse could be taken.
Permanently bad position is when the bee colony has bad microclimatic living conditions throughout the year. A good example for this position is the beehive located in the vicinity of the western wall of some building.
Temporary bad position is when the bee colony has bad microclimatic living conditions during a short time period of the year. A beehive located in the sunny place is regarded to be in the temporary bad position.

BEHAVIOURAL STUDIES ON SOME RACES AND HYBRIDS OF HONEYBEE IN ASSIUT REGION, UPPER EGYPT

No 213

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Carniolan race was highly infested by varroa mite in case of workers brood and adult workers, followed in a descending order by Carniolan hybrid. Meanwhile, workers brood and adult workers was the lowest infested by varroa mites in case of Egyptian race, followed in descending order by Italian hybrid. Regarding to the infestation level during the months, it varied considerably from one month to another. For the workers brood infestation, the average rate being lowest in March and the highest was during October. In case of adult workers infestation, the lowest rate was during April and the highest during September. Italian hybrid and Egyptian race were with the highest grooming behaviour. In contrast, Carniolan race had the lowest grooming behaviour. Meanwhile, the grooming behaviour was medium in case of Carniolan hybrid and Caucasian hybrid. The highest hygienic behaviour was found in the Egyptian race followed by Italian and Carniolan hybrids. While the lowest values, were observed in Caucasian hybrid and Carniolan race, respectively. Egyptian race revealed the highest defensive behaviour, while Carniolan race was more gentle, easily handled and showing a mild defensive responses. Smoking was significantly reduced the aggressive behaviour of bees. Opening the hive or exposure the balls to workers on the comb tops after the lid and remove it markedly increased the aggressiveness. Geraniol was active in inducing aggressive response and severe stings. Highly significant and negative correlation was detected between cubital index and aggressiveness in studied races and hybrids. Six behavioural characters were used for evaluation, or scoring method for tested hybrids and races. Total scores and (ranking order) of behavioural characters were: 114 (1), 167 (2), 211 (3), 250 (4) and 288 (5), in Italian hybrid, Egyptian race, Caucasian hybrid, Carniolan hybrid and Carniolan race.

PHYSIOLOGICAL AND BIOCHEMICAL STUDIES ON SOME RACES AND HYBRIDS OF HONEYBEE IN ASSIUT REGION, UPPER EGYPT"

No 214

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The newly emerged workers for Carniolan hybrid, Caucasian hybrid and Carniolan race were with the highest thorax fresh weights (mg/bee). Meanwhile, Egyptian race had the lowest weight. In case of thorax dry weight (mg/bee), Carniolan hybrid and Carniolan race were with the highest weight. Meanwhile, Egyptian race had the lowest weight. The highest nitrogen content was found in Carniolan race, whereas, the lowest nitrogen content was noticed in Egyptian race. The same trend was obtained for total protein content (%). The newly emerged workers for Carniolan hybrid, Caucasian-hybrid and Carniolan race had the highest head fresh weights (mg/bee), whereas, Egyptian race had the lowest weight. For head dry weight (mg/bee), Carniolan hybrid was the highest. Meanwhile, Egyptian race was the lowest. Carniolan hybrid, Caucasian hybrid and Carniolan race were with the highest K content (ppm), whereas, Egyptian race had the lowest value. The highest Ca content (ppm) was detected in Carniolan race. Meanwhile, Egyptian race was the lowest. Maximum Na content (ppm) was found in Carniolan race. Meanwhile, Carniolan hybrid, Italian hybrid and Caucasian hybrid were with the lowest values. Maximum Mg content (ppm), was found in Carniolan hybrid. Meanwhile, Egyptian race was the lowest. Carniolan hybrid and Caucasian hybrid were with the highest (K/Na) ratio. Meanwhile, Egyptian race was the lowest. The highest (Mg/Ca) ratio was noticed in Carniolan hybrid, whereas, Carniolan-race was the lowest. The newly emerged workers for Carniolan race had the highest total fat content (mg/bee). Meanwhile, there were insignificant differences between Carniolan hybrid, Italian hybrid, Caucasian hybrid and Egyptian race. Workers with 12 days old were with the highest degree of hypopharyngeal gland (HG) development in all tested hybrids and races. On the other side, workers, with 3 days old were with the lowest degree of (HG) developmental in all tested hybrids and races of honeybees. Maximum degree of development of (HG), and maximum acinal area of lobes were noticed in Carniolan hybrid workers.

A STUDY ON ADVANTAGE OF ARTIFICIAL NUTRITION AND SUGAR SYRUP ON POPULATION AND PRODUCTION OF HONEYBEE COLONIES

No 215

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Introduction: Honeybee like other animals need food productes for growth and multiplying which involve carbohydrates, proteins, fats, minerals substans .In ordinary, honeybee supply their nutritional needs from nectars and pollens. But in bad occasion and inapperiate environment they'll deprived from sufficient foods, so their productions will be diminished and their body sizes will be decreased. These subjects show the necessity of honeybee artificial feed for increase of output and efficiency of bee colonies in such conditions that they can't supply their needs from natural ways. We should remember that in artificial feed, sugar syrup, as usual in apiaries, now can't eliminate their needs,but we must also use supplements like ,proteins and vitamins
Methods: For these study we selected 30 colonies with normal position in Chaharmahal and Bakhtiar in random, then divided them to 3 groups; one of them as witness and others as cases which feeding by protein cake with different viscosity (15% and 30%), as supplement.
Each case group divided in two 5 members groups for feeding with carbohydrate syrup with one part water and one part sugar for one of them and one part water and two parts sugar for another one.This study began from December to February in the other word; in bees spawning; and continued for two months.
These honeybees tested for parasites and bacterial diseases, hive numbered and weighed, and population and numbers of combs and spawning of each colony recognized for registerations of the results. After that honeybees feeded every 10 days by pulpy cake of protein materials (soya powder) which was sweetened by honey and sugar syrup; and every other day feeded by sugar syrup for two or two and a half months.
Results: Population amount, increase of larvae and honey bees population, pleasant to taste at the cakes, the weight of the hives and the resistant of the colonies considered in spring and summer colonies operation.
Results are as below:
Spawning and growth of population in cases groups 15% more than witness. They (cases groups) showed 30% better operation to compare with witness group. They also were more successful in health and daily activities.

PHEROMONAL ACTIVITIES OF THE MANDIBULAR GLAND PHEROMONES ON FORAGING ACTIVITY OF DWARF HONEYBEES

No 216

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The pheromonal activities of mandibular gland pheromones; 1-eicosanol, eicosane, heneicosane and 2-heptanol were investigated by applying the chemicals with various concentrations from 0.1%, 0.5%, 1.0%, 5.0% and 10.0% (v/v) in n-hexane on Mimosa pudica

Linnaeus during foraging activity of Apis andreniformis and Apis florea. The data were analyzed by using one-way ANOVA at 95% confidential level. The finding shows that the chemicals which act as the repellence to A. andreniformis foragers are as follows; 5.0% eicosane, 5.0% and 10.0% 2-heptanol. While, 0.5% and 1.0% 1-eicosanol, 0.1%, 0.5%, 1.0%, 5.0% and 10.0% eicosane, 0.5%, and 1.0% heneicosane and 1.0%, 5.0% and 10.0% 2-heptanol are repellent substance to A. florea foragers. The chemicals with act as attractant to A. andreniformis foragers are 0.1% 1-eicosanol, 10.0% eicosane, 1.0%, 5.0% and 10.0% heneicosane and 0.1% 2-heptanol. However, no chemical with the concentration shows attractant properties to A. florea foragers.

Keywords: Apis andreniformis, Apis florea, pheromones, mandibular glands, honeybees, 2-heptanol, eicosane, 1-eicosanol, heneicosane

THE HISTOLOGICAL AND HISTOCHEMICAL STRUCTURE OF THE HYPOPHARYNGEAL GLANDS OF THE ASIATIC AND THE EUROPEAN HIVE HONEYBEES

No 217

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The histological and histochemical structure of the hypopharyngeal glands of the Asiatic hive honeybees, Apis cerana Fabricius, 1793 and the European hive honeybees, Apis mellifera Linneaus, 1758 in four stages of workers; pupae, nurse, foraging and guardian bees were investigated by using paraffin and staining techniques; hematoxylin & eosin, ninhydrin Schiff's and periodic acid Schiff's reagents (PAS) were used for studying histological structure, histochemical structure of proteins and carbohydrates, respectively. The finding shows that the histological structure between species are similar. However, the differences are found among stages within both species. The histochemical structure of proteins and carbohydrates among four stages within both species are different.

Key words Histological structure, histochemical structure, hypopharyngeal glands, Apis mellifera, Apis cerana, pupae, nurse bees, foragers, guardian bees periodic acid Schiff's reagent (PAS), ninhydrin Schiff's reagent

GENETIC VARIATION OF MITOCHONDRIAL DNA OF CHARACTERS FOR HONEY BEE

No 218

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Honeybee is a kind of society insect. The races fed in China are Apis mellifera imported form abroad and native Apis cerana cerana. In this study, the genetic variation of mitochondrial DNA (mtDNA) of characters for some honeybees were analyzed in the purpose of detecting the phylogenetic relationships of honeybees.
The mtDNA polymorphismin four species of Apis mellifera and Chinese bees (Apis cerana cerana) from six localities were analyzed with 15 restriction enzymes of 6 base pair recognition. Four kinds of Apis mellifera could be divided into two groups:
Apis mellifera carnica and Apis mellifera carpatica
Apis mellifera caucasica and Apis mellifera acervorum
Apis cerana cerana from six localities could be divided into two groups from: Jilin, Fujian, JiangXi, Gongdong, Kongming and Beijing. The Jilin bee is the result of the ECOR site lose of Apis cerana cerana from other regions. The mtDNA polymorphisms in egg, larva, pupa and adult bee of Apis cerana cerana were studied with RFLP. The heterophasmy of mtDNA in different development periods was not detected. Apis cerana cerana from six localities were discriminated with Hinf including groups from JiangXi, Beijing and Jilin, Gongdong and Kongming, Fujian.

Key words: Honeybee, Mitochondrial DNA

QUEEN BREEDING AND SELECTION IN EAST HERZEGOVINA BIH

No 219

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In this area Carniolan bee is the only race that has been raised for years. It has adapted to all honey flows and climate conditions. Main characteristics of this race of Carniola bee are good wintering, low food consumption during wintering, disease resistance, tranquillity, rapid spring development, good honeybees.
Ministry of Agriculture has initiated a project on protection of this race of Carniolan bee. It is led by known specialists in this field. Its title is "Project on protection of genetical resources of bees of the area EH".
As a selection station an isolated and ecologically pure place has been chosen. This apiary is circled by high mountains and make it possible to gain high level of well controlled mating. In this apiary there are 250 beehives. 86 beehives are included in this selection which has 8 lines. All queen mothers are from this area. Modern methods of queen breeding are used. There are 500 mating nucleuses. 30% are 4-frame LR nucleuses, 70% are baby 4-part nucleuses, which have proved as very

good ones. During this selection we pay a very strong attention on: pure line breeding, swarming impulse, good honeybees, tranquillity, high productivity.
During this project 4 ways of bee feeding have been used: bees fed with honey, with sugar, with the mixture of honey and pollen, and bees were not fed.
We have also checked and recorded their influence on the number of accepted and raised queen cells, length and structure of queen cells, their volume, and weight of bee queens before mating.
The percentage of queen fertilization is 89% in 2003, 95% in 2004.
In 2004 we produced 2,000 bee queens, but we expect to produce 5,000 in 2007.

COMPARATIVE ANALYSIS OF NUTRITION NEEDS OF *APIS MELLIFERA* FROM TROPICAL ANDES AND HOMO SAPIENS, WITH EMPHASIS IN REPRODUCTION BUDGET: A PREGNANT SUPERORGANISM HYPOTHESIS

No 220

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We have studied the pollen harvested per day in 100 colonies of Apis Mellifera adansonii in "Mitológica Farm", situated at 1,300 meter over sea level in wertern Andes, Venezuela. We make morning daily observations per minute at hive entrances observing the number of bees with pollen load. Our study was made from 1999 until 2001. We use pollen trap, and then the pollen loads were classified by color and weighted. Thus, we estimated the weight of harvested pollen per hive/day in different period of the apiculture year. All colonies had an average harvest over 50g pollen per colony/day, with an average of 200g pollen per colony/day (October-November- honey period). We used this maximum average of harvesting of pollen, comparing it with nutritional values reported for mineral and vitamins of bee pollen. We estimated the average content of vitamin and minerals demanded by an average colony in different steps of Apiculture year. We emphasize the following vitamins and minerals as key indicators: Vitamin A, Vitamins B1, B2, B6; Folic Acid; and the minerals Iron, Manganesum and Zinc. The nutritional Apis- budget was compared with nutritional needs of Humans in different steps of development. We conclude that the nutrition allocation for an average colony of Apis mellifera is well adjusted to the nutrition of female human during pregnancy and breast-feeding period. We discuss the implications of this comparison to manage natural swarm and colonies. The physiology of a female pregnant superorganism, suggest that the human female needs (Hormone like relations and human female perception and feelings) must bee applied to Apis female superorganism.
We propose a new theory of Apis colony as a pregnant superorganism making use energy-space-time concepts of quantic physic.

RAPID COLONY INCREASE FROM 200 COLONIES TO 1,700 COLONIES IN EIGHT HOURS USING 3 BEEKEEPERS

No 221

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With large scale nucleus production, the difficulty arises with high labour costs and drifting of nucleus populations due to a variety of reasons. Drifting results in weak hives, chilled brood and a low percentage of hatched and mated queens. With the practical and proven method described here, these problems are eliminated. There are four primary causes of loss of adult population (drifting) when making nucleus colonies. Adult bees drift towards colonies with strong queen pheromone, colonies with strong larval pheromone, colonies with the same colour of the mother hive, and colonies at the sunny end of the bee yard.
Methodology: Step 1: Early Spring, Feed 200 hives Caspian Solution* until they have 30 frame population (average 2 months time). This will stimulate large scale brood production. Step 2: Remove queen, 2 frames of brood and 1 frame of extra population. This makes 200 new nucleus colonies in one hour. This also removes queen pheromone from the mother colony and encourages the main colony to finish feeding & capping young larvae. Step 3: (Same day as step 2) Feed the queenless mother colonies (27 frame population) three feedings of 200ml Caspian Solution in 6 litres 2:1 sugar syrup every 3 days. This ensures quick production of young brood. Step 4: (Four days after Step 3) After four days, there are no eggs and very little young larvae Divide 27 frames into 1,500 colonies & add a queen cell. This will take three beekeepers eight hours. Step 5: (One day after Step 4) Check new nucleus colonies for those with no adult population due to drifting (less than 5%) and redistribute those frames to the original 200 nucleus colonies.
Results: There will be less than 5% drifting due to lots of emerging brood and very little queen pheromone or larval pheromone. The labour costs will be minimal as compared to convention methods of nucleus production.
Note: * Caspian Solution is a liquid protein diet rich in royal jelly that contains a pheromone that causes bees to work extra hard.

THE ORIGIN OF EUROPEAN FOREST BEEKEEPING

No 222

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The book "The Archeology of beekeeping" written by Eva Crane states that forest beekeeping first developed in the middle course of the Volga and in the lower course of the Kama river 2000 -1000 B.C. where a branch of Finno-Ugrian peoples lived. Later on forest beekeeping spread with the Finno-Ugrian peoples westwards to the Baltic. From these people the beekeeping practices were passed on to the Slavs and from the western Slavs to the Germans.
However there is no evidence given in the book. In order to prove this hypothesis we have carried out a survey of bee tree constructions and bee hive open side constructions appeared afterwards. Both constructions were traditionally used in the mentioned territory. The variety of types, their likeness and simplicity confirm the fact of forest beekeeping origin in this area. The most ancient is Udmurt type of bee tree with slit-like entrance which served as a prototype for bee tree with slit-like entrance in the door and side wall.

RADIOECOLOGICAL ASPECTS IN PRODUCTION OF BEE PRODUCTS

No 223

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One of basic conditions of manufacture of high-quality products of beekeeping is the non-polluting inhabitancy of bees. However it is difficultly achievable in practice at presence of the enterprises which work is connected to high ecological risk. In this connection the territory of Ukraine is not exception. It is given that the significant part of high-efficiency apiaries in the country located in the areas which have suffered from intensive radionuclide contamination of Chernobyl origin. On a global scale consequences of Chernobyl atomic power station accident have led to significant increase of contamination levels of planet vegetative cover with radionuclides 137Cs and 90Sr.
In connection with above-stated, the purpose of our researches was to study the influence of radiation component on quality of beekeeping products, made on territory of the country.
It has been established, that radioactive pollution of pollen is caused by radionuclides 137Cs and 90Sr, honey - 137Cs. In samples of bee products, that have been taken from radionuclide contaminated areas, the radionuclide content was in 10-100 times higher in comparison with areas which were safe in this respect. The radionuclide ratio of 137Cs/90Sr in samples of pollens was different: from 0.2 up to 1.4 - for clean areas and 36 - for the territories suffered from Chernobyl atomic power station accident. The highest level of pollution has been found out only in one settlement: for pollen it has made 300 Bk/kg as regards 137Cs and 8 Bk/kg - as regards 90Sr; for honey it has made 428Bk/kg as regards 137Cs.
On the basis of the received results we made the conclusion, that at the present stage of post Chernobyl accident, pollution levels of the Ukrainian origin beekeeping products are not harmful for the Ukrainian population health. At the same time, the carried out research has evidently shown an opportunity of use of plant pollen (bee pollen load) as the indicator of radioecological safety of honey yield territory.

ORGANIC ACIDS IN HONEY

No 224

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Honey contains a whole series of organic acids. We tested the hypothesis that the spectrum of organic acids in honey may give evidence of the autenthicity of the honey, its botanical and geografical origin.
Honeys for analyses were obtained directly from bee yards in the Czech Republic. The determination of acids was based on HPLC method with UV detection.
All honey samples contained kumaric acid (up to 9 ppm), ferulic acid (up to 3 ppm) and benzoic acid (up to 28 ppm). The salicylic, syringic, protocatechic and other acids in some honey samples were present.

ANÁLISIS ISOENZIMÁTICO EN POBLACIONES DE *APIS MELLIFERA* L. EN COLOMBIA

No 225

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Los análisis isoenzimaticos en poblaciones de Apis mellifera en el continente americano, han demostrado que las abejas africanizadas son un polihibrido compuesto principalmente por las subespecies scutellata, mellifera y ligustica. En este trabajo se presentan los resultados del estudio de 900 abejas adultas colectadas en diferentes zonas biogeográficas colombianas. Se Analizaron 6 individuos por colonia de un total de 150 colonias, pertenecientes a 15 localidades de 5 departamentos. Las muestras fueron colectadas desde los 15 y hasta los 3000 msnm. Las

determinaciones isoenzimáticas para Los locus Hexokinasa (Hk-1) y Malato deshidrogenasa (Mdh-1), se realizaron en la Universidad Federal de Sao Carlos SP Brasil, el laboratorio de genética y bioquímica. El estudio permitó comprobar, que las frecuencias de los alelos de estos locos en muestras de A. mellifera en Colombia son similares a las observadas en poblaciones de abejas del Brasil, presentando una frecuencia para Hk-1 del alelo F = 0.5679, M = 0.0768 y S =0.3554; y para Mdh-1 valores para F = 0.7286, M = 0.2436 y S = 0.0277. Las abejas revelaron un alto grado de africanizadas de grado heterogéneo, presentando niveles distintos de introgresión de los genes africanos en las poblaciones europeas residentes. Estas poblaciones se encuentran en equilibrio genético de Hardy-Weinberg y no presentan desequilibrio de ligación para estos locos, evidenciando que posiblemente el proceso de africanización en Colombia ya se completó. Además, se verificó un gradiente altitudinal, corroborado por el análisis de correlación linear (r = 0.70, P<0.001), que lleva a suponer un efecto de selección sobre los fenotipos de la Mdh-1.

THE INFLUENCE OF BEES AND QUANTITY OF CELL TO THE PROFIT OF HONEY IN BEE COLONIES

No 226

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The purpose of this work is to determine correlative relations between the quantity of bees, cell and profit of honey in bee colonies.
Applying statistic methods, regression analyses it is possible to quantify and determine a direction of changes correlatively connected properties.
In our two years research it has been observed bees and cell on the honeycomb surfaces during the spring (the last week of march and the last week of april) to 36 bee colonies and it has been estimated the quantity of mentioned properties in 1/10 LR of frame. The quantity of profit of nectar has been measured during the first three days of robinia flow by partial method of measuring - (method of Szabo, 1982.).
On the basis of the statistic calculations, the next data were obtained of the first spring observation: the quantity of profit of honey brings about the increase of bees by 0.89kg and brings the reduce of cell surface by 0.29kg.
To the second spring observation (about thirty days before robinia flow) the quantity of nectar brings the increase of bees by 0.08kg and of quantity of cell by 1.26kg. In the next year during the first observation it can be seen that the quantity of nectar brings the increase of bees by 2.73kg and the reduce of cell by 1.19kg. On the basis of the data from the second observation in the second year it can be seen that the profit of nectar brings the reduce of bees by 0.42kg and the increase of cell by 0.78kg.

On the basis of the analyses and by testing of the obtained results it has been determined that there were differences and reciprocal relations between followed parametars.

COMPARISON OF THE PERFORMANCES OF IMPORTANT HONEY BEE(APIS MELLIFERA L.) RACES AND ECOTYPES IN DIFFERENT REGIONS OF TURKEY

No 227

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In this research, peformance tests of important honey bee races and ecotypes between North (Thrace) and South (Cukurova) regions of Turkey have been compared. Colony livability, adult bee population, brood production, swarming tendency, flying activity, aggresiveness and honey production have been evaluated.

In Thrace region, the differences among the Anatolian, Caucasian, Thrace and Mugla races and ecotypes have not been found significant (P>0,05) acccrding to the livability where as the same groups have exhibited significant differences (P<0,01)in Cukurova Region. In Thrace, races and ecotypes have indicated higher performance (P<0,01) for adult bee population and brood production fllowed by Mugla, Thrace, Caucasian and Anatolian, respectively. In Cukurova conditions, the differences among groups according to adult bee population have been found important (P<0,01). Mugla ecotype has indicated higher performance (P<0,01) than all the groups in brood production whereas Anatolian was higher than Thrace (P<0,05) and Caucasian (P<0,01). Thrace was higher (P<0,05) than Caucasian.
In terms of swarm tendency, no significant difference (P>0,05)has been observed between the races and ecotypes in the conditions of Thrace and Cukurova. According to flying activity and aggresiveness the difference between races and ecotypes were not significant (P>0,05) in Thrace conditions where as differences were important (P<0,01) in Cukurova conditions. In Thrace Region conditions, average honey production of Caucasian, Anatolian, Mugla and Thrace races and ecotypes were 29,971 ± 7,797; 24,857± 8,545; 23,171 ± 7,721 and 19,529 ± 4,067, respectively. On the other hands,in Cukurova conditions, average honey production of groups were 20,544 ± 1,386; 24,670 ± 3,353; 34,862 ± 3,576 and 17,381 ± 2,852, respectively. Caucasian ecotype in Thrace conditions and Mugla ecotypes in Cukurova conditions have yielded the highest honey production.

UTILISATION OF TROPHALLAXIS BEHAVIOUR IN ENVIRONMENTAL RESEARCH

No 228

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Food transmission from mouth to mouth is termed trophallaxis, and is common between the honeybee workers and also from worker to queen and drones. The trophollaxis is very important behaviour for honeybees' social life and especially in the process of honey making. Honeybee collects her nectar reward with working hard. Several hundred visits may be necessary to obtain a load of nectar from small flowers such as those of sweet clover. House bees wait for the field bees near the entrance of the hive to receive their nectar load. The bees exchange the food by trophallaxis behaviour. The house bees know better where to store honey in the colony and the field bees know exactly where to find more nectar. Therefore trophollaxis is important in honey making.
Fakhimzadeh & Lodenius (2000, Apiacta 35:85-95) investigated the amount of heavy metals in Finnish honey, pollen and honeybees. The amount of heavy metals in honey was only 10% of the accepted level in food material in Finland. The same metals were considerably higher in bees than in honey. For example in Harjavalta the mean value of Cd in bees was (1.2±0.51 mg/kg dry wt) was 133 times the level of Cd in honey (0.0089±0.0125mg/kg). In Harjavalta Pb, Cu and Zn was 36, 180, 42 times higher in bees than in honey, respectively. As honey possesses excellent surface to collect any pollution and bees were highly polluted, one can hypothesis that the bees filter the honey and accumulate metals pollutions in them.
Until recently the examination of this hypothesis was not easy. However, recently a series of cages were made to examine the hypothesis. From one colony, samples of 78 bees (range 49-107) were confined in each cage and the cages were assembled over each other with a net in between. Bees in the three lower cages had no access to food. Sugar solution was supplied only to the top cage. It is known that bees without food die within few hours. However, in this experiment hungry bees transferred the sugar solution to the lower cage while they had to beg the food from the bees in their top cage. All bees including the queen bee (kept in the lowest cage) lived in this manner in a dark laboratory for several days of the experiment. This bio-filter (bees fed in this way) makes it possible to examine the hypothesis of accumulation of metal pollution in bees' body during honey making.

THE DEFENSIVE BEHAVIOUR OF *APIS MELLIFERA CYPRIA* AGAINST THE HORNET VESPA ORIENTALIS

No 229

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The honeybee Apis mellifera cypria has not been studied in detail despite the fact that it is interesting from a scientific point of view on two accounts: it is a distinct race which has a small area of distribution and it possesses a pronounced and effective defensive behaviour against attack by hornets and wasps which try to penetrate hives to rob them.
Our study focused on the different parameters of the defensive behaviour of this honeybee race against the hornet Vespa orientalis at different periods of the year. The observations were performed on 40 colonies.

SOME DEVELOPMENT AND REPRODUCTIVE CHARACTERISTICS OF THE ITALIAN, CARNIOLAN, CAUCASIAN AND ANATOLIAN QUEEN HONEYBEES (*APIS MELLIFERA* L.) AND THE EFFECTS OF JUVENILE HORMONE ANALOQUE (METHOPRENE) APPLICATION ON THE QUALITY OF THE QUEENS

No 230

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In this study some development and reproductive characteristics of the Italian (Apis mellifera ligustica) Carniolan (Apis mellifera carnica), Caucasian (Apis mellifera caucasica) and Anatolian (Apis mellifera anatoliaca) queen bees and the effects of juvenile hormone analoque (methoprene) application on the quality of queen bees were determined.
The grafting rates in Italian, Carniolan, Caucasian and Anatolian queen larvae were found to be 82.7%, 62.9%, 62.9 %, 78.2%; the length of the capped queen cells were 24,4±0,2mm, 24,9±0,2mm, 24,6±0,3mm, 24,8±0,2mm; diameter of the capped queen cells were 11,3±0,1mm, 11,4±0,1mm, 11,5±0,1mm, 11,5±0,1mm; weight of the queens at emergence were 196,3±2,3mg, 223,6±2,9mg, 204,4±3,1mg, 204,9±2,5mg; diameter of the spermathecae were 1.17±0.05mm, 1.14±0.01mm, 1.18±0.01mm, 1.20±0.01mm; the number of spermatozoa in the spermathecae 3.820± 0,520 million, 4,466 ±0,520 million, 4,320±0,52 million, 4,830±0,520 million respectively.
Application of methoprene (0.05 mg/larvae) increased the

weight of the queen bees; however it caused high larval mortality. The application of acetone as the solvent of methoprene also caused high larval mortalty. Acetone and acetone dissolved methoprene at 0.05:mg/larvae should not be used in queen rearing.

Key words: Honeybee (Apis mellifera L.), genotypes, queenbee, methoprene.

POLLEN ANALYSIS OF SOME UKRAINIAN HONEY

No 231

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The pollen analysis of honey or mellisopalinological research finds use at definition of a botanical and geographical origin of honey. It is known, that because of certain species of plants in the fodder base for bees, honey from different regions of the world have characteristic pollen spectrum.
In Ukraine botanical spectrum of honey are studied unsufficiently. The works Cherkasova (1970) are known. Recently is investigated species structure of pollen load (Lokutova, 2004). The purpose of our work was study of pollen spectrum Ukrainian honey. The samples of honey were prepared by the method of Louveaux et al, (1978) in laboratory of pollen analysis of IPF, Poland (Teper, 2004). 10 samples were selected from the central and 2 - from southern region of Ukraine.
The results of our researches show that honey named as monofloral have poor pollen spectrum. In them prevails or contains the pollen those of plants, which name they carry (sophora, robinia, tilia, fagopyrum, onobrychis). Multifloral honey have wider pollen spectrum. These honey contain pollen of agricultural plants (helianthus, fagopyrum, brassica, trifolium ets.), pollen of garden culture, wood, field and grassy plants (salix, crataegus, garden cultures, taraxacum, echium, centaurea, cirsium, artemisia ets.). In honey from southern part are found out pollen of lavandula and majorana. This fact confirms a geographical origin of honey.
In general should be noted, the honey central part of Ukraine characterized to the high contents of pollen from echium, helianthus, fagopyrun, trifolium, centaurea ets.

INVESTIGATIONS OF DIFFERENCES OF HEAVY METALS AMOUNT IN HONEYBEE BODIES AND THEIR HONEY - INDICATION OF HONEYBEE BIO-FILTER ABILITIES

No 232

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In this work, investigations of heavy metals amount were done in samples of honeybees and their honey from two apiaries from Serbia. The first apiary (7 hives) is an experimental school apiary of Faculty of Veterinary Medicine in Belgrade and it is situated on the hill which is 30 m distant from highway. The second apiary (7 hives) is located on Sjenica-Pester plateau, far away from sources of environmental pollutants (control apiary).
Honey and 300 honeybee workers (150 house bees and 150 field bees) were sampled from each hive. Among house bees, only young, barely emerged workers were sampled.
Contents of Pb, Cd, Zn, As, Cu and Fe in samples of honey (14) and honeybee bodies (4,200) were determined by atomic absorption spectrometer AAS (Varian AA 375 and Unicam 969 AA).
The analyses of honey and honey bees from Belgrade apiary showed the following results: the mean values for Pb, Cd, Zn, As, Cu and Fe in honey samples from Belgrade apiary were <0.20 mg/kg, <0.03 mg/kg, 1.347 mg/kg, <0.20 mg/kg, 0.246 mg/kg and 2.197 mg/kg, respectively; in samples of house bees: 0.352 mg/kg, <0.03 mg/kg, 1.552 mg/kg, 0.588 mg/kg, 0.735 mg/kg and 2.883 mg/kg. The highest mean values for Pb, Cd, Zn, As, Cu and Fe were affirmed in samples of field bees: 1.452 mg/kg, 0.992 mg/kg, 3.844 mg/kg, 0.965 mg/kg, 1.658 mg/kg and 11.212 mg/kg. In addition, those field bees lived 1.5-3-2 days shorter and had darker fatty tissue.

DIVERSITY INVESTIGATIONS OF INDIGENOUS APIS MELLIFERA CARNICA ECOTYPES IN SERBIA

No 233

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Comparative cytogenetic, morphometric and behavioural investigations of three honeybee ecotypes of Apis mellifera carnica from Serbia were performed. Adult honeybee workers were sampled from 30 different localities in Serbia, allocated in three regions, some 200 km apart, with different climatic, geographic and floristic features. The analysis of variance (ANOVA) for each character in whole speciment revealed statistically highly significant differences ($p<0.001$) in the means of 22 morphometric characters and significant differences ($p<0.01$) in the means of 4 characters. The results of cytogenetic investigations point to a great inter- and intraecotype diversity of G-bands on chromosomes of investigated honeybee ecotypes. The greatest differences in G-band number and distribution were registered in chromosomes 1, 2, 4, 11, 12, 13, 15 and 16. Moreover, differences in exertion of hygienic and grooming behaviors were affirmed within and among investigated ecotypes, with potential of hygienic behaviour ranged from 81.24% to 99.50%, and potential of the grooming behaviour ranged from 20.68% to 42.14%. Considering affirmed cytogenetic,

morphometric and behavioural diversity it can be concluded that analysed indigenous ecotypes A. m. carnica represent a remarkable genetic resource. To preserve such honeybee diversity, conservation of those ecotypes in Serbia is necessary, for example by forming segregated apiaries in their original regions.

THE EFFECT OF QUEEN ABSENCE ON THE PRODUCTIVITY OF HONEYBEE COLONY

No 234

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Introduction: The problem of the effect of queen absence on the honeybee colony productivity was long the aim of the analysis of bee-keeping theorists and practitioners. In the hitherto literature there are divergent opinions that matter. The results of the tests executed in that field confirm the increase in honey production by honeybees in some cases, in the others – its drop. Dzier_on (1859), for instance, claimed that before the main honey flow it is necessary to make an interval in oviposition of breeder queens by removing them from the honeybee colony so as to decrease honey consumption needed for larvae rearing. Also Berlepsch (1869) offered the removal of bee queens in the hive 36 days before the end of main flow. However, Butlerow (1886) and Maurizio (1975) have stated in their studies that the lack of bee queen as well as young unsealed seal brood in the honeybee hive results in a considerable drop of honeybee activity and also restraint in the range of executed functions.
Such large divergences in the evaluation of the above mentioned view to a large extent result from too general treatment of the state of the analysed colony.
It is widely known that in some cases (e.g. during intensive development of a honeybee colony) the bees react to the queen's absence extremely strongly, while at the pre-swarming period the loss of the queen seems not to be noticed by the other honeybees.
As the results of many authors' research concerning this problem are contrary and they do not explain the reasons of such big divergences, there has arisen the need to study honey production dynamics in the colony – from the moment of their orphaning to the appearance of the bees coming from a young bee queen.
Methods: The experiment was carried out on ten Caucasian honeybee colonies. The observations were performed during the whole vegetation season in 2002 –2004 in an apiary near Lublin. During the observations, the volume of honey stock and propolis accumulated in individual hives and also the surface of a brood comb in particular periods of growth were measured. The obtained results were analysed by determining the dynamics of productivity and colony's development according to the state of an orphaned honeybee colony.
Results: The analysis of the obtained results proved that there was a dependence between the collection of food and the inner state of the honeybee colony. In this range confirmed six fundamental stages of honeybee behaviour were observed (comparing with the controls):
From the moment of orphaning the colony to setting up queen cells – in that time the weight of the collected food decreases significantly;
From setting up queen cells to gnawing out of a young bee queen - the productivity of the honeybee colony increases and often reaches the initial value;
From gnawing out of a young bee queen to the start of brooding – the tendency to the decrease in the productivity.
From the beginning of brooding till the moment of gnawing out of young bees – significant increase in the activity in the colony, the number of worker bees, however, drops. In consequence – no increase in productivity.
From the beginning of gnawing out of the bees descended from a young bee queen to their start of work outside a beehive – the bulk of brood increases – further decrease in productivity.
From the beginning of work by honeybees descended from a young bee queen outside the colony – further increase in the intensity of accumulating stock food by the colony
Discussion: The analysis of the results received when carrying out the experiment described above proves that the term 'orphaned colony state' used to date in bee-keeping practice is very general and ambiguous.
The theory of the sense of removing the bee queen from the bee colony prior to the main flow or 36 days before its termination, generally accepted in bee-keeping practice, calls for specifying and verifying, regarding the stage of developmental advancement of the orphaned colony. Thus, according to final conclusions determined on the basis of the analysis of productivity of bee colonies at individual stages of orphaning, it ought to be stated definitely that the above mentioned theories are most correct, on condition, however, that the colony will be deprived of the bee queen at such a date which will ensure that the phases of production prosperity arising at the developmental phases pointed to in the conclusion of the hitherto study will fall on the period of the main flow.
The above analysis shows that a very negative consequence of orphaning a bee colony prior to or at the main flow is the situation when the reaction of apathy in the industry of bees resulting from being orphaned falls at the time of full main flow.
Moreover, the statement of some authors of apiarian scientific studies in the view of above presented research appears not to be fully valid as the phases of the prosperity of bee activity in orphaned colonies do not threaten with lowering the intensity of using the flow by the bees comparing with the colonies not deprived of the bee queen during the whole vegetative season.

Literature

1.Berlepsch A. (1869). Die Biene und ihre Zucht mit beweglichen Waben in Gegenden ohne Spatsommertracht, Mannhein, Verlag von J. Schneider. 8. s. XVI.
2. Butlerow A. (1886): Jak hodowa_ pszczo_y, Warszawa

ssXI +60 (How to Keep Bees?)
3.Dzier_on J. (1859): Nowe udoskonalone
szczolnictwo.Leszno, ss 257 (New Improved
Apiculture")
4.Maurizio A. (1975): Handbuch der Bienenkunde,
Stuttgart. Bd.6.

THE AGGRESSIVE PATTERNS OF WORKER HONEYBEES TOWARDS A FOREIGN QUEEN: THEORY AND EXPERIMENT

No 235

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Introduction: When introducing a new queen honeybee in a protective cage, bees often display hostile behaviors on the cage collectively known as balling. Ideally, the number of aggressive bees displaying this behavior often decreases to zero before the queen's release; if not, the queen may be killed.
Methods: Queens in standard introduction cages were introduced with and without attendant bees. The number of balling bees on the cage screen was recorded twice a day. This observational data was compared to a mathematical model of queen introduction that we derived.
Results: Several factors may extend the duration of balling. One factor is the presence of attendant bees accompanying the queen. During queen introduction without attendant bees, the number of balling bees typically exhibits an exponential decay to zero. With attendants if the number of ballers decreases, the decay is usually slower. However, other aggressive and erratic patterns are also observed. With chronic balling the number of ballers never decreases to zero. With a reversion, the number decreases to zero and then dramatically increases, and either subsequently decreases to zero again or never decreases to zero (reversion and chronic balling).
Discussion: To our knowledge, chronic balling has never been previously reported. We interpret this chronic balling as a permanent state of queen rejection. These experimental results suggest a mathematical model whose dependent variable is the number of bees balling the cage over time, along with a parameter describing the intensity of aggression due to attendant bees. The model mimics the experimental data and displays mathematical chaos when the simulated aggression of the recipient colony is high.

EFFECT OF PROPOLIS PRODUCTION ON HONEY YIELD AND POPULATION OF HONEYBEE COLONIES

No 236

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Propolis, a resinous wax-like substance produced by honeybees (Apis mellifera), is well known in recent years, some curable diseases by propolis include bad breath, eczema, eye infections, throat infection, ulcers and urinary tract infections. Propolis is available for purchase as an ingredient in capsule form, lip balm, skin cream, tincture, toothpaste and sore-throat lozenges. Considering the importance of the propolis, four propolis-producing methods were studied between 1999-2000 in the Research Centers of khojir and Alborz. These methods were Net (mesh18), Tarpaulin, Fiber, and Roland bell trap. In these experiments, population of adult bees and broods, the amount of honey and pollen in the hive were uniformed, and also, young queen sisters were introduced to the colonies. This study was conducted for 3.5 months in 1999 and 2.5 months in the year 2000. Amount of propolis was estimated every twice a week, population once per months, and amount of honey at the end of autumn. The Rolland bell produce propolis was significantly lower than the others in October. However, it did not different significantly effect compared to others in December. The maximum amount of harvested propolis, was 51.27g/hive, using the Fiber method. Population density of colonies did not significantly different ($p<\%5$) among the methods in this study. Propolis-producing methods did not indicate undesirable effect on propolis was observed and there was not noticeable difference among honeybees colonies population.
A significantly positive correlation was observed between population and honey yield, and between honey yield and propolis ($p<5\%$). These results indicated that propolis-producing methods might not have undesirable effects on bee population density and honey production.

POLLEN FORAGING LOADS OF APIS CERANA INDICA UNDER DIFFERENT AGROCLIMATIC OF KARNATAKA, INDIA

No 237

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The foraging loads of Apis cerana indica was determined under different agroclimatic ecosystems during 2003-2004. Attempts were made to study the size of the foraging population with reference to the number of foragers gathering pollen, nectar, and both pollen nectar during different hours of the day and different months of the year in different agro-ecosystems.
Pollen gathering activity showed greater fluctuations than the nectar gathering activity. The pollen load carried by A.cerana indica was maximum between 09.00 – 11.00 hrs, however the number of pollen collectors were moderate during evening hours. The mean number of pollen foragers during the study period showed peak

during September, October and second peak again during the months of March, April and May. The minimum numbers of foragers were observed during the months of June, July and August.
Pollen gathering activity steadily increased from March to June. It was observed that, the worker bee carried less quantity of pollen during July and August. The amount of pollen carried progressively increased from August to the end of the season. The daily flight shows precise foraging time of bees in a day. The foraging profile shows that there was a definite ratio among pollen gatherers and nectar gatherers. Many factors like the frequency of trip, pollen collection frequency, foraging time, length of foraging life and size of the foraging loads were also determined in different agroecosystems are discussed.

COLONY PERFORMANCE OF THE INDIAN HONEYBEE, APIS CERANA INDICA UNDER DIFFERENT AGROCLIMATIC REGIONS OF KARNATAKA, INDIA

No 238

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The colony performance and foraging index of Apis cerana indica was determined to find out the efficiency of the bees foraging under different agro-ecosytems during 2003-04. Attempts were made to find out the foraging index in different regions and its relation to honey and pollen production. The brood rearing activity has also been recorded during the study period. The maximum brood rearing activity was between January to March ranging between 30.25 – 37.56 cells/inch2 with a moderate between September – December ranging 21.35 – 31.17 cells/inch2 and the lowest was recorded during April – June with only 14.36 – 19.14 cells/inch2. On an average it was noticed 4-6 brood combs during most of the year and 8 frames during the peak honey flow seasons. The quantities of pollen production, honey yield have been correlated in relation to the foraging behaviour and the brood rearing activity. It was found out that the average honey production per annum was very high in the forest and also in monoculture agriculture ecosystems. Honey production ranged between 8 – 12kgs per annum and pollen production was 150 – 260grams/day during the peak honey flow season. Information was also obtained on the said parameters in migratory apiary sites and non-migratory apiary sites and its economics was also worked out. Further details on the colony with comparative studies on performance in different agro-climatic region and its sustenance have been analysed and discussed.

HISTORY AND APPRECIATION OF HONEY BEE FERAL COLONIES ON KANGAROO ISLAND SPECIFICALLY FOR A QUEEN BREEDING PROJECT

No 239

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Introduction: In the absence of meaningful production records it is necessary through observation of feral colonies to establish a suitable selection programme for queen rearing of the Kangaroo Island Ligurian Honey Bee.
Methods: Feral colonies were assessed for balance in fecundity and honey production. All outstanding established colonies (< 1 year history) were used.
- Retained Honey was weighed.
- Queen and Brood pattern assessed
- Evidence of swarming tendency noted
- Uniformity of bees in the colony assessed
- Evidence of Hygiene visually observed
- Temperament

Selected colonies were transferred into Langstroth equipment for further observation, quality testing and an initial programme of queen breeding.
Results:
1. Disparity in Honey Storage
2. Good honey storage correlates with a sound brood pattern
3. Swarming tendency is high in 96% of feral colonies.
4. Colonies of uniform colour and size bees performed well. However, evidence of inbreeding such as deformed bees. And drones with white/red eyes detracted from performance.
5. All selected colonies demonstrated a high standard of hygiene. More specific tests on hygiene will be done.
6. Great variation in temperament.

Discussion: Outstanding and tenacious quality of bees that work in adverse conditions (temperatures between 13 and 43 degrees C and in light rain. High hygiene results in minimal disease on Kangaroo Island.

A STUDY OF COMPARISON OF MUGLA (*APIS MELLIFERA ANATOLICA*), ITALIAN (*APIS MELLIFERA LIGUSTICA*) AND CARNIOLAN (*APIS MELLIFERA CARNICA*) BEE GENOTYPES IN THE HATAY REGION WITH RESPECT TO THEIR BEHAVIOUR CHARACTERISTICS

No 240

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In the present study behavioral characteristics between Mu_la (Apis mellifera anatolica), Italian (Apis mellifera

gustica) and Carniol (Apis mellifera carnica) bees were compared.
The result of behavioral studies showed that the time period for the first sting to tennis ball was 30.76±0.84, 32.88±0.75 and 23.76±0.76 sec; the number of sting were 2.58±0.14, 2.25±0.10 and 3.64±0.19; the number of swarm cups were found as 6.04±0.73, 9.57±1.23 and 7.16±1.09 per colony; the propolis production for two weeks were as 1.45 ± 0.12, 1.26 ± 0.10 and 2.07 ± 0.28 g per colony; pollen yield were 52.31±3.46, 53.16±4.32 and 42.69±3.07 g per colony for 3 days for Carniolan, Italian and Mu_la bee genotypes respectively.
Mu_la (Apis mellifera anatolica) bees, which showed higher aggressive behavior than those of other two genotypes. It was determined that the tendency of swarm was lower in Carniolan (Apis mellifera carnica) and Mu_la (Apis mellifera anatolica) bees in comparison to Italian (Apis mellifera ligustica) bees while propolis production was high in Mu_la (Apis mellifera anatolica).

Key words: Apis mellifera L, A. m. anatoliaca, A. m. ligustica, A. m. carnica, Physiological characteristics, Behavioural characteristics.

MELIPONINA IN AN OLD INSULAR REGION

No 241

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Meliponina is a pantropical group of eusocial bees, with largely occurrence in Brazilian regions. This group has a great importance on the functioning of this rain forest, yet its natural community have been poorly studied, particularly in islands. This study examines some parts of a bee community structure, pointing out the hypothesis that the studied island follows the similar pattern with others one already studied. For this, these results were also compared with the others surveys on island and mainland communities. The study was carry out in Ilha Grande State Park (23o09'05"S, 44o23'W), an island with 190km2, the average yearly temperature is 22.5oC and rainfall of 2,242mm. Highly Apidae was captured in year round samples, which followed a standardized method, in tropical habitats in different strata. In this reserve 12 stingless species and Africanized honeybee (AHB) were found, the primer being the most abundant flower visitor. In the understory, the relative abundance was expressive comparing with others studies conducted in Brazilian rain forest. Bees visited 105 flowers species, the majority was in the understory and subcanopy, where small-sized bees were more prevalent (56%) than medium to large-sized bees. A strong predominance of Apidae, mainly Meliponina is similar in some mainland habitats, where there are no AHB's apiaries. However, this pattern contrasts with those of Brazilian islands communities, which are characterized by low species richness and abundance of Meliponina. The major presence of aggressive bee species, the limit distance of swarming system used by stingless bees (1,000m from the hive), a poor presence of crossing water gaps to reach the mainland and the incapacity of stingless bees to cross water gaps are evidences that these species were not introduced in this island. Since, in Ilha Grande Meliponina species have been introduced a long time ago, why have its bee richness not been decreased, as occurred in others Brazilian islands. The ecological and history aspects of Ilha Grande are being discussed to reinforce the conservation management of this reserve.

BIOLOGICAL STUDIES ON *MEGACHILE UNIFORMIS* (A) (HYMENOPTERA – MEGACHILIDAE) IN EGYPT

No 242

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The duration of the immature stages of Megachile uniformis (A) was studied at room temperature. The incubation period ranged between 2-4 days with an average of 2.86 ± 0.133 and 2.8 ± 0.223 days in 2001 and 2003, respectively. The larva has 5 instars , the 1st instar larva lasted between 2-4 and 1-4 days with an average of 2.93 ± 0.153 and 2.13 ± 0.274 days , the 2nd instar larva ranged 2-4 and 1-3 days with average 2.6 ± 0.19 and 1.87 ± 0.236 days , the 3rd from 2-4 and 1-3 (average 2.87 ± 0.133 and 2.07 ± 0.118 days) , the 4th took from 2-5 days with an average of 3.87 ± 0.225 and 3 ± 0.239 days , the 5th instar larva lasted from 3-5 and 2-5 days with an average of 3.93 ± 0.206 and 3.4 ± 0.214 days in the two years , respectively. Prepupa took about 8-11 and 7-12 days with an average of 9.87 ± 0.256 and 9.8 ± 0.335 days and the pupal stage took from 21-25 and 18-25 days with an average of 22.6 ± 0.335 and 21.6 ± 0.55 days respectively. Pupa male ranged between 7-21, 8-9 days with average of 14.11 and 8.5 days whereas pupa female lasted 8-21, 8-13 days with average of 13-7 and 10 days respectively. The mean weight of female pupa was 22-22mg, while the mean weight of female pupa was 26.47mg.

REMOVAL OF HONEYBEE EGGS AFTER TREATMENT WITH WATER SOLUTION SPRAYS.

No 243

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Spraying of water solutions is a practice commonly used in apiculture. Solutions such as lactic acid and amitraz

demonstrated acaricide action. Lactic acid and amitraz have been widely applied against Varroa, Tracheal mite and Tropilaelaps. Some other water solution sprays, like diluted aniseed oil, are applied for direct unification of honeybees from different colonies, a practice commonly used in Greek apiculture. Many research results are available for the adverse effects of the above solutions to adult bees and brood, but very few are available concerning effects on eggs.

In order to assess the effect on honeybee eggs when applying the above solutions, two experiments were carried out in September 2003 and August 2004.

Ten colonies of equal populations and brood areas, were divided into five groups of two and received five applications of each of the following treatments: a) spray with 5ml amitraz (Mitac®) solution b) spray with 5ml of lactic acid solution c) spray with 5ml of aniseed oil solution d) spray with 5ml of water e) no treatment (control colonies). Spraying was applied to all frames by hand-operated atomizers every 5 days.

In order to estimate the number of eggs removed after each treatment, 100 eggs were marked by the use of a transparent slide on one side of the frame. After marking the eggs, the marked side which was covered with workers, was sprayed. Four days after treatment empty egg cells were counted.

During the first experiment, removal of eggs (average) was 56.7% for amitraz, 66.8% for lactic acid, 33.8% for aniseed oil, 19% for water and 4.9 % for control. During the second experiment, removal of eggs (average) was 87.7% for amitraz, 89.9% for lactic acid, 34.7% for aniseed oil, 39.2% for water and 6% for control.

The results of the two experiments indicate that all types of water-solution sprays (even water spraying) cause egg removal by worker honeybees. Amitraz and lactic acid caused significantly higher removal in both experiments. Aniseed oil and water also caused significantly higher removal compared to control colonies.

IN SITU HYBRIDIZATION OF ALPHA GLUCOSIDASE IN STINGLESS BEES, SCRAPTOTRIGONA BIPUNCTATA

No 244

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Young (YB) and old (OB) stingless bees, Scraptotrigona bipunctata, were collected according to their behaviours. YB crawls on the floor and cannot fly while OB can fly to forage food. The paraffin sections of head and abdomen of YB and OB were made on glass slides. For probe preparation, a sequence of 120 bp of alpha glucosidase (AG) based on the AG sequence of A. mellifera in GenBank (accession number D79208.1) was synthesized by MALDI TOF MASS. The chosen sequence was linked to T7 promoter (AGTAA TACGA CTCAC TATAG GG) at both ends in order to synthesize sense and antisense probes. Forward and reverse primers were designed from the mentioned AG sequence above. Sense and antisense reactions were performed under the optimal conditions (annealing temperature at 55oC for sense and 50oC for antisense reactions). For sense reaction, the concentration of product is 1.46ug/ul (with the ratio of O.D. 260/280 = 1.74) while for antisense reaction, the concentration of product is 4.14 ug/ul (with the ratio of O.D. 260/280 = 1.71). The obtained PCR product was sequenced and purified. Then, it was labelled by AmpliScribe T7 high yield transcription kit (Epicentre) AS3107 or AS2607. The quantity of DIG RNA was determined by 3 methods, optical density at 260nm and 280nm, formaldehyde gel electrophoresis, and dot blot analysis. Hematoxylin staining of paraffin sections was performed as control. After in situ hybridization, the different patterns of AG expression from head of YB and OB and from abdomen of YB and OB were clearly visible.

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ALPHA GLUCOSIDASE FROM HONEY OF APIS DORSATA

No 245

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It aims to purify alpha glucosidase (AG) from honey of Apis dorsata, one of Thai native honeybees. At the beginning, honey was dialysed against 50 mM Sodium acetate, pH 4.5 at 4oC for 3 days. Then, the dialysed supernatant (DS) was condensed by centriprep YM50 (MW cut off at 50 kDa). The condensed supernatant (CS) was preserved in 0.02% Sodium azide at 4oC. Total protein of DS (0.34 mg/ml) and CS (1.1mg/ml) was determined at O.D.280. Maltose activity of DS (0.03u/ml) and CS (0.1u/ml) was determined by using Glucostat reagent and measured at O.D. 505. Sucrose activity of DS (0.08u/ml) and CS (0.28u/ml) was determined by using Glucostat reagent and measured at O.D. 505. The pNPG activity of DS (0.2u/ml) and CS (0.7u/ml) was determined at O.D.400. Five bands (MW in the range of about 50-70kDa) were visible on SDS PAGE. Only one active band was observed on Native PAGE stained with 4-methylumbelliferyl-alpha-D-glucoside and Coomassie brilliant blue R250. The active band was cut out of Native PAGE and used for N-terminal amino acid sequence. The result showed that the N-terminal sequence was blocked. The active band on Native PAGE was coincided to the approximate 65kDa band on SDS PAGE. This band

was cut out off the SDS PAGE. It is used for tryptic digestion in order to determine the internal amino acid sequence by using MALDI TOF MASS. The amino acid sequence of AGIII from A. cerana japonica was used as a reference sequence. It indicated that the difference of amino acid sequences of AG from both species is significant.
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PHYLOGENY OF ALPHA GLUCOSIDASE OF APIS SPP. AMONG OTHERS

No 246

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Apis cerana and A. florea are one of Thai native honeybees. The cDNA sequences of alpha glucosidase (AG) in both Apis were obtained by reverse transcriptase-PCR (RT-PCR). The primers were designed from the AG sequence of A. mellifera (accession # D79208). The nucleotide and deduced amino acid sequences were aligned by using Genetyx program. The cDNA sequences were aligned and compared to the sequences of maltase 1 in A. mellifera (XM_393379), Drosophila melanogaster CG14934-PA (NM_135678), glucan 1, 6-alpha-glucpsodase putative in Enterococus faecalis (GI: 29343377), sucrose specific enzyme II of the PTS (ScrA) and dextran glucosidase (dexB) genes in Lactobacillus sakei (AF401046), and Culicoides sonorensis clone CsMAL1 maltase (AY603565). The AG cDNA of A. cerana is compared to that cDNA from other organisms. It is partially similar to the alpha-glucosidase in A. mellifera at 82.81% (1,557 bp comparison), to maltase in A. mellifera at 53.44% (1,570 bp comparison), to maltase in Culicoides sonorensis at 48.75% (1,600 bp comparison), to CG in Drosophila melanogaster at 53.66% (1,584 bp comparison), and to Sucrose-specific enzyme II of the proton transport system, PTS (ScrA) in Lactobacillus sakei at 50.82% (1,159 bp comparison). Phylogenetic trees of AG among these organisms were made.
This research was financially supported by Thailand Research Fund, grant # MRG4780007 and RTA4580012 and Center of Excellence in Biodiversity, Faculty of Science, Chulalongkorn University.

BEHAVIOR DIVERSITY OF *APIS FLOREA* AND *APIS ANDRENIFORMIS:* TEMPERATURE CONTROLS BY FANNING AND RAIN PROOFS BEHAVIOR

No 247

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Apis florea and Apis andreniformis construct a single comb in on a twig exposed to sun in summer and rain in rainy seasons. In this study, temperature controls and rain proofs behaviors of A. florea; and A. andreniformis were observed in northern parts of Thailand. When the nest directly exposed to the sunlight, curtain formation bees of A. florea were fanned, deformed and took a short flight to reduce brood temperature. Subsequently, A. andreniformis, fanned but did not deform, formed a tail like structure from the bottom of the nest. During the rainy time, all the curtain formation bees of A. florea came up on the dancing floor and formed an umbrella shaped by spread wings up on wings and formed a roof of waterproof jacket to protect the nest from rain. In case of A. andreniformis, curtain formation bees oriented their heads upwards and rest compactly against the brood cells and spread the wing in_ _-shaped, so that one wing can overlay another wing of curtain formation bees. In both species, the honey cells sizes are double than the brood cells serve as a roof of nest.
This research was financially supported by Thailand Research Fund, grant # RTA4580012.

ATTACHING CELLS IN THE HONEYBEE COMBS

No 248

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Natural honeybee combs are fastened to the upper, sloped or even vertical surface of the nest cavity. In the modern hive frames combs are also joined to the upper, side and lower bars. E Zander (1927) proposed to use terms "top outermost' and "side outermost" cells, but these terms weren't clearly defined. Zander's classification is inapplicable to the cells, which join the comb to any rigid object, inserted into the central part of the comb.
We proposed to use the term "attaching cells" for the cells, which connect the comb with any surface. These cells are distinguished from the others (bees', drones' and transitional cells) by the presence of one plane, formed by the material of surface (usually wood or plastic in modern frames).
We faced the problem of classification of attaching cells for description of new kinds of comb honey (Komissar, 2002), when rigid horizontal or vertical sticks were built into the body of the comb.
Attaching cells are divided into upper, side and lower ones according to the disposition of the surface to which they are joined. The shape of attaching cells can be different depending on the vertical anisotropy of cell disposition in the comb, which results from the angle of 9-14∞ from the base to opening of the cell to prevent honey from running out. The upper attaching cells differ from the lower ones by the relation of height of opening to the height of the bottom: in lower cells it is >1 and in

the upper - <1. In the normal cells side walls are parallel and this value is equal to unity.
Transitional cells unlike attaching ones are disposed usually between the areas of the comb with bee and drone cells or along the line of the lateral fusion of two neighboring tongue-shaped combs, but all planes of transitional cells are always formed from wax.
The study of attaching cells is necessary for improving of the small section frames for the comb honey and frames for the mating micronucs, where the task of minimal quantity of irregular cells exists, as these cells are unfit for the brood rearing and sometimes for storage of honey.

RESIDUES OF COUMAPHOS IN HONEY AND WAX AFTER THE TREATMENT OF BEE HIVES WITH CHECKMITE,

No 249

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CheckMite, is a plastic strip, which is used for the treatment of Varroa infestations in beehives. In the USA it is also used for the treatment of infestations of the Small Hive Beetle.
CheckMite, contains the well established active substance coumaphos. An official Maximum Residue Limit (MRL) of 100 µg/kg in honey was granted by the European Medicines Evaluation Agency.
Two residue studies were conducted in Germany according to the label instructions for Varroa control. One study was conducted in autumn, the other in spring during the honey flow season. The concentrations of coumaphos in all honey samples taken from the honey chambers were significantly below the MRL at all sampling dates. These results were confirmed by studies in the USA, which considered both, Varroa control and Hive Beetle control.
The concentrations of coumaphos in wax samples from the US studies were in the range of 1 - 40mg/kg. In a special study, wax foundations containing coumaphos at a concentration of 5mg/kg were hung into the honey chamber of an untreated hive. The coumaphos residue in honey extracted from the resulting frames was below 10µg/kg.
The validated routine analytical method for monitoring coumaphos residues in honey is presented, which has been accepted by the European Medicines Evaluation Agency.
Based on the approved Maximum Residue Limit of 100µg/kg, the possible intake of coumaphos by the consumer will represent only 13% of that acceptable intake, which has been confirmed to be safe by the European Medicines Evaluation Agency. Considering the residues after use of CheckMite,, the possible intake of coumaphos is even much less.

HONEY-SPECIFIC YEASTS AS PRODUCER OF HIGHER ALCOHOLS

No 250

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Honey is only somewhat susceptible to microbiological spoilage due to its natural composition, nevertheless a very few yeast species will always be able to grow. These yeasts are natural and were detected in honey as well as in nectar and pollen, its raw material. The following species were very often identified in honeys from different countries: Z. rouxii 6701, Candida magnoliae, Schizosaccharomyces. octosporus, Debaryomyces hansenii and Rhodotorula.
These yeast species were first isolated and then accumulated in glucose-bouillon or on diluted wort-Agar by the Institut für Honiganalytik (Bremen) before the solutions were then analysed for obtaining an overview of their metabolism products. Within the scope of these investigations the formation of the so called higher alcohols was also analysed. This was carried out by using the method described in § 35; L 37.00-1 (LMBG). Bouillon solutions und wort-agars were analysed after an accumulation time of 29 days. The higher alcohols were determined in the distillate by means of a double column system with FID detection. The results will be presented.

MORPHOLOGIC FEATURES OF THE TATAR POPULATION OF MIDDLE-RUSSIAN BEES

No 252

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Middle-Russian (Dark European Forest) bees, that differ such qualities as good winter hardiness, resistance to a number of diseases, high egg-laying capacity of queens, consider-able strength of colonies, enabling to use stormy late summer honeyflow effectively, represents a valuable genetic material, which is necessary to protect from cross-breeding in every possible way and use in selection.
For many years the north of Tatarstan republic has been considered as a place of localization of the Tatar population of Middle-Russian breed of honeybees.
The purpose of our work is a study of breed belonging of the bees of Sabinsky, Mamadishsky and Baltasinsky

regions of Tatarstan by generally accepted methods (N.I. Krivtsov et al. 2000). Selection of samples was conducted in August and the first half of September in 2002-2004. A valuation of exterior features of worker-bees of 10% colonies of bees from each apiary was carried out according to the following parameters: proboscis length, length and width of the 3d tergite and cubital index of a wing. Alongside with that they took into ac-count the results of a questionnaire survey of beekeepers and oblique indexes, particularly the colouring of bee chitin involucre, reaction to smoke and character of honey capping.
The results of the study of exterior features showed that on 70% apiaries average pro-boscis bees were revealed (6,15mm – 6,27mm), the indicators of cubital indexes were 61%, and an average width of the 3d tergite was about 5mm. These results along with oblique indica-tors allow us to talk about predominance of Middle-Russian breeds on the experiment apiaries.
The amount of genuine Middle-Russian colonies of bees, localized in the regions of in-vestigation in Tatarstan republic (10000), allowed creating a federal brood factory on this base. Besides, an isolated breeding centre on the island in the water area of Kamsky storage reser-voir was prepared for controlled mating of brood queens and drones.

GENETIC AND MORPHOMETRIC COMPARISON OF HONEYBEE (*APIS MELLIFERA L.*) POPULATIONS OF TURKEY AND IRAN

No 253

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Five honeybee populations of Iran and one population from Turkey are compared with morphometric and mitochondrial DNA analyses. On a total of 250 worker bees 23 morphometric characters were measured. Data were analysed by multivariate statistical methods (PCA and DFA). Five Iranian populations formed four distinct groups and Turkish population (Hakkari) clustered separately from all five Iranian populations. Multigroup discriminant analysis showed that FL, BDG, and d variables have the highest discriminant weight among other characters. We also observed that there is a positive correlation between size and altitude, that is, bees become increasingly larger with increasing altitude which demonstrates the effect of biogeographical conditions on morphological traits of honeybees. PCR amplification and DraI digestion of the COI-COII intergenic region of mitochondrial DNA showed no variation, all of them had exhibited the same C1 pattern. All the samples studied were A.m.meda.

CONSERVATION AND SELECTION OF APIS MELLIFERA CAUCASICA IN MACAHEL (ARTVIN-TURKEY)

No 255

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The Caucasus honeybee (Apis mellifera caucasica) is one of the five honeybee races in Turkey, being distributed in North-east of Turkey bordering to Georgia. This honeybee subspecies is one of the most sought after honeybee subspecies in the world because of its high productivity and imported into different parts of the world, especially into the regions with colder climates. Genetic and morphopmetric investigations were conducted on subspecies of Turkey using different techniques such as morphometry, allozymes, mtDNA and microsatellites. Therefore it is possible to distinguish A. m. caucasica from the other subspecies.
Conservation efforts on one of the ecotypes of Apis m. caucasica were started earlier at the village of Camili, an isolated place by preventing honey bee movements into the area from other regions. The results of our studies showed that the local honeybee population in that region kept its original genetic and phenotypic structure as there were no migrant beekeepers visiting the area. The second step was initiated after preliminary research and the queen production was started. After surveying the local beekeepers, the best colonies were determined to serve as breeding colonies during queen production. Local area beekeepers were educated as part of the rural development project and several beekeepers produced queen bees to be distributed in areas where A. m. caucasica introduction is appropriate. The last step, which is in progress, is the further selection of a better A. m. caucasica breeds for high yield of honey, hygienic behavior, aggressiveness and disease resistance.

DISCRIMINATION OF APIS MELLIFERA SUBSPECIES USING GEOMETRIC MORPHOMETRY

No 256

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The identification of Apis mellifera subspecies is normally based in morphological characters and the qualitative difference are restricted mainly to the rank of Apis species. Up to now, the DNA analysis is the only method that is able to clarify both, species and subspecies. However the usage of multivariate morphometrics has improved and facilitated the discrimination of these subspecies. In this work we tested the modern

techniques of geometric morphometry based in relative warps in a sample of 3 Apis mellifera subspecies, Apis mellifera carnica, Apis mellifera ligustica and Africanized honey bees with 30 individual each sample. The three groups separated very well and all the individuals were correctly classified in their respective groups. From the 90 individuals, 87 were classified with a P = 1.00 and the other three were classified with a P > 0.99. The Mahalanobis square distance between groups are 147.5 for Africanized honey bees and Apis mellifera carnica, 57.5 between Africanized honey bees and Apis mellifera ligustica, and 70.2 between Apis mellifera ligustica and Apis mellifera carnica. The relative warps technique does not consume a large time, and is a very powerful tool to discriminate these subspecies.

THE THREE OCELLI AS A POWERFUL NAVIGATION AID

No 257

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The three ocelli on the heads of bees are also found on the heads of a wide range of other insects (e.g. dragon-flies, locusts). They evolved over 200 million years ago from a two ocelli form. They must have some important function, still not understood, that cannot be provided adequately by a single ocellus.
The lens of each ocellus does not form an image, but it collects a quantity of polarized light, mainly ultra-violet light, from a whole region of the sky. This is focused well below the rhabdoms that sense the light in the retina and thus the light is spread over a large number of rhabdoms. By averaging, this would enable the intensity of the polarized light to be measured more accurately than it would be possible with light focused on a single rhabdom.
In this paper it is shown for the first time that three accurate intensities of polarized light from the three ocelli can be used to find the exact orientation and elevation of the sun after first finding the direction and degree of polarization of the light. The light can come from any single region of sky. Two ocelli would not be sufficient (except if overhead). A condition is that the three axes of polarization of the three ocelli must be different from one another, optimally inclined at right angles to one another to produce the most accurate directions.
These three axes are determined by microvilli that sense the polarized light within the rhabdoms. It follows that the corresponding rhabdoms and the structures containing the rhabdoms of the 3 ocelli should be at right angles to each other. To facilitate the neural processing the nerves need to come together below these structures. So the three structures should converge to form an upside-down tetrahedron, with the three lenses forming a triangle on the surface. There is evidence in the literature and in particular in a recent NMR study that this is indeed the structure below the three ocelli.
All of this suggests strongly that the 3 ocelli are a simple but powerful navigation aid, based on 3 measurements of polarized light from any region of sky.

MORPHOMETRIC ANALYSIS IN *APIS MELLIFERA* IN DIFFERENT AREAS OF ARGENTINA

No 258

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Honeybees (Apis mellifera L) have evolved in different environments and have developed different ecotypes. The MeGA (Argentina Honey Bee genetic Program) has selected honeybees adapted to different areas using a large number of colonies as base population. Morphometric analyses have been included as a tool to characterize genetic materials that are being selected. The objective of this work was to study if it was possible to use this technique to detect differences between honeybees from four areas in Argentina and to choose the variables that could be used for better discrimination. Thirty morphological variables were analyzed in honeybees from colonies in four different areas in Argentina. The Image-Pro was used for morphometric measures and statistic multivariate techniques were used for analysis. R analyses were used. Some variables allowed to discriminate honeybees from different areas and it was possible to detect similarities between two of these regions. Morphometic analyses allowed to detect differences between ecotypes and could be associated with behavioural differences.

MOLECULAR IDENTIFICATION OF THE SPERMATOZOA IN SPERMATHECAE OF *APIS CERANA* FAB. QUEENS NATURALLY MATED IN AN *A. MELLIFERA L.* APIARY

No 259

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Four virgin queens of Apis cerana colonies that emerged in September successfully mated and laid eggs in the apiary of Apis mellifera in Suwon, South Korea. There were plenty of A. mellifera drones and only a few A. cerana drones. The eggs from two mated queens, which were proved to have mated only with A. cerana drones, developed into normal A. cerana workers. The rest two queens laid the abnormal eggs, which were unhatched and removed by worker bees or hatched and developed into drone bees. The spermatozoa in the spermathecae of two groups of queen were identified by several polymorphic DNA profiles and mitochondrial CO1

sequences of ten amplified DNA strands per queen. The spermatozoa from abnormal egg-laying A. cerana queens were composed entirely of A. mellifera drones. We collected another twelve queens of A. cerana in Chungju where two Apis species distributed sympatrically. All spermatozoa from these A. cerana queens were identified as A. cerana. It was concluded that A. cerana queens from a few colonies reared in circumstances with high population of A. mellifera could encounter interspecific mating without any mingle of conspecific drones.

THE EVALUATION OF TURKISH HONEYBEE POPULATIONS BY USING MITOCHONDRIAL DNA PCR–RFLP MARKERS.

No 260

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Apis mellifera is composed of three evolutionary branches: branch A for African subspecies (intermissa, monticola, scutellata); branch M for western and northern European populations (mellifera subspecies) and branch C for Eastern European and Mediterranean subspecies (caucasica, carnica, ligustica). Honeybees were collected from 18 different localities in Turkey. Totally 194 worker honeybees were analyzed. The mitochondrial genomes of these honeybees were surveyed for the presence or absence of four restriction sites that differentiate three lineages of honeybee mitochondrial DNA. These restriction sites are cytochrome oxidase b (cytb), large ribosomal subunit (lsRNA), 3' end cytochrome oxidase I to 5' end cytochrome oxidase II (COI-COII), 5' end cytochrome oxidase I (COI). Based on these diagnostic sites, Turkish honeybees belong to Mediterranean lineage.

DISTRIBUTION OF HONEYBEE FORAGERS ON NECTAR PATCHES: A COMPUTER-SIMULATION STUDY

No 261

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Honeybee colonies have to be efficient in collecting nectar. In a stable environment a good strategy is to recruit massively on the best of all known nectar sources. In a fluctuating environment, that is an environment that contains nectar sources that change in quality over time, a colony has to adapt its strategy: It has to allocate its foragers among all known nectar sources, without neglecting even the poorest one, because a poor nectar source can suddenly change into a good (profitable) one. We used a multi-agent computer-simulation of a foraging honeybee colony to investigate which strategy emerges from the recruitment behaviour of individual bees as it is described in literature: The higher the net energetic efficiency of a nectar source is (that is the more energy can be gained per invested units of energy), the longer a foraging bee advertises this source via (waggle) dancing. Similar to the behaviour of real bees in nature, the agents in our simulation assess the source profitability individually and modulate their advertising behaviour accordingly to it. The ultimate result of thousands of these proximate behaviours in parallel is the collective foraging strategy of the colony: the allocation pattern of foragers among all nectar sources. In our simulation experiments we confronted the simulated honeybee colony to different kinds of environmental fluctuations. All simulation scenarios started with two equidistant nectar sources, one offering a high sugar concentration and one offering a poor sugar concentration. In all runs, the good nectar source worsened and the poor source improved in quality, so that at the end of the simulated period (8h) the two nectar sources switched their initial qualities. The duration of the transitional period was varied within the simulation runs between 36sec. and 8h. We found that in all simulation runs (independent from the dynamics of the environmental fluctuation) the colony was able to adapt its foraging strategy according to the changes in the environment. It showed that rapid fluctuations (in contrast to the slower ones) lead to a small improvement of the colony's net honey gain, suggesting that the adaptation process itself provides energetic costs for bees.

CHOOSING QUEEN REARING METHODS SUITED TO SMALL SCALE BEEKEEPING IN VIETNAM

No 262

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Traditional Apis cerana beekeeping has been practiced for long time in the mountainous and highland villages of Vietnam. However, most beekeepers were not able to keep their colonies in sustainable development because they lacked basic knowledge and experiences in management techniques of bee colonies, especially in queen rearing techniques.
During two last decades, through more than 30 beekeeping development projects for the ethnic minorities and poor farmers in Vietnam, we introduced four queen rearing methods to the beekeepers to find the methods corresponding to the beekeeping conditions in these areas: Using natural queen cells from colonies having tendency to swarm, emergency queen rearing, Jensen method of queen rearing and queen production on a large scale by grafting techniques. Practical results showed that three former methods could suit to the beekeepers keeping bee colonies in small scales with poor management techniques of bee colonies. The

beekeepers in mountainous and highland areas of Vietnam adapted easily and effectively practiced these methods in their beekeeping. Last method should only be applied with beekeepers operating large scale beekeeping with more advanced beekeeping techniques.

Key words: Small scale, minorities, swarm, emergency queen rearing, Vietnam

DISTRIBUCIÓN CLIMATICA Y CORRELACION CON EL SISTEMA APICOLA COLOMBIANO

No 263

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Colombia es el cuarto país en extensión en Suramérica, después de Brasil, Argentina y Venezuela, su posición geográfica al norte del continente en plena zona tropical hacen del que el país sea atractivo para el desarrollo intensivo de las explotaciones apícolas, posee una superficie de 2'070.408 Km2, de los cuales 1'141.748 Km2 son tierras emergidas. Las condiciones climáticas del país lo enmarcan dentro del sistema tropical e influenciado por un sistema de cadenas montañosas provenientes del sur del continente, generando tres orogenias diferentes y separadas una de otra por los valles longitudinales de los Ríos Magdalena y Cauca, Las condiciones de sabana del Caribe, la Orinoquia y la selva de la Amazonía y el entorno en el océano Pacífico, hacen del territorio nacional uno de los países de más alta biodiversidad del mundo. La circulación atmosférica es dependiente del sistema de confluencia intertropical (ITCZ), donde confluyen masas de aire de los trópicos ejerciendo condiciones especiales de humedad relativa, presión y temperatura en distintas zonas de vida a lo largo y ancho del país, al igual que para el departamento del Tolima. Conforme a los pisos altitudinales se suele usar el criterio de las cotas convencionales, que marcan diferencias ecoclimáticas importantes entre la unidad andina mayor de 1000 m.s.n.m. y la basal de 0 a 1000 m.s.n.m, esto indica que el país cuenta por lo menos 10 clase de coberturas principales atendiendo a su extensión superficial, de las cuales en orden de magnitud se mencionan: Selvas y bosques, agroecosistemas, sabanas, pantanos, xerofitia, áreas de páramo, cobertura rupícola, manglares, cobertura hídrica y asentamientos humanos. Para el departamento, las cotas van de 0 a 3000 m.s.n.m. En contexto anterior el grupo de Mellitopalinología de la Universidad del Tolima se ha propuesto evaluar la producción de miel en cinco zonas biogeográficas del departamento del Tolima, considerando los parámetros climáticos de brillo solar, humedad relativa, precipitación y temperatura, estimando en cada caso la evapotranspiración potencial. En este trabajo se presentan los resultados asociados al sistema apícola productivo desde el punto de vista climático. Se analizan los factores climáticos medios, relacionados con la precipitación, evapotraspiración, temperatura, humedad relativa y brillo solar, a partir de los datos de 10 años y en cinco zonas biogeográficas: bosque húmedo y seco tropical, bosque húmedo, muy húmedo premontano y muy húmedo montano bajo (bh-PM; bmh-PM; bmh-MB) en el departamento del Tolima. El régimen pluvial mas alto correspondió a la zona de bmh-PM con topes de 516 mm; las condiciones de evapotranspiración favorecen a la zona de bmh-MB, la producción apicola en función de las cosechas de miel en Kg/colmena año son mayores en la zona de bh-PM con 28.7, seguida de bh-T con 28.1, mayor que bmh-PM (27.2), mayor que bmh-MB (26.5), siendo la más baja la de bs-T (20-22)Kg/colmena-año.

QUALITY CONTROL OF BEEKEEPING PRODUCTS IN THE RUSSIAN FEDERATION

No 264

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Quality control of beekeeping products corresponds to the operating state standards of the Russian Federation (all-Union State Standards). 360 honey samples, 42 wax samples, 270 propolis samples, 87 pollen load samples were analyzed according to organoleptic, microbiological and physicochemical indices over the period of 2000-2004.
Moreover honey conductivity, veterinary drugs and pesticides residues in honey, chromatography-mass spectrometry analyse of propolis and its' plant sources, antibacterial activity of propolis were examined.
Presented information reflects key problems of apiproducts quality control in the Russian Federation and the Commonwealth of Independent States.

IMPROVING THE IMPACT OF FOREIGN VOLUNTEER EXPERTS TO THE BEEKEEPING EFFORTS OF BEEKEEPERS THROUGH LOCAL NON GOVERNMENTAL ORGANIZATIONS IN BANGLADESH

No 265

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Educating beekeepers as a limited time foreign honeybee volunteer expert has partial successes. Local trainers do not have usable educational materials and a poor understanding of up to date beekeeping practices to train others after the expert has left the host organization and country.
Two new projects have been started in Bangladesh. The first is to spend more time training local NGO reps as

eld extension agents by providing them with necessary ills and usable educational materials to work with the cal beekeepers.
this program training and testing of these field tension agents to improve their knowledge has been tiated to insure that agents can handle issues that nfront beekeepers long after a foreign bee volunteer s left.
ne second project is to eliminate the lack of technical ducational materials in the local languages or chnology transference. An effort in translating technical ducational materials has been started on a limited scale th funds for printing currently being provided by a local siness that has ties in the beekeeping industry.
nversion of educational materials into the host untry's languages and the intensive training of local gents has more impact and longer lasting results for the reign aid donations currently given to the host country

FIELD SURVEY OF HONEY QUALITY AND ONEYBEE DISEASES IN CHILE

lo 266

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nce 2004 a survey has been initiated in several Chilean iaries in order to ensure honey quality produced by nall beekeepers associated to a national network. The st step involved the determination of honey color and midity. Additionally, the incidence of varroosis, caropisosis and nosemosis in honeybee colonies was udied.
oney samples were collected between summer and rly autumn of 2004, from 116 apiaries randomly lected from eight districts distributed from north to uth. From the same apiaries and hives, adult honeybee mples were taken from the brood chamber between utumn and early winter of the same year. A ectrophotometer was used to determine color and midity of honey samples. For the analysis of adult es, the methods used in order to determine presence absence of the diseases were based on those commended for a large amount of samples; for rroosis the infestation level was also calculated as a ference.
of the seven Pfund scale colors were recognized on e analyzed honey with the following order of edomination: light amber, amber, white, extra light mber, dark amber and extra white. Most of these honey mples had fewer than 18% of humidity. Almost all the alyzed honeybee samples presented varroosis with festation levels that were critically high in some cases hile acaropisosis and nosemosis were detected only in small amount of these samples.
Until 2007 further parameters, as residue levels in honey and apicultural practices will be associated with the results already obtained, as well as additional sampling will be done each year in order to achieve a complete vision of local beekeeping.

IMPROVEMENT OF COLLECTING HONEY FROM APIS DORSATA AT RIAU PROVINCE INDONESIA

No 267

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Apis dorsata is still the main producer of honey in Indonesia. Because of its aggressiveness, honey harvesting usually is done at moonless night and the entire comb is cut. The comb is squeezed to extract honey which make honey is mixed with debris such as wax, pollen, brood etc. This condition makes honey easily adulterated and more over the water content of honey is very high (>26%).
Since seven years ago in the district of Rokan Hulu and Kuantan Sengigi, Riau Province, with proper protection and simple equipment, the honey collectors have been collecting honey during the day. This technique makes easier for the honey collectors to take only the portion of the comb that content honey. This method also makes safer for the honey collectors and more over honey can be harvested seven to eight times a year.

BEEKEEPING FOR RURAL MICRO INDUSTRIES.

No 268

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Apart from producing honey, bees are known for producing other products that are useful for mankind use. Like beeswax, propolis etc.Unfortunately the usefulness of these products are less known in the rural areas where beekeeping is a potential activity for income generating.
in the paper we see how it is posible to start a small scale creame/jellies producing industries using beewaxes ,propolis mixed with vegetable oils and other natural herbs with all the benifits that goes with all this. This products is natural and having medicinal value and friendly to the environment and skin

HONEY AS A MARKETING STRATEGY ON UNA SANA CANTON

No 269

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Una Sana Canton is located in the north-western part of Bosnia in an area of moderate climate with relatively strong winters and warm summers. The medium January temperatures are below 10oC and medium July temperatures are between 18,7oC and 22,7oC
The total area of Canton is 4.837km2, out of which 47,9 % is covered with forest, 40,58 % ploughed fields, pasture and orchards. There are 358,000 inhabitants and over 40 % is depending of agriculture. Native flora is seen by the beekeeper as a positive advantage it can provide the richest honey. The representative species Apis carnica produce 5 kind of honey in a value of 100t/year. Technology of producing is very traditional. This study was conducted to determine the quality of honey, weaknesses of production and to design a plan of action for sustainable beekeeping and income. The biggest problem is with health of bees, chemical using, there is no low and organisation for management and honey production strategy planning.

Key words: beekeeping, Apis carnica, the quality of honey

L´APICULTURE EN AFGHANISTAN

No 270

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L´Afghanistan est un état de l´Asie occidentale situe' entre le Pakistan au sud,l´ Iran a'l´
Ouest,le Turkménistan,l´Ouzbénistan et le Tadjikistan au nord et la Chine a'l'est.Ce pays couvre 650.000km2 pour une population de 20.000.000 habitants parlant le pachto ou le persan.capitale:Kabul.
L´Afghanistan est trés montagneux ,surtout dans sa partie nord avec notamment l´Hindu Kuch et le paropamisus .Le climat est sec (moins de 250mm de pluie par an). Il existe cependant quelques vallées telles que l´Amou-Daria au nord ou Hilmand au sud.Au pied des reliefs, relativement arrosés,se sont développés des cultures céréalières et un élevage nomade de moutons, l´une des principales ressources du pays qui a donné naissance a une industrie textile importante.Jusqu´en 1965, l´apiculture Afghane était essentiellement de forme traditionnelle avec l´exploitation contribution de la F.A.O., des colonies d´Apis Mellifera ainsi que du matériel 'apicole ont été importés d´Europe, afin d´assurer le développement d´une apiculture moderne.

La race d´abeille et le genre Apis en Afghanistan
Les quatre espèces d´abeilles ,les plus connues ,Apis dorsata, Apis.florea, Apis cerana et Apis. mellifera ,sont présentes en Afghanistan,les trois premieres y sont d´origine et se rencontrent a'l´ état sauvage , en plein air dans les arbres ou dans les creux de rocher suivant le mode de nidification de chacune .Apis.cerana fait essentiellement l´objet d´une apiculture paysanne, dans des ruchers sédentaires de ruches traditionnelles .Avec cette Abeille,il n´est guère possible de faire plus 6 à 7 kg de miel par ruche et par année. Depuis les années 2000, l´exploitation de ruches à commencé é à se développer De nos jours, la plupart des apiculteurs professionnels contruisent eux-mêmes leurs ruches à cadres, Généralement de type langstroth avec des cadres de 48,5 x 22cm.et les peuplent avec de l´Apis.mellifera. Ces ruches sont aptes à produire entre 15 et 20 kg de miel chacune.
En Afghanistan,le prix du miel est extrêmement élevé En effet, au détail, le miel se vend couramment entre 6 et 10$ lekg .Une ruche peuplée se négocie entre 150 au 200$, une ruche vide 50$

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Les ruches
A defaut de recensement , il n´est guère possible de déterminer avec précision le nombre de ruches existant en Afghanistan.On estime simplement qu´il y en aurait environ 30.000 à 40.000. Celles-ci se trouvent concentrées dans les régions mellifères favorables a l´Apiculture; Ailleurs il n´ya pas de ruche. Outre les ruches à cadres,construites et gérées par des apiculteurs professionnels,comme nous l´avons vu plus haut, les ruches traditionnelles paysannes sont réalisées en poterie,en argile,en tronc d´arbre ou en vannerie (branches de saules)suivant les materiaux leur disposition.

Maladies et parasites des abeilles
Bien que les maladies, parasites ou ennemis des abeilles soient nombreaux, le pays ne dispose pas d´organisation sanitaire ni de laboratoire spécialisé permettant d´organiser une lutte efficace contre les maladies et parasites des abeilles. Les vétérinaires, quand à eux, sont pratiquement ignorants de l´apiculture. Au cours de mes investigation, j´ai pu cependant diagnostiquer les maladies suivantes :
-Maladies du couvain: loque européenne, loque américaine,sacbrood , mycoses diverses.
-Maladies des abeilles adultes:nosemose, dysenteries et viroses diverses.
-Parasitoses: notamment dues àTropilalaps clarea et à varroa destructor.
Bien que la plupart des apiculteurs Afghans affirment qu´il n´y a pas de varroa destructor en Afghanistan, nous sommes d´un avis contraire, avis qui est partagé par la plupart des chercheurs qui ont étudié ce problème et qui sont depuis longtemps persuadés de sa présence. Par ailleurs, les colonies d´abeilles sont confrontées adivers ennemis tels que les parasites des rayons (Galleria mellonella L.(grande teigne),ou Achroia grisella

ab.(petite teigne), la mite des étoffes, des acariens du ollen (Tyroglyphus,Glyciphagus) ou encore des guêpes, es triongulins, des fournis, des araignées, diverses spèces de dyptères ou de coléoptères, des oiseaux, es rongeurs (souris ou rats) qui contribuent tous,plus ou oins,à réduire le rendement et donc la rentabilité du heptel apicole du pays.

echnologie apicole

n Afghanistan, les techniques utilisées en apiculture este plutôt traditionnelles. Il existe cependant des piculteurs qui ont su se moderniser, notamment aux veau des ruches mais il ya par ailleurs trés peu de rogrès. Sides apiculteurs Afghans possèdent des ches à cadres, ils ne savent pas, la plupart du temps, s exploiter correctement. La technologie du miel est atiquement inexistante. De ce fait, les apiculteurs oduisent un miel de mauvaise qualité. Sa présentation mmerciale est défectueuse car l'apiculteur manque la lupart du temps de matériel moderne dans sa miellerie. a qualité du cheptel laisse également beaucoup à sirer car rien de valable n'est fait dans le domaine de sélection et de l'élevage des reines.

onclusion

epuis plus de deux décennies, les Afghans vivent dans n état de guerre permanent. Pour des raisons d'ordre olitique, ce peuple demeure sous-développé et les aysans, faute d'être en mesure de développer leurs tivités traditionnelles, se réfugient dans la culture de pium. Il serait donc nécessaire que ce pays soit aider our lui permettre de s'en sortir.
e développement et la modernisation de l'apiculture ourraient contribuer à l'apport économique dont les ghans ont tant besoin. Au cours de mes visites dans pays, j'ai pu constater l'existence d'un trés grand otentiel économique en matiére d'apiculture .Par pplication d'un plan rationnel de développement étalé r cinq ans, on pourrait obtenir facilement la création emplois pour au moins 10.000 personnes avec 000.000 ruches à mettre en place. Ceci serait facile à aliser si l'on tient compte du climat et de l'énorme otentiel apicole de ce pays. Malheureusement, l' piculture est une science qui est actuellement mplètement négligée. Il manque d'ouvrages et de rmation organisésur le sujet; les apiculteurs Afghans nt encore totalement ignorants des méthodes apicoles production intensive!
ansun pays où l'arboriculture fruitière occupe une place portante, il serait indispensable d'enseigner et de évelopper tout ce qui touch à la pollinisation des ergers pour en accroître et en améliorer les ndements. Ceci est vraiment fondamental pour ce ays.

ibliographie

lashalah Jamshidi 2004 Rapport de voyage et études d piculture en Afghanistan.
irecteur de deptement Apiculture du Ministere de had-e-Agriculture d'Iran. E .mail :mashlahj@yahoo.com hahrouzi.Reza 2003 et 2004 La recherche sur les aladies et parasites des abeilles et la technologie apicole en Afghanistan .
Colin.M.E. 1999 -Options médite:ranéennes.Série B:Etudes et recherches Numéro 25 Bee disease diagnosis, p.117-120 et 143-146.
Cet article a publie' dans la Bulletin Technique.Apicole Vol.31 (3)2004. No.127. p.105-106.Web:http://assoc.wanadoo.fr/opida/opida/

Summery

L'Apiculture en Afghanistan
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L'Afghanistan est un état de l'Asie occidentale situe' entre le Pakistan au sud l' Iran a'l'Ouest, le Turkménistan, l'Ouzbénistan et le Tadjikistan au nord et la Chine a'l'est. Ce pays couvre 650.000km2 pour une population de 20.000.000 habitants parlant le pachto ou le persan capitale: Kabul. Jusqu'en 1965, l'apiculture Afghane était essentiellement de forme traditionnelle avec l'exploitation contribution de'la F.A.O., des colonies d'Apis Mellifera ainsi que du matériel 'apicole ont été importés d'Europe, afin d'assurer le développement d'une apiculture moderne.
Les quatre espèces d'abeilles, les plus connues, Apis dorsata ,Apis.florae ,Apis cerana et Apis mellifera, sont présentes en Afghanistan, les trois premieres y sont d'origine et se rencontrent a'l'état sauvage ,en plein air, dans les arbres ou dans les creux de rocher suivant le mode de nidification de chacune. Apis.cerana fait essentiellement l'objet d'une apiculture paysanne, dans des ruchers sédentaires de ruches traditionnelles. Avec cette Abeille, il n'est guère possible de faire plus 6 à 7kg de miel par ruche et par année. Depuis les années 2000, l'exploitation de ruches à commencé é à se développer. De nos jours, la plupart des apiculteurs professionnels contruisent eux-mêmes leurs ruches à cadres, Généralement de type langstroth avec des cadres de 48,5 x 22cm.et les peuplent avec de l'Apis.mellifera. Ces ruches sont aptes à produire entre 15 et 20kg de miel chacune. A defaut de recensement, il n'est guère possible de déterminer avec précision le nombre de ruches existant en Afghanistan. On estime simplement qu'il y en aurait environ 40.000. Les ruches traditionnelles sont réalisées en poterie, en argile, en tronc d'arbre ou en vannerie (branches de saules) suivant les materiaux leur disposition.
Depuis plus de deux décennies, les Afghans vivent dans un état de guerre permanent. Pour des raisons d'ordre politique, ce peuple demeure sous-développé et les paysans, faute d'être en mesure de développer leurs activités traditionnelles, se réfugient dans la culture de l'opium. Il serait donc nécessaire que ce pays soit aider pour lui permettre de s'en sortir.
Le développement et la modernisation de l'apiculture pourraient contribuer à l'apport économique dont les Afghans ont tant besoin. Au cours de mes visites dans ce pays, j'ai pu constater l'existence d'un trés grand potentiel économique en matiére d'apiculture .Par l'Application d'un plan rationnel de développement étalé sur cinq ans, on pourrait obtenir facilement la création

d'emplois pour au moins 10.000 personnes avec 1.000.000 ruches à mettre en place. Ceci serait facile à réaliser si l'on tient compte du climat et de l'énorme potentiel apicole de ce pays. Malheureusement, l'apiculture est une science qui est actuellement complètement négligée. Il manque d'ouvrages et de formation organisésur le sujet; les apiculteurs Afghans sont encore totalement ignorants des méthodes apicoles de production intensive!

LOS COLMENEROS. HISTORIA Y TRADICIÓN DE LA APICULTURA EN TENERIFE

No 271

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El trabajo describe la evolución de la apicultura insular desde la conquista europea a finales del siglo XV hasta la actualidad. Asimismo, se describe el conjunto de manifestaciones etnográficas de la apicultura tradicional (fijista), mantenida en claro retroceso hasta los últimos tiempos. Para el estudio de la evolución histórica se han consultado las actas capitulares transcritas durante la primera mitad del siglo XVI, en las que se contiene abundante información sobre la producción y las regulaciones mercantiles de la miel y la cera, distancia entre colmenares, etc. Igualmente, en los protocolos notariales se ha encontrado una notable información sobre los contratos de compraventa y arrendamientos de colmenares y de compraventa de miel y cera. También se han consultado las crónicas de la conquista, literatura de viajes, historias regionales, etc. y estadísticas (siglos XVIII-XX). Se analiza la producción y comercialización de miel y cera, los conflictos entre viñas y colmenas, los usos de la miel y la cera, diezmos, ilustrados y apicultura, etc. El declive de la apicultura durante el siglo XIX y su modernización durante la segunda mitad del siglo XX también son estudiados. El estudio etnográfico comprende, igualmente, la descripción de aspectos como el oficio de la colmenería, el espacio geográfico (asientos, vegetación, etc.), la trashumancia, la utilización de las colmenas tradicionales de corchos y la producción de miel y cera. También se incluye un capítulo sobre la apicultura en el folklore (cantares, décimas, romances, dichos, refranes, adivinanzas, toponimia, etc.), así como un léxico de los colmeneros tinerfeños y un calendario apícola. Este trabajo de investigación constituye el primer estudio exhaustivo sobre la historia y la etnografía de la apicultura insular. Permite valorar la relación de la apicultura insular con la apicultura de la Península Ibérica, la importancia de la producción de miel y cera durante el Antiguo Régimen y apunta la posibilidad de que la apicultura insular pudiera haber desempeñado algún papel en el origen de la apicultura americana. Finalmente, pone de manifiesto el alto valor de las manifestaciones apícolas tradicionales que aún se conservan en la isla.

COMPARISON OF EUROPEAN HONEYS TO TROPICAL HONEYS -- EFFECTS OF YEAST CELL NUMBERS ON THE CONCENTRATION OF ESPECIALLY SELECTED COMPONENTS

No 272

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Theoretically, honey is only somewhat susceptible to microbiological spoilage due to its natural composition. But a special problem with honey is created by yeasts. These are natural components of honey but may lead to a sensory change in the product caused by the metabolic activity of yeasts. European honey is only rarely affected by this due to climatic conditions. Highly endangered, however, is honey from regions with a tropical climate. Russmann proposed limiting the number of yeast cells (50.000/g) and the content of glycerine (300 mg/kg). But Beckh and Lüllmann (1999) reported that limiting the values cannot be given without characterizing the yeast species.
From our investigations – we analysed a number of European and tropical honeys – it is more suitable to speak of fermentation by relying on parameters like the sum of selected free fatty acids or the sum of their fatty acid ethyl esters. The latter could only be identified in honeys with a higher ethanol content, their occurrence already having been described in association to yeasts (Wagner and Rapp, 1998; Timmroth and Speer, 2003).

Literature

Rußmann, H.: Hefen und Glycerin in Blütenhonigen - Nachweis einer Gärung oder einer abgestoppten Gärung Lebensmittelchemie (1998), 52, 116-7.
Beckh, G.; Lüllmann, C.: Natürliche Bestandteile des Honigs – Hefen und deren Stoffwechselprodukte. Teil 1 Hefegehalt Deutsche Lebensmittel-Rundschau (1999), 95, 457-3.
Wagner, K.; Rapp, A.: Über den Einfluss der Hefe auf die Bildung von 2- Phenylethanol bei der alkoholischen Gärung. Deutsche Lebensmittel Rundschau (1999), 95, 304-9.
Timmroth, R.; Speer, K.: Development of analytical indicator substances for honeys strongly contaminated with yeasts in: Proceedings of EURO FOOD CHEM XII (2003) Strategies for Safe Food, Brugge, Belgium, 24 - 26 September, Volume 1, 142-5.

PROPOSED BEEKEEPING DEVELOPMENT PLAN FOR ANGOLA

No 273

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ngola was once described as one the food baskets of frica. More than three decades of war have left the ountry with very limited training and skills, poor frastructure, unemployment and communities that are etting poorer. The country is now on the brink of a new emocracy but to rebuild economic activity is not going be that easy but one has to start somewhere.
is internationally accepted that the most efficient way restart economic activity is by means of establishing able and sustainable rural agricultural enterprises rough community driven programmes. The success of is intervention is based on the large number of employed people becoming participants and owners of eir own programmes. Infrastructural development llows and basic life skills are taught, followed by higher vels of formal training and education. Many ternational agencies, including the World Bank and the nited Nations Food and Agricultural Organisation in rticular, recognise community based beekeeping ogrammes to be of vital importance in rebuilding and ck-starting economic activity.
eekeeping is for all as young and old, male and female n practice it. The proposed programme will be targeted ex soldiers as the main beneficiaries and recognising eir role in rebuilding economic activity. Various eekeeping projects were also successful in creating job portunities and income for the physically handicapped. is aspect will receive special attention from the project cilitators as Angola is listed as being the country ffering the most as a result of landmines.

ONEY MARKETING AND SALES METHODS USED N A DEVELOPMENT PROJECT IN MALAWI

lo 274

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ne paper outlines the problems facing beekeepers in e Nkhata Bay area of Northern Malawi and some ethods used to ameliorate them. The problems were etermined using rapid rural appraisal techniques among llage beekeeping groups and included limited access to liable markets. The unpredictability of the market npacted on honey prices leaving beekeepers sceptible to glutted markets and disinclined to invest improvements. Trading from a position of weakness lt producers vulnerable to opportunistic travelling ders. Enabling isolated rural producers to move honey city markets was key to the project.
eed corn funding was used to support a newly stablished grass roots beekeepers organisation. Support as given to ensure a democratic and participatory ganisational infrastructure to help beekeepers address eir problems. The project is designed so that it can be nancial viable after donor withdrawal. Sustainability cludes training and capacity building for key project personal. An examination system has been developed with the support of the British Beekeepers Association (BBKA) to help trainers disseminate consistent beekeeping practise. Profitable sales of good quality honey provide a predictable price for producers, finance organisational costs and fund training and other benefits to beekeeper members. Examples of the way a large producer organisation has benefited village beekeepers are described.
Producers have linked to the market in a variety of ways notably developing business planning, a group built processing facility and seed corn donor funding to purchase honey for retailing. The presentation describes successful market testing methods and looks at the difficulties encountered including accessing export markets. Issues of product branding and different market perceptions of product and practical problems arising from selling honey onto the retail market especially honey quality and honey labelling are discussed.

AS SWEET AS HONEY: APICULTURE AND POVERTY ALLEVIATION IN CAMEROON

No 275

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Cameroon located in the Guinea-Congolian tropical rainforest region of Sub-Saharan Africa (SSA). Amongst her floristic regions of high biodiversity conservation value is the Cameroon highlands, a global biodiversity hotspot. The Cameroon highlands support a high human population density, due to its fertile volcanic soils. It has experienced habitat loss due to farming which has led to decimation of its wildlife population, which includes the endangered African Elephant (Loxodonta cyclotis) and the Chimpanzee (Pan troglodytes). In response to the Government of Cameroon's (GoC) ratification of the UN Convention on Biological Diversity (UNCBD) in 1992, the government initiated measures to conserve the nation's rich biological diversity.
These measures were multilateral and bilateral agreements with donor agencies such as the World Bank and the Department for International Development (DFID). This led to the establishment of integrated conservation and development projects (ICDP) in areas of high conservation value. Major ICDP's in the Cameroon highlands were the Birdlife International Kilum-Ijim Project and DFID funded Mount Cameroon Project (MCP) Limbe. Strategies adopted by these projects included the introduction of alternative livelihood options, based on sustainable use of the forest. A notable livelihood intervention was in the area of apiculture or beekeeping. While exploitation of honey from forest is an age-old practice in the Cameroon highlands, the ICDP's introduced a conservation friendly and more financially rewarding approach.
Recent studies in the Cameroon Highlands of selected beekeeping groups using semi-structured questionnaires

reveal that these are receiving meaningful benefits from apiculture. Constraints faced by these groups include poor market intelligence, inadequate capital and lack of government support. The sector in is struggling to meet local demand. To fulfil its potential there is a need for a long term research and development strategy.

HONEY TRACEABILITY AND MARKET TRANSPARENCY: A PILOT MODEL FOR HONEY CHAIN MANAGEMENT

No 276

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Introduction: The crisis in food sector the last years has made very clear that consumers need to be sure about the safety and quality of the products that they consume, something that makes the traceability in food very important.
The objective of this study is to increase consumer confidence and consequently market transparency in honey supply chains by developing a complete traceability model. This study demonstrates that honey products can be linked to their source. It also shows that the traceability of genetically modified organisms is also possible.
Methods: Based on extensive literature review on honey traceability and marketing, a qualitative pilot study is currently ongoing to examine the factors that influence its adoption and ease-of-use.
Results: The results from the qualitative study are going to be tested using a quantitative survey. Using the results from the empirical methods, a web-based model of honey traceability is proposed.
Discussion: This study points out that through effective Supply Chain Management and traceability, honey producers and companies can enhance market transparency and thus gain consumer confidence and competitive advantage.

Key words: Traceability, Supply Chain Management, Transparency, Web-based supply model.

HONEY AS A MARKETING STRATEGY ON UNA SANA CANTON

No 277

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Una Sana Canton is located in the north-western part of Bosnia in an area of moderate climate with relatively cold winters and warm summers. The medium January temperatures are below 10°C and medium July temperatures are between 18,7° and 22,7° C. The total area of Canton is 4837km2, out of which 47.9% of area is covered with forest, 40,58% are cultivable fields, pastures and orchards. There are 358,000 inhabitants living there and over 40% of population depends of agriculture. The beekeeper consider native flora as a positive advantage that can provide the richest honey. The representative species Apis carnica produces 5 kinds of honey in value of 100t/year. Technology of producing is very traditional. This study was conducted in order to determine the quality of honey, weaknesses of production and to design an action plan for sustaining the beekeeping and income. The biggest problem is with the health of bees and usage the chemical. There is no low and organisation for management and honey production strategy planning. The results of the control laboratory analysis showed that all samples of honey met the quality criteria regulated in B&H regulations for honey.

Key words: beekeeping, Apis carnica, the quality of honey

EFFECT OF APIS MELLIFERA L VENOM ON CHRONIC OSTEOMYELITIS

No 278

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Introduction: Osteomyelitis is a serious infection that is often difficult to diagnosis and treat. Inadequately treated osteomyelitis results in avascular necrosis of bone and the formation of islands of nonvascularized and infected bone.
Patients with chronic osteomyelitis may have intermittent episodes of disease actively manifested by increased local pain and the development of drainage of infected material through the sinus tracts.
Methods: A 33-year-old female Chinese had traffic accident on May 17,1992. Her left lower extremity was hit by an vehicle when she was driving a motorcycle. She developed multiple open fractures of left femur, left tibia and left fibula. Her surgeon recommended for amputation of her left lower extremity. Because she developed severe acute pyogenic osteomyelitis. However, she refused for amputation of her left lower leg.
But she developed chronic osteomyelitis with intermittent episodes of local pain and pus drainage through the sinus tracts of left leg during the last 12 years. Patient received Apis mellifera L (AML) venom therapy three times weekly for 16 weeks since August 2,2004. Serum IgG and IgE were examined every 2 weeks as indicators to adjust the appropriate dosing during AML treatment.
Result: She found that the pus drainage and local pain of her lower extremity were disappeared after 16 weeks of AML venom therapy.
Discussion: Mellitin, the major component of Apis

ellifera L venom, is a well-known antimicrobial and tolytic transmembrane peptide against both gram-sitive and gram-negative bacterium. The chronic teomyelitis patient may find that AML venom will event the recurrent episodes of further infections in ture.

LINICAL THERAPEUTIC EFFECT OF APITHERAPY ON ROCHOGENIC ADENOCARCINOMA.

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troduction: Lung cancer is the leading cause of death Taiwan. Scientist believes that the cause of lung ncer is highly related to exposure to tobacco smoking. e causal connection between cigarettes and lung ncer is now established through identification of rcinogens in tobacco smoking and the analysis of se carcinogens effect on specific oncogenes pressed in lung cancer. Apis mellifera L. (AML) bee nom inhibited the proliferation of cancer cells in nchogenic Adenocarcinoma cell line study.
ethod: A 65-year-old male Chinese presented with sistent cough, weight loss and anorxia for 3 months. est radiography and CT scan showed a 3.0x2.5x2.5cm id mass was found over right lung. Lung biopsy ported brochogenic adenocarcinoma of right lung. No mph nodes metastasis lesions were found. Patient eferred for apitherapy before surgical treatment. He ceived Apis mellifera L venom therapy every two day d propolis capsule, 800 mg four times daily.
sult: The CT scan showed the size of the brochogenic enocarcinoma decreased from 3.0x2.5x2.5cm to x1.0x0.5cm after patient taking 6 weeks of therapy. Patient received surgical resection of the maining cancer. He continued the apitherapy with AML nom therapy every two days and propolis capsules 0mg twice daily for 12 months. No recurrence of the ncer was reported after one year of surgical treatment d apitherapy.
scussion: Mellitin, the major component of Apis ellifera L venom, is a well-known antimicrobial and olytic transmembrane peptide against both gram-sitive, gram-negative bacterium, virus and cancer cell. itherapy with AML venom and propolis may provide alternative treatment in Brchogenic Adenocarcinoma future. .

HE ART OF BEE-ING: NATURE'S PERFECT LIFE AN©

o 280

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Throughout the ages, bees have been associated with hard work, harmony and prosperity; values esteemed in all cultures. **The Art of Bee-Ing: Nature's Perfect Life Plan©** provides the framework by which to experience sustainable personal and professional excellence.
The Art of Bee-Ing teaches:
Bee-Yourself
Bee-Hold Your Purpose
Bee-Long
Bee-Come the Solution
Bee-Courageous
Bee-Willing To Rest
Bee-True To Your Dance
Bee-Planful About Tomorrow
By applying the instinctive wisdom of honeybees the author invites others to explore the not-so-hidden secrets of living life in the fullest.
The Art of Bee-Ing: Nature's Perfect Life Plan© offers effective life lessons based on a solid review of scientific honeybee research and applied personal achievement methodologies. Learning and applying these eight lessons provides a sound foundation for individual and organizational effectiveness. The synergies found between human and honeybee behaviour is insightfully explored in this presentation.
The author's clinical social work background and professional speaking and consulting career afford her the ability to present her science-based content in an entertaining style.
This upbeat presentation is also appropriate for an Accompanying Person's Luncheon Program.

VETERNIARY ASPECTS OF APITHERAPY IN EGYPT

No 283

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Recently apitherapy has a great attention especially in Egypt that directed to study all aspects of apitherapy as in veterinary practices. The evaluation of the therapeutic efficiency of honey in septic and aseptic wound in animals using honey was carried out. The antibacterial activity against Gram positive and Gram negative bacteria of crude honey was studied.
Egyptian propolis has antibacterial, antiviral, antifungal and immunostimulant activities which were also studied. The activity of propolis and its relation with its geographic zone against Staphylococcus aureus; Streptococcus faecalis; Corynebacterium pseudo-tuberculosis; Aeromonas hydrophila, Escherichia coli, Salmonella typhimurium; Aspergillus niger and Candida albicans were determined. Immunostimulant activity of propolis was used in chicken also the antiviral activity against avian viruses were observed.

DETERMINATION OF CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY IN HONEYS WITH DIFFERENT FLORAL ORIGIN

No 284

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Four honey samples from different floral sources (acacia, coriander, sider and palm) were investigated by GC/MS and HPLC. 88 compounds have been identified. Acacia honey was characterized by the presence of 18.7% of 2-hydroxypropanpoic acid, 10.5% 2-hexenoic acid, 8.27% 5hydroxy-n-valeric acid & luteolin (52.76µg/100g. honey) as major compounds. Coriander honey was characterized by the presence of apigenin (225.6µg/100g. honey). Palm honey was characterized by the presence of 28.72% succinic acid, 4.15% 4-hydroxybenzoic acid and 3.05% vanillic acid as major compounds. Palm honey was characterized by the presence of 15 aliphatic acids (64.1%) from which 7 are dioic acids (37.66%). Acacia honey was characterized by the presence of 20 aliphatic acids (54.73%) from which 7 are dioic acids (5.9%). Sider honey was characterized by the presence of 20 aliphatic acids (22.87%) from which 4 are dioic acids (1.17%). Finally, Coriander honey was characterized by the presence of 20 aliphatic acids (8.72%) from which 4 are dioic acids (0.16%).
For detecting honey marker, using the GC/MS analysis, 2-hydroxypropanpoic, 2-hexenoic, 5hydroxy-n-valeric, benzoic and cinnamic acids, 2,4-bis(dimethylbenzyl)-6-t-butylphenol could be used for acacia honey. For coriander honey, 3,4-dimethoxybenzoic acid, 3,4-dimethoxybenzeneacetic acid, 2,3-dimethoxy benzaldehyde and vanillyl alcohol could be used. 2-amino-benzoic acid, furyl acrylic acid, p-hydroxy-dihydrocinnamic acid and 1,2-benzenediol-3,5-bis(1,1-dimethylethyl) could be used as honey marker for sider honey. For palm honey, 4-hydroxybenzoic acid, vanillic acid, 3,4-dimethoxy cinnamic, caffeic acids, 3-hydroxy pyridine, picolinic acid and succinic acid could be used. As honey marker, using the HPLC analysis, luteolin and 2 unknown compound could be used for acacia honey. apigenin and 2 unknown compound could be used for coriander honey.
The antimicrobial activity against Staphylococcus aureus, Escherichia coli and Candida albican was also investigated. The honey samples showed inhibition in the growth of the examined pathogens but the inhibition varied according to the honey origin.

QUEEN BEE'S SYNDROME

No 285

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Purpose: Rejuvenascence of facial skin, hands skin and the whole organism.
Methods: 1. Application of cream with queen jelly. 2. Biological way of defence from varroa tick.
Results: For three years I have been making up the cream with queen jelly using it myself and prescribing it to my patients. Facial and hands skin restores and cellulitis areas recover. Skin becomes delicate and beautiful and wrinkles disappear. Vessels recover in case of atherosclerosis of lower extremities and brain, memory recovers, intracranial and arterial pressure regulates, migraine attacks stop, vision improves and hearing recovers. In case of cholecystitis, sinusitis, maxillary sinusitis, rhinitis and osteochondrosis inflammation stops. After inflammatory processes and surgical intervention commissurae resolve and infertility can be cured. The cream is applied for treating tumoral processes in brain (positive result according to tomography and clinical data. It is a supporting medicine in a neglected state). The best time for cream application is morning as being absorbed it gives strength and good spirits.
Conclusion: New technology - home preparation: In the middle of May we put a building frame between frames with drone brood. Bees can't stand emptiness so they quickly build the frame of drone dimensions and a queen bee lays ova soon. When 1/3 of frame is sealed we take the frame out, cut it off and put it back (as a matter of fact it is a biological way of defence from varroa tick). Then we put the pieces of drone brood into the juicer and squeeze out some drone extract. (It contains queen jelly, honey, bee bread and a growing body of larval that gives a huge supply of energy to those who take it). After that we mix drone extract with honey in the proportion of 1:4 and keep it in the fridge. We take one-half teaspoonful under the tongue in the morning. Cream (olive oil, wax, and drone extract) is applied to any area that pains. Microcirculation will be restored and pain will be over. In the morning being applied to the face the cream will wake up and hearten you even if you haven't slept enough. And all day long you will feel men's looks at you – not understanding the reason they will sense your magnetic force.

WATER SOLUTION OF PROPOLIS: CHEMICAL COMPOSITION AND EFFECT ON HEART MITOCHONDRIAL FUNCTION

No 286

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It is not surprising that propolis collected in different regions has different chemical composition and biological properties. Chemical composition of propolis water solution (WSP) made from in Lithuania collected propolis has not been investigated yet. Moreover, there are no data on the action of propolis on mitochondrial function

art mitochondria are important organells of the cell, oducing energy required for heart contraction. Thus, e aim of this study was to determine the chemical mposition of WSP and its effect on rat heart tochondrial respiration.
ing GC-MS 48 chemical compounds were identified in SP, main type of them were phenolic compounds and ters of aromatic acids. Rat heart mitochondria were lated in the mannitol-sucrose medium and respiration e was measured oxygraphically at 37∞C with cinate as substrate. No effect of WSP on the state 2 ADP) and maximal (+ ADP) respiration rates of tochondria was observed at 10-3 % and less ncentrations of phenolic compounds present in WSP. 9x10-3 % and 2x10-2 % phenolic compounds WSP used the significant decrease of state 2 and the ximal respiration rates by 24%, 54% and 58%, 70%, spectively ($p<0.05$). Respiratory control index creased by 38%.
conclusion, the WSP effect on cardiac mitochondrial spiration was dose- dependent. WSP induced decrease mitochondrial respiration rate with succinate as ostrate was probably due to the inhibition of succinate hydrogenase activity caused by phthalic acid esters nd in WSP.

ERAPEUTIC EFFECT OF APITHERAPY ON LLULITIS.

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troduction: Cellulitis is an acute diffuse spreading ammatory condition of the skin that is characterized localized pain, erythema, swelling and heat. Melittin, major component of Apis mellifera L. (AML) bee om, is a well-known transmembrane antimicrobial otide that plays an important role in innate immunity to crobial invasion. In Taiwan, we apply the using of mbination of the knowledge of modern medicine, technology and Oriental Medicine in Apitherapy. And found that the result of modern Apitherapy was iting.
ethod: A 55- year-old female Chinese developed ere local pain, tenderness and swelling over right er limb after a traffic accident. A 1.5x1.0.x1.0cm eding wound associated with 15.0x10.x05cm ntusion wound was also found over right leg. Patient veloped cellulites over right lower leg later. She eived Apis mellifera bee venom treatment every day. e also received propolis capsule, 800mg four times ly.
sult: The cellulites of right lower led was completely aled after three weeks of Apis mellifera venom and opolis capsules treatment.
scussion: Cellulitis may be caused by a wide variety of ogenous bacteria (e.g. S. aureus and S. pyogenous). cteria may gain access to the epidermis through cracks in the skin, abrasions, cuts and surgical incisions. Bee venom contains strong anitmicrobial peptides. Up to the present time, we do not find any bacteria resistance to bee venom. The combination of bee venom and propolis provide a strong antimicrobial treatment for both gram positive and gram-negative bacterial skin infection. Apitherapy with AML venom and propolis may provide the alternative treatment in skin infections. .

VISUAL FUNCTIONS IN PATIENTS WITH ENDOCRINE OPHTHALMOPATHY TREATING WITH BEE'S MILK

No 288

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Introduction: The problem of visual functions in patients with endocrine ophthalmopathy treating with bee's milk has not been investigated up to now. The purpose of the work was to investigate visual functions of patients with endocrine ophthalmopathy treating with bee's milk.
Methods: There were investigated 29 patients (I group) 48-65 years old with endocrine ophthalmopathy who were treated with bee's milk tablets (70mg twice a day). 15 patients (II group) were not treated with bee's milk. All patients earlier were treated with prednisolone (60-80mg per day). There were investigated the data of visual acuity, exophthalmometry, ophthalmoscopy, visocontrastometry, campimetry. The examinations were done before the treatment with bee's milk and after three months after the course of treatment. Results were statistically analysed by using Student's t-test. Relationship between parameters was determined by calculating correlation coefficient.
Results: The results showed that before the treatment with bee's milk visual acuity was decreased, contrast sensitivity was reduced in lower frequencies and enlargement of blind spot was found. In patients with endocrine ophthalmopathy treated with bee's milk an improvement of visual functions and reduction of retinal blind spot ($p<0.05$) was noted in comparison with those patients who were not treated with bee's milk.
Conclusion: In conclusion, bee's milk can be recommended together with other methods of conservative treatment of endocrine ophthalmopathy.

20% HONEY EYE DROPS AND PULSED ELECTROMAGNETIC THERAPY IN PATIENTS WITH GRAVES' OPHTHALMOPATHY

No 289

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Introduction: The effect of treatment with 20% honey eye drops and pulsed electromagnetic therapy in patients

with Graves' ophthalmopathy was not investigated. The purpose of our work was to investigate the effect of 20% honey eye drops and pulsed electromagnetic therapy in patients with Graves' ophthalmopathy.
Methods: There were examined 30 patients (60 eyes) with Graves' ophthalmopathy (mean age – 43.4 years old) before and after the treatment. 14 patients were treated with pulsed electromagnetic field (10 procedures) and 16 – with pulsed electromagnetic field (10 procedures) and 20% honey eye drops (three times a day). There were evaluated eye signs (eye microsoft tissue, cornea state, optic nerve function), proptosis before and after the course of treatment. Results were statistically analysed by using Student's test. Relation between parameters was determined by evaluation the correlation coefficient.
Results: In patients, proptosis measurements before the treatment with pulsed electromagnetic field and 20% honey eye drops were 19.7 mm, after the treatment – 18.8 mm ($p>0.05$). Oedema of conjunctivae and eyelids was noted in 81.3% of patients before the treatment and after the treatment the swelling of the eyelids and conjunctivae was only in 31.3% of patients with endocrine ophthalmopathy. Sensitivity of the cornea was decreased before the treatment in 50.0% of patients, after the course of treatment – in 18.8% of treatment. The best results were achieved when the treatment was started early while the eye soft tissue signs, swelling of the extraocular muscles and infiltration of retrobulbar cellular tissue predominated and there was no fibrosis of the microsoft tissue of the eye.
Conclusion: According to the results of investigation there was more positive effect of 20% honey eye drops and pulsed electromagnetic therapy than magnetic field alone on the state of ocular microsoft tissue and the cornea in patients with Graves' ophthalmopathy.

THE PHENOLICS CONTENT IN POLISH HONEYS WITH DIFFERENT FLORAL ORIGIN

No 290

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The quality of honey is judged by the botanical origin or floral origin and chemical composition. Traditionally the floral origin has been identified by the analysis of bee pollen present in honey. It is suggested, that flavonoids and phenolic acids could be used for authenticating honey floral origins.
The aim of our study was to evaluate and identificate the content of phenolics in 15 samples of honey. The phenolic acids (absisic acid, ellagic acid, galeic acid) and flavonoids (luteolin, quercetin, kaempferol, apigenin and chrysin) were analyzed by HPLC after extraction from honey using procedure reported by Lihu Yao et al. All of the analyzed honeys contained variable amounts of absisic acid, luteolin, quercetin, kaempferol, apigenin and chrysin. Galeic acid was found in 1 samples and ellagic acid was not found in any samples. The most shares in the total percentage of absorbance in all investigated samples had absisic acid. Rape honey was characterized by the presence of chrysin, heather honey by quercitin and apigenin and accacia honey by luteolin and kaempferol. This preliminary study shows on differences in phenolics contents of particular monofloral honeys. Further studies will be continued in order to find correlation between botanical origins and phenolic profiles.

EFFECT OF WATER SOLUBLE DERIVATIVE OF PROPOLIS AND ITS POLYPHENOLIC COMPOUNDS ON FUNCTIONAL ACTIVITY OF MACROPHAGES AGAINST TUMOR CELLS

No 291

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Effect of two preparation (Croatian and Brazilian) of water-soluble derivative of propolis (WSDP), caffeic acid, quercetin, chrysin, naringenin (components present in WSDP) on the development of Ehrlich ascites tumour (EAT) was evaluated. Test components (50mg/kg) were given by gastric intubations (po) or intraperitoneally 2 hour prior the intraperitonel injection of EAT (2 x106) cells. It was observed that WSDP and its compounds effectively inhibited tumour growth and the proliferation of EAT. The volume of ascitic fluid induced by EAT cells and total number of cells present in the peritoneal cavity was markedly reduced in EAT-bearing mice treated with test components. Treatment with test components increased the number of polymorphonuclear (PMN) cells and decreased the number of macrophages in the peritoneal cavity of treated animals. The macrophage spreading revealed that WSDP and all test compounds affected the functional state of macrophages increasing their tumorcidal activity. The results indicate that the WSDP and its polyphenolic compounds significantly reduced the tumour growth and proliferation of EAT cells; the antitumour effect of test components might be due to an increase of peritoneal macrophage activity and not to an increase in macrophage number.

DISTRIBUTION OF MINERALS IN COLOMBIAN PROPOLIS

No 292

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Propolis can be defined as a complex mixture of biological origin elaborated from resins, balms, rubbers and other sweets of the plants that the honeybee (Apis

ellifera) picks up and it modifies, adding them wax, ollen and enzymes among other materials. A primary nalysis of any propolis sample allows to determine the resence of wax (20-30%), resins and aromatic balms 0-50%), essential oils (5-10%), pollen (4-5%) and echanical mixtures (10-30%). Nearly 19 minerals hare een reported in propolis. One very important of them is nc. For Argentinian propolis levels of zinc ranks from .3 to 105.8 mg/kg. Inside the apiary the results were mparable using other two different collection methods 0.7 to 58.8 mg/kg and 11.6 to 64.3 mg/kg).
his work shows the analytical results about the mineral mposition of the Colombian propolis, collected at the ogeographical area of Tropical rain forest (bh-T: 2,000-000mm/year; 24°C and 0-1,000 m.s.n.m.), Premountain in forest (bh-PM: 1,000-2,000mm; 17-24°C; 800 2,000 .s.n.m) and Tropical dry forest (bs-T: 1,000 to 2,000mm; 4°C; 0-1000 m.s.n.m.). 18 samples of propolis from ree biogeographical areas were collected, rresponding to two departments and 15 municipalities Colombia (Tolima and Valle). The observed average in mples according to the biogeographical origin, resented smaller variability for the iron content in the opolis from (bs-T), with a range of 686mg/kg followed (bh-PM) and (bh-T), with 983 and 1094 respectively. ne most representative elements in all cases rresponded to calcium and sodium. In the last one ith variations among 18.3 mg/kg for the propolis from h-T), 181 and 331.4mg/kg for (bh-PM) and (bs-T) spectively. The fluctuations for calcium levels rresponded to 2,377.5, 1,451.2 and 1,094mg/kg for h-PM), (bs-T) and (bh-T) in this descending order. The ntents of zinc observed in the Colombian propolis, ere 161.3 (bh-T), 442.9 ~ 443.2mg/kg for (bh-PM) and s-T). The presence of manganese and nickel complete e spectrum of minerals, with averages of 6.4 (bh-T), .2 (bs-T) and 37.2 mg/Kg for samples from (bh-PM) for ckel. The values observed for manganese oscillated etween 6.9 and 61.5mg/kg.
ne propolis of the three studied biogeographical areas Colombia showed significant differences in minerals mposition. Atomic absorption spectroscopy indicate at the smaller variability is showed in iron levels from s-T). The most representative elements were calcium d sodium. In the last one the variations ranked from 3.3mg/kg for propolis of (bh-T), 181 and 331.4mg/kg for h-PM) and (bs-T) respectively. The observed content of nc was bigger than the one reported for Northwest gion of Argentina. For the Colombian ones, the served values were in the order of 161.3 (bh-T) and 42.9 ~ 443.2mg/kg for (bh-PM) and (bs-T) respectively.

FFECTS OF COMPOUND SOFT CAPSULES OF OYAL JELLY ON THE SLEEP IMPROVEMENT OF ICE

lo 293

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Aim to investigate the effect of Compound Soft capsules of Royal Jelly on the sleep improvement of mice. Compound Soft capsules of Royal Jelly was composed of Royal Jelly, Ziziphus jujuba Mill. Var,Ganoderma lucidum (Leyss. Fr.) Karst and Radix Acanthopanacix Senticosi.

Method: The investigation was composed of three trials with 180 Balb/C male mice. In each trial 60 Balb/C male mice were randomly divided into 4 groups including solvent group, Compound Soft capsules of Royal Jelly (CSCRJ) 0.13, 0.27, 0.80£Á·£Î£Á-1 group. In trial 1 with prolonged mice sleep time test which induced by pentobarbital sodium, we studied the prolonged effect of the CSCRJ on pentobarbital sodium sleep time. In trial 2 with barbital sodium threshold dosage hypnotize tests, we studied the sleep rate of the mice after barbital sodium was administrated in 30 min. In trial 3 with barbital sodium sleep incubation period tests, we studied the effect of the CSCRJ on the barbital sodium sleep incubation period.

Results: The main results from three trials are given in Table 1. Administrated CSCRJ 30d to mice through stomach, the mice sleep time of middle dosage group was prolonged obviously ($P<0.05$), and high dosage group was prolonged significantly ($P<0.01$). Mice sleep rate of high dosage group was increased obviously ($P<0.05$). The sleep incubation period of mice in middle dosage group was decreased obviously ($P<0.05$), and the sleep incubation period in high dosage group was decreased significantly ($P<0.01$).

Table 1 Compound Soft capsules of Royal Jelly on the sleep improvement of mice.

Treatment (CSCRJ)	Sleep time -min- (±s)	Sleep mice (n) (30 min after injection)	Sleep incubation period (min) (±s)
0 g/kg.BW	25.8+6.3	2	26.4±5.5
0.13 g/kg.BW	32.6+7.9	3	22.5±5.2
0.27 g/kg.BW	34.9±9.9*	6	19.4±3.4*
0.80 g/kg.BW	38.0+9.0**	8*	17.5±3.1**

* $P<0.05$ ** $P<0.01$

Conclusion Compound of Royal Jelly, Ziziphus jujuba Mill. Var,Ganoderma lucidum (Leyss. Fr.) Karst and Radix Acanthopanacix Senticosi can improve the mice sleep effectively.

Key words: Sleep improvement; Compound Soft capsules of Royal Jelly

TOXICOLOGICAL ASSESSMENT OF PROPOLIS COMPLEX CAPSULE ON ANIMAL

No 294

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Objective: Propolis complex capsule is a kind of constituent of herbal medicine and propolis compounded preparation of tradition. It was necessary to make the toxicological assessment. Methods: The acute toxicity LD50 test in mice, micronuclei test of bone marrow cell and sperm shape abnormality test and chromosome malformation analysis of testicle reproductive cell in mice Ames test 30 days feeding test in mice.
Result: According to the result of acute toxicity LD50 test in mice, the Propolis complex capsule has not acute toxicity. All three genotoxicity tests had negative. The developmental toxicity and embryotoxicity had also not been found in teratogenicity test. Abnormal phenomena had not been found in 30 days feeding test.
Conclusion: Propolis complex capsule is safe in using.
Key words: Propolis complex capsule; Safety; toxicity tests

EXPERIMENT STUDIES OF HYPOGLYCEMIC ACTION ON THE PROPOLIS COMPLEX CAPSULE

No 295

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Objective: The Propolis complex capsule is a kind of constituent of herbal medicine and propolis compounded preparation of tradition. To study hypoglycemic action of the Propolis complex capsule by observing the effects of the Propolis complex capsule on blood glucose levels in many alloxan animal models.
Method: The blood glucose levels in alloxan animal model was determined after oral administration ,with the model of diabetes induced by alloxan of hyperglycemic mice and normal mice.
Result: The Propolis complex capsule had good therapeutical action on diabetes mice induced by alloxan, but had no significant effects on blood glucose levels of normal mice.
Key words: The Propolis complex capsule; hypoglycemic action ; animal experiment

THE STUDY APPLICATION OF PLANT EXTRACTS DISTILLATES IN HONEY BEE NUTRITION IN ORDER TO INCREASED OF ENZYME AND PHARMACOLOGICAL PLANT FACTORS LEVELS IN NATURAL HONEY

No 296

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In order to increase of honey enzymes and the main pharmacological plant factors used solutions that prepared of natural honey and plant extract distillate. This solution contain natural honey and plant extract distillate include of Labiatae (Mentha sativa), Salicaceae (salix aegyptiaca), Labiatae (origanum vulgare), Labiatae (mentha pulegium) with 1:1(v/v) concentration prepared and used in 30 honey bee colonies nutrition. This research conducted with CRD design in 5 treatments (1 control, 4 experimental solutions) and each treatment with 6 replicates.
After two month nutrition with this solution, sampling of all colonies and samples send to laboratory for analyses with HPLC and spectrophotometer method for pharmacological factors and used enzyme determine kits for evaluated enzyme levels. Data analyzed with computer statistically soft ware (SAS).
Results showed all enzymes in this research increased and main pharmacological factors transport to honey produced. However all treatments have significant different compared with control group ($P<0.01$).

THE PSYCHONEUROECOLOGICAL BASIS OF BEE VENOM THERAPY: EVOLUTIONARY CLUES OF PROTEIN-DOPAMINE LANGUAGE FOR CONSCIOUS LEARNING IN HOMO SAPIENS.

No 298

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Our bee venom therapy has considered the psychoneuroecological approach for autoimmune and nervous system diseases. We present evidences of clinical improvement in notable patients in each one of the following diseases: Multiple Sclerosis, Tropical Spastic Paraparesis, Lupus, Psoriasis, Rheumatoid arthritis, schizophrenia, addiction and paranoic states. All these pathologies, however characterized by allopathic Medicine, are individual experiences related with Genetic Authenthicity (GA) and Social Conditioning (SC). Genetic confers legitimacy, and social conditioning "teachs" about to be afraid of disease. Nevertheless of the individual differences between patiens, the perception and pain management of bee sting is more than only physical experience. Bee Venom Therapy (BVT) conects physical perception and conscience and then is an experience against fear. We have detected that BVT increase concentration, attention, memory, and qualities as selfperception, selfconfidence, self-preservation, self-expression, self-determination, self-rejoyce and self-knowledge. These are variables directly affect conscience and then how the patient lives its disease and which way can consider to catch an individual equilibria. Thus, the course of present disease summarize the similar chain of events along evolution This is a fundamental clue: disease onthogeny revive memories of disease phylogeny.
We propose a model of bee venom action that is depending of dopamine-protein system present in apitoxin. We make biochemical, ecological and

evolutionary correlations. Our conclusion is really a new heory. The bee venom has been a ecological modulator etween bees and its predators. Particularly and more eeply, bee venom in Apis mellifera - Homo sapiens elationships means a delicate molecular warning "Molecular learning") to become aware of dangerous nd to escape. We are talking about selfconscious earning, not of a mortal combat against an enemy, isease is not an anemy, is a chance to self-learning. hese approach is beginning to explain the importance of ee venom therapy on conscience. Bee venom is a key nd ancient evolutionary way to open the door of our earning, and then is a language to understand our ddictions and to begin a real way for our self-healing.

LECTROSPRAY IONIZATION – MASS PECTROMETRY CHARACTERIZATION OF SAMPLES F APIS MELLIFERA PROPOLIS FROM BAHIA, RAZIL.

lo 299

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he chemical composition and plant sources of Apis ellifera propolis from temperate zones have been the bject of study for many years and are now well known. n the other hand, the composition of propolis from opical and sub-tropical areas in the world were uropean Apis mellifera bees have been introduced, is gely unknown. In the present study, samples of opolis from Bahia, Brazil were analysed by negative ode Electrospray Ionization – Mass Spectrometry (ESI-IS) and the results compared by Principal Component nalysis (PCA).
he samples were collected from 14 hives placed in the me area in Cruz das Almas, Bahia, in February 2003: amples A were collected in July and Samples B in ecember of the same year. Therefore bees collected e plant resins during different months for the two oups of samples. For further comparison, samples of opolis collected in a different region of the State of hia were also analysed. ESI-MS fingerprinting is a fast, ccurate and reliable technique for the characterization of tural products, the negative mode ionization being rticularly suited to those with acidic and phenolic mponents, such as propolis.
he ESI-MS fingerprints of the samples show there was eater variation in the composition of Samples A. PCA ouped all Samples B in the same quadrant, whereas amples A were divided; some in the same quadrant as and some in another one. The samples from the other gion were placed separately. The loadings show that e ions of m/z 345, 347, 371, 373, 375, 401, 455, 469 d 471 were responsible for grouping Samples B and me of A. Tandem MS analysis of these compounds ows that most of them have analogous structures and are possibly derived from the same plant. Studies are being undertaken to identOify this species, which is apparently a main source of resin. Ions of m/z 197, 285, 299, 301, 215 and 319 were responsible for grouping the rest of Samples A, possibly indicating a secondary plant source. These results are important for the characterization of propolis from Northeast of Brazil and their plant sources.

COMPARISON OF THE COMPOSITION AND ACTIVITY OF SAMPLES OF BRAZILIAN PROPOLIS AND CASEARIA SYLVESTRIS

No 300

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Both propolis and the medicinal plant, Casearia sylvestris, are used topically in Brazilian popular medicine for their healing properties, which are frequently related to components with antimicrobial activity. The main purpose of this study was to compare the chemical composition and antimicrobial activity of extracts of samples of propolis and Casearia sylvestris. Samples were extracted by maceration and using the Soxhlet extractor. The samples of Apis mellifera propolis tested came from the southeast (3 samples) and northeast (2 samples) of Brazil. A sample of Apis mellifera propolis from Mozambique and one of Tetragonisca angustula propolis from the southeast of Brazil were also tested. The general composition of the extracts was evaluated by negative mode Electrospray Ionization – Mass Spectrometry (ESI-MS) fingerprinting and by Thin Layer Chromatography (TLC). The total phenolic content of the extracts was determined using the Folin-Ciocalteau method. The antimicrobial activity was evaluated directly on the TLC by bioauthography with Staphylococcus aureus.
The ESI-MS fingerprints of the propolis extracts showed differences due to the species of bee and geographic origin. Different forms of extraction did not affect the qualitative composition of the C. sylvestris extracts. The TLC plates showed that the less polar components of propolis were lost during the Soxhlet extraction. The samples of green propolis from the southeast of Brazil had the highest concentration of phenolic compounds whereas the extracts of C. sylvestris had the lowest. The components of high to medium polarity were responsible for the antimicrobial activity of all the extracts tested, with the C. sylvestris extracts showing the smallest inhibition zones, therefore the lowest inhibitory activity. The extracts of C. sylvestris had the lowest concentration of phenolic compounds and antimicrobial activity, suggesting that its wound healing properties are due to another mechanism. Most samples of propolis, on the other hand, showed strong antimicrobial activity, which could contribute to the cicatrisation of wounds.

EFFECT OF COMPOUND SOFT CAPSULES OF ROYAL JELLY ON THE IMMUNE FUNCTION OF MICE

No 301

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Abstract: Compound Soft capsules of Royal Jelly was composed of Royal Jelly, Ziziphus jujuba Mill. Var,Ganoderma lucidum (Leyss. Fr.) Karst and Radix Acanthopanacix Senticosi. Objective to study effect of Compound Soft Capsules of Royal Jelly£®CSCRJ£©on the immune function of mice.
Methods: The phagocytosing functions by cock RBC, the plaque forming cell (PFC) and HC50 testing were assessment with 48 male Balb/C mice of 18-22g (group_), the mice were randomly divided into 4 groups including solvent group, Compound Soft capsules of Royal Jelly 0.13, 0.27, 0.80-1 group, until 30 days. The lymph cell transformation by ConA and NK cell activity were assessment with other 48 male Balb/C mice of 18-22 g (group_), the mice were randomly divided into 4 groups including solvent group, CSCRJ 0.13, 0.27, 0.80-1 group, respectively, until 30 days. Other 48 female Balb/C mice of 18-22g (group_) were divided into four group as the same treatment, The phagocytosing functions by carbon powder were assessment. The data were statisticed by Stata soft.
Results: (1) The CSCRJ had no statistically obviously effects on the ratio of thymus and body weight. (2) By contrast with solvent group 0.27g/kg BW dosage can remarkly increase the lymph cell transformation by ConA (P£º0.01), and increase the phagocytosing ability by cock RBC (P<0.05). (3) But 0.80g/kg BW dosage can increase he lymph cell transformation by ConA (P£º0.05), and increase the phagocytosing ability by cock RBC (P<0.01), and increase the phagocytosing functions by carbon powde (P<0.05). (4) The CSCRJ had no effects on the body weight of mice.
Conclusion: Compound of Royal Jelly, Ziziphus jujuba Mill. Var,Ganoderma lucidum (Leyss. Fr.) Karst and Radix Acanthopanacix Senticosi can advance the mice immune function effectively.
Key words: Immune Function; Compound Soft capsules of Royal Jelly

DISINFECTION OF BEEKEEPING TOOLS TO KILL SPORES OF *PAENIBACILLUS LARVAE* SSP. *LARVAE*

No 302

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A part of the successful control treatment in the American foulbrood foci is disinfection of all surfaces and materials with possible survival of the pathogen in the virulent state.
We tested 17 registered preparations with declared sporocidal effects.
Very high efficacy was found by the use of magnesium monoperoxyphtalate (Dismozon ®). This preparation is environment friendly, but very expensive.
Hot solution of caustic soda (sodium hydroxide) is effective for small tools, cheap, but dangerous for man. The best effect was obtained by use the mixture of 5% sodium hydroxide and 0,5% of sodium hypochlorite. This solution worked at room temperature very well. In our laboratory experiments with this mixture the amount of 107 CFU of Paenibacillus larvae larvae was reduced to 102 CFU in 1 gram of treated material.

EVALUATION OF BIOLOGICAL ACTIVITIES AND PHYSICOCHEMICAL PROPERTIES OF A NEW TYPE OF BRAZILIAN PROPOLIS

No 304

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Propolis a resinous hive substance collected by honeybees Apis mellifera from several parts of the plants. In Europe, North America, and West of Asia, the main source of propolis is the exudates of poplar buds (Populus sp.) and therefore, only one type of propolis is found in these regions. However, in South America, this plant is not native, and there is a greater plant diversity used to obtain this resinous compound, thus making it difficult to correlate propolis with its source. A new type of Brazilian propolis produced by honeybees and known as red propolis has been shown, by in vitro studies, to have important biological activities. The objective of this study was to evaluate the chemical composition, antioxidant properties and the antimicrobial activities of this new type of Brazilian propolis. For these analyses, samples were collected from the shore regions of Maceió, in the state of Alagoas. The ethanolic extract of propolis (EEP) was analyzed by UV-visible spectrophotometry, TLC and HPLC, and the total phenolic compounds content was determined. Afterwards, the EEP was fractionated by liquid-liquid extraction with hexane, dichloromethane, and ethyl acetate, and the Minimal Inhibitory Concentration (MIC) and the Minimal Bactericide Concentration (MBC) values were determined against Sthaphylococcus aureus ATCC 6538. The antioxidant activity was determined by the DPPH method. Results obtained showed that the hexane fraction did not have any inhibitory action while the dichloromethane fraction had a MIC with values ranging from 200 to 400 µg/mL. The MBC for the dichloromethane fraction was between 800 to 1600

g/mL. For the antioxidant activity, the tested fractions owed values that sequestered free radicals similar to at of butylated hydroxytoluene (BHT), which was 2.18%. The EEP had a mean value for the content enolic compounds of 30 g/100 g, and this was greater an those found for other types of Brazilian propolis. e results obtained from the physicochemical and ological analyses indicate that this new type of propolis s important antioxidant and antibacterial properties.

ETERMINATION OF THE ANTIMICROBIAL AND NTIOXIDANT ACTIVITY OF THE PROPOLIS (TYPE 6) ROM BAHIA, BRAZIL

o 305

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opolis is a resinous hive substance collected by oneybees from different plant exudates. Its chemical mposition is very complex and diverse, and it is closely ated to the diversity of the vegetation from each gion visited by honeybees. Propolis samples used in s study were classified as type 6 and were collected m the Atlantic Rain Forest located in the state of hia, in Northeastern Brazil. This type of propolis has a stinct chemical composition when compared with other es, has mainly non-polar compounds and no tectable flavonoids. This study analyzed the propolis timicrobial activity using the Minimal Inhibitory ncentration (MIC) and Minimal Bactericide ncentration (MBC) methods. The antioxidant activity of e ethanol extracted type 6 propolis was determined by e DPPH method, which measures sequestered free dicals. The MIC and MBC values were determined by e serial micro-dilution technique against aphylococcus aureus (ATCC 6538), Micrococcus luteus TCC 4698) and Bacillus subtilis (ATCC 21332) at a ncentration range from 0.625µg/ml to 320µg/ml. The tioxidant activity of propolis (type 6) was 82.19%, ile gallic acid was 94.73%. Bacterial growth inhibition IC) occurred from 5µg/mL to 10µg/mL for aphylococcus aureus, 0.625 mg/mL to 1.25 mg/ml for crococcus luteus, and 1.25 mg/ml to 2.50 mg/ml for cillus subtilis. Data obtained for MBC showed only ited bactericidal activity for the bacteria and ncentrations tested. The results obtained in this study owed that the ethanol extract of the propolis from hia has antioxidant activity lower than gallic acid, a nificant microbial growth inhibitor, and no bactericidal tivity at the tested concentrations.

HONEY QUALITY INFLUENCED BY NONTOXIC PESTICIDES.

No 306

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Moulds, bacteria and insects appearing also during blooming phases of rape, pomes and stone fruits are treated with pesticide applications during the blooming phase. Only non toxic preparations are tolerated for this purpose. Such applications don't have visible effects on the foraging behaviour of bees. The pesticides were collected together with nectar and pollen and were transported into the beehive.
A routine method was established to analyse 12 fungicides and insecticides classified as non toxic. The investigated substances were Vinclocoline, Prochloraz, l-Cyhalothrine, Deltamethrine, a-Cypermethrine, Chlorfenvinphos, Phosalone, Myclobutanil, Captan, Dichlofluanid, Fenhexamid and Iprodione. German honey samples (n=1859) submitted in 2003 were analysed. The sample preparation based on an automatic Solid-Phase-Extraction (SPE) on C18-cartriges, followed by separation and detection with a Shimadzu GC 2010/ECD system. Nine of the tested substances were not detectable in the investigated samples. Three pesticides, Vinclocoline (n=28; 3-18 ppb), a-Cypermethrine (n=5; 3-6 ppb) and Iprodione (n=5; 27-115 ppb) were detectable in few samples. Effects of dilution with nectar of other untreated blooming plants and a reduction of the lipophilic substances during honey processing may be responsible. Hydrophilic substances like Streptomycin or Carbendazim have stronger effects on the honey quality. The EU is planing a regulation for pesticide residues in animal food.

CHEMICAL COMPOSITION OF HONEYBEE (*APIS MELLIFERA* L.) VENOM

No 307

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The aim of the study was to the development of the method for the separation, identification and determination quantitatively of the major constituents of honeybee (Apis mellifera L.) venom by high performance liquid chromatography (HLPC) and determination of the chemical composition of the domestic product by running routine tests.
In the study to develop an HPLC method to assay the major venom compounds the following elements were tested: chromatographic columns with C18 packing

materials of different pore size (100, 180 and 300Å), separation temperature (25, 30 35ºC), flow rate (1.0; 1.5; 2.0 ml/min.), conditions of gradient elution (0%B - 45%B, 60 min. and 0%B – 60%B, 60 min, 5%B – 80%B, 40 min). Chromatographic separation was performed using the following mobile phases: A – 0.1% trifluoroacetic acid (TFA) in water, B – 0.1% TFA in acetonitrile : water (80:20). The assays of the separated venom compounds were made using UV detector at 220 nm wavelength. The best separation of the bee venom protein fraction was obtained on 180 and 300Å pore size columns at a temperature of 25ºC. The routine assays of bee venom chemical composition involved 29 samples collected from the apiary of the Apiculture Division, Institute of Pomology and Floriculture in Pulawy over three consecutive beekeeping seasons (2002-2004). Bee venom samples were analyzed for the following major protein fraction compoounds: melittin, phospholipase A_2 and apamine. Melittin content varied from 61.15 to 70.15 and averaged 64.40%. Phospholipase A_2 content came within a range of 11.24 to 15.05, and averaged 13,00 %, and apamine content was between 2.09 to 4.18, averaging 3,1%. Statistically significant year-to-year differences were found for melittin.

PRODUCTION OF AMNION GRAFTS FOR WOUND COVERING USING THYME HONEY AS A PRESERVATIVE AGENT

No 308

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The use of skin substitutes (biological dressing) in the treatment of burns, open wounds and post-operation wounds has been used long time ago. Many factors affect the acceptance of a specified tissue graft in wound cover using whether it was biological (allografts, xenografts) or synthetic (artificial skin, hydrogels and etc.).
The wound cover material should have the following properties; availability, inexpensive, not inflammatory to the wound, not antigenic, prevent bacterial access to the wound, decrease evaporation of body fluids and loose of electrolytes of burn sites, adhere well to the wound and encouraging granulation (epithelialization), and accelerating wound healing as well.
However, it is hard to find a single graft can provide all the above properties.
Tissue banks in developing countries become aware of processing and producing of Human amniotic membranes (HAM) sterilized by gamma rays from cobalt-60 sources. The implementation of such a biological dressing material could serve as life saving biomaterial especially in emergency and disasters.
The unavailability of radiation sources for sterilization due to the high cost and technical problems has lead to the use of honey impregnated amnion grafts as an alternative to the gamma sterilized ones for the clinical purposes mentioned above. This could achieve two goals at once, preservation of the amnion grafts and accelerating wound healing at the time of application. In this paper, honey impregnated amnion grafts processed for the first time in different packing forms and kept at room temperature without further irradiation until its use as wound covering material. The bacteriological quality control tests show obvious pasteurization effect and reduction of the bacterial counts in the processed HAM. From the results, it can be concluded that honey cannot substitute the radiation method for sterilization but may serve as pasteurizing and preservative agent.

CORRECTION OF LIPID METABOLISM IN PATIENTS SUFFERING FROM CHRONIC JOINT AND CARDIOVASCULAR DISEASES BY BEE BREAD MIXED WITH HONEY

No 309

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The aim of the study was to investigate the effect of bee bread mixed with honey on the correction of lipid metabolism in patients suffering from joint and cardiovascular diseases. A group of 36 patients, including 29 women and 7 men, between the ages of 60 to 80 suffering from chronic joint and cardiovascular diseases were involved in this study. 26 patients (21 women and 5 men) received 15 grams of bee bread and honey mixture (1:1) twice a day after a meal in line with conventional medical treatment. Assessments of the general state of the patients and laboratory blood tests, including glucose level and lipid profile, were carried out before treatment and 4 weeks after the treatment. The data were compared with those of the control group of 10 patients (8 women and 2 men) who had not received any bee bread treatment.
Results. Both general health condition of the patients and blood tests improved for the group that had received bee bread with honey. A statistically significant increase in haemoglobin, lymphocytes and a reduction in the total cholesterol and low density lipoproteins were identified compared with the control group ($p<0.05$). Our experimental evidence suggests that bee bread mixed with honey has a positive effect on patients suffering from chronic joint and cardiovascular diseases and facilitates regulation of the disordered lipid metabolism
Key words: bee bread, chronic joint and cardiovascular diseases, lipids.

CLINICAL THERAPEUTIC EFFECT OF *APIS MELLIFERA* VENOM ON ICHTHYOSIS PATIENTS

No 310

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troduction: The Ichthyosis is a group of disorders of ratinisation in which the skin is extremely dry and any. Ichthyosis often invades joints and may cause nts deformities because of severe infections.
ethod: Four Ichthyosis patients were selected in this dy. They received Apis mellifera venom treatment ery two days. Polyflower honey was also applied to e skin lesions every 12 hours. Serum IgG and IgE were amined every four weeks. Patients received apitherapy 40 weeks.
sult:
ter 40 weeks of apitherapy, all four patients found that eir skin lesions of Ichthyosis were greatly improved. severe bacterial infections were found during the 40 eeks of apitherapy.
iscussion: Mellitin, the major component of Apis ellifera L venom, is a well-known antimicrobial and tolytic transmembrane peptide, provides a first line of fence against wide spectrum of pathogens. The result this study indicates Apis mellifera venom is an fective antimicrobial agent in preventing skin infections Ichthyosis patients.

FFECT OF ROYAL JELLY ON DEPRESSIVE STATE DUCED BY BILATERAL OVARIECTOMY IN FEMALE ICE.

o 311

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cently, we demonstrated that the bilateral ovariectomy as able to produce a depressive state in female mice: e immobility time in the forced swimming test gnificantly prolonged 2 weeks after the ovariectomy. cause the prolongation of immobility time was evented by chronic treatment with either estradiol or tidepressants it is conceivable that this phenomenon sely correlates to menopausal mood disorder. Royal y produced by honeybees to feed the queen of the e is known to be effective in mental illnesses such as gue and depressive state in women. There is, wever, little experimental proof supporting these ditional applications.
the present study, we determined whether or not ronic treatment with royal jelly prevents the olongation of immobility time in ovariectomized mice, d also investigated the active components of royal y. ICR albino female mice were used and their ovaries ere resected bilaterally at 9 weeks of age. All drugs ere given once per day for 2 weeks after the operation. cording to the method of Porsort et al (1977) each ce was placed into a polycarbonate cylinder (25cm gh x 10cm diameter) filled to a 10cm depth with water aintained at 25_ for 6 min. Behavioral testing was corded on videotape and the duration of immobility during the last 4 min of the trial was measured using a computerized event recorder. Chronic treatment with royal jelly (300, 600, 900mg/kg/day) reduced significantly the duration of immobility time [F (7, 72)=8.34, p<0.01] in a dose-dependent manner. Among the fractions extracted from royal jelly, either supernatant or aqueous fraction prevented significantly the prolongation of immobility time induced by ovariectomy [F (5, 54)=14.84, p<0.01]. In contrast with estradiol, royal jelly did not show any increase of uterus weight as compared with the vehicle-treated control. These findings suggest that daily intake of royal jelly is effective in menopausal mood disorder, and it is clear that substance contained in the aqueous fraction, not in the organic fractions, is one of the psychoactive ingredients of royal jelly.
In our latest clinical study, we demonstrated that royal jelly was effective in women's menopausal disorder, such as depression.

ANTIOXIDANT CAPACITY AND PHYSICOCHEMICAL COMPOSITION OF HONEY

No 313

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Reactive oxygen species (ROS) such as O2_, OH_, or lipid peroxyl radical (LOO_) lead to diverse biological complications, due to oxidative damage to lipids, proteins and nucleic acids. Honey has been known to exert a significant in vitro antioxidant activity, in part due to its phenolic content. In this work, we compared the inhibition percentage of superoxide anion and hydroxyl radical of honey from Apis mellifera, Melipona favosa favosa and Trigona (Tetragonisca) angustula angustula with values of artifical honey. We found that genuine honey samples inhibited the formation of superoxide anion in a higher percentage than artificial honey. This inhibition capacity was, for genuine honey (68.9-80.2) higher than quercetin (53.0) and melatonin (53.9), but lower in artificial honey (33.5). On the other hand, we measured the antioxidant activity (AOA) values of honey samples in comparison to uric acid at 1mM. In this case, lower AOA values were found for artificial honey (0.31) and genuine honey samples (0.64-0.73), as compared to melatonin (0.83) and quercetin (0.86). There was no correlation between the values of antioxidant capacity and the physicochemical composition of acidity, ash and water.

Honey	Bee Origin	Acidity (meq/kg honey)	Ash (g ash/100 g honey)	Water (g water/ 100 g honey)
1	Apis	27.92	0.09	19.2
2	Apis	48.32	0.21	17.8
3	Apis	44.20	0.12	18.0
4	Melipona	54.60	0.07	30.4
5	Trigona	188.52	0.25	27.4
6	Artificial	8.60	0.04	19.4

ANTI-INFLAMMATORY EFFECT OF ASIAN HONEYBEE VENOM (*APIS CERENA* L.) ON INDUCIBLE NITRIC OXIDE SYNTHASE AND TUMOR NECROSIS FACTOR-ALPHA IN RAW 264.7 CELL LINE

No 314

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Several investigators have evaluated the effects of honeybee venom (Apis mellifer L.) to biological activity such as anti-inflammatory and antinociceptive effects. But, the biological activity of the venom from Asian honeybees (Apis cerana L.) is not evaluated yet. In this study, the production of proinflammatory cytokines, nitric oxide (NO) and tumor necrosis factor-alpha (TNF- alpha) was examined in a macrophage like cell line, RAW 264.7 cells, in the presence of the venom from Asian honeybees (A. cerana) water-soluble (BVW) extracts. RAW 264.7 cells activated with lipopolysaccharide (LPS) were treated with various doses of BVW extracts. Supernatants were analyzed for the production of NO and TNF-alpha using Griess reagent and enzyme-linked immunosorbent assay (ELISA) and western blotting, respectively. BVW extracts up to 10ng/ml still required to inhibit NO and TNF-alpha induced by LPS. These results suggest the possibility that BVW may be effective therapeutic agents for inflammatory diseases.

THE THERAPEUTIC BENEFITS OF HONEY IN AUSTRALASIA

No 315

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People, throughout an extremely diverse array of cultures, have used honey for its healing properties for thousands of years. Ailments traditionally treated with honey range from diseases of the gastric and respiratory systems to sexually transmitted diseases, burns and eye infections. Honey has been especially persistent as a therapeutic agent for wound dressings, due mainly to its antimicrobial properties. It exhibits significant antimicrobial activity due to high sugar content, low pH, hydrogen peroxide production and floral factors. However, the level of activity varies greatly from honey to honey, and is dependent on the floral source. There are certain honeys that exhibit broad-spectrum antibacterial activity that is just as effective against antibiotic-sensitive and –resistant pathogens. Honey also has favourable effects on wound repair, above those due to infection control. Although honey has been largely ignored by modern medicine, the past few years have seen an increased interest its therapeutic use in conventional medicine, particularly as a wound dressing. For example, in Australia and New Zealand certain honeys are being used to dress chronic ulcers, with remarkable results. Honey is also very effective as a dressing on other infected surgical or traumatic wounds and for burns. Honey possesses many ideal wound dressing properties, and while there are still questions to be answered with regard to the mode of action and the choice of honey type for therapeutic use, the potential benefits of an increased medicinal use of honey are likely to be substantial.

HONEY KILLS SOME OF OUR MOST DANGEROUS MICROBIAL ENEMIES

No 316

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Honey has been used therapeutically by many different cultures since ancient times. Much of its popularity stems from the fact that honey is a broad spectrum antimicrobial agent. Although still used in some instances today, honey has been largely forgotten by Western medicine since the advent of antibiotic therapy. However, the rapidly escalating problem of antibiotic resistance among microorganisms is arguably one of the most urgent issues facing medicine today. As our antimicrobial arsenal dwindles, people are considering alternate therapies to combat infection by antibiotic resistant organisms. In vitro data from our laboratory show that honey is effective against a range of microorganisms that are responsible for severe or problematic infections, including those that are not susceptible to conventional antimicrobial therapy. Remarkably, multiply resistant Staphylococcus aureus ("Golden Staph") is particularly sensitive to honey, with minimum inhibitory concentrations (MICs) of 5% (w/v) or less. Various members of the bacterial family Enterobacteriaceae, which is one of most commonly implicated groups in wound infection, are inhibited by honey at concentrations of 15% (w/v) or less. Similar concentrations inhibited the growth of Propionibacterium acnes, an anaerobic bacterium implicated in the pathogenesis of acne. Several species of the pathogenic yeast Candida, which is responsible for wound infections and thrush, have also been tested. MICs ranged from 10% to 47% (w/v), depending on the type of honey used. Importantly, honey inhibited all of these drug resistant organisms at concentrations that are easily achievable in a clinical setting.

REE RADICAL SCAVENGING AND POPEROXIDATION INHIBITION EFFECTS OF OREAN PROPOLIS

o 317

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opolis, a natural product derived from plant resins llected by honeybees, has been used for thousands of ars in traditional medicine all over the world. The mposition of the propolis depends upon the vegetation the area from where it was collected and on the bee ecies.
this study, propolis samples were collected from the ee region of Korean Peninsula, such as central, uthern, and Jeju island. Ethanol extracts of propolis EP) were prepared and evaluated for antioxidant ivity by 1,1-diphenyl-2-picrylhydrazyl(DPPH) free radical avenging assay system, deoxyribose OH radical avenging assay system, and lipoperoxydation inhibition stems. EEP from central and south region had strong e radicals scavenging effect and lipoperoxydation ibition effects. On the other hand, Jeju's sample was wer free radical scavenging effect than other regions.

OMPARISON OF ANTIBIOTIC PROPERTY OF HONEY ROM VARIOUS FOOD SOURCES IN THAILAND

o 318

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oney is the major product from bee. It has been utilized idly through the use for therapeutic purpose or therapy in both traditional and modern medicine. In s research, honey was from different floral sources ngan flower, sunflower, wildflower, and April honey). ch honey was diluted with LB media at concentration _, _, _, and 1 (v/v). Then, they were used to test ainst the growth of Escherichia coli by agar well-fusion bioassay. The diameter averages of inhibition ne (DIZ) suggest that wildflower honey and April honey e more effective than the others at any concentrations. ngan honey at concentration of _, _, _, and 1 (v/v) ovides DIZ (cm) at 2.800, 3.367, 3.600, and 3.833, spectively. Sunflower honey presents 2.867, 3.300, 611, and 3.600 cm of DIZ, respectively. Furthermore, ldflower honey shows 2.978, 3.467, 3.811, and 3.800 n of DIZ, separately. In addition, April honey indicates 022, 3.478, 3.633, and 4.033 cm of DIZ, separately. At ncentration of _, _, _, and 1 (v/v), all honeys provide e same activity (one-way ANOVA, _=0.05). Wildflower oney is the most effective at concentration of _ while ril honey without any dilutions presents the most effective activity (one-way ANOVA, _=0.05). Moreover, some components of honey such as proline, moisture and % invert sugar were performed. These obtained characters may be responsible for the difference of honey.
This research was financially supported by Thailand Research Fund, grant # MRG4780007 and RTA4580012 and Senior Project Fund of Chulalongkorn University.

RADICAL SCAVENGING ACTIVITIES AND ANTIBROWNING EFFECTS OF SPANISH HONEYS

No 319

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According to recent studies, some honeys have high antioxidant activity. The aim of this study is to evaluate the antioxidant capacity of 38 Spanish honeys, monofloral or honeydew. Thus, radical scavenging activity and browning inhibition capacity of these honeys have been evaluated.
Firstly, the total antioxidant capacity has been determined as the radical scavenging effect of honey on a methanolic solution of 1,1-diphenyl-2-picylhydrazyl radical (DPPH•). Furthermore, in order to study the nature of the compounds that confer antioxidant activity to the honey, ten honeys were selected among the more active samples and were fractionated. These fractions have been obtained by solid phase extraction using strong anion exchange columns, strong cation exchange columns and C-18 columns. Previously, removal of the volatile fraction was achieved. Subsequently, the radical scavenging effect of these fractions has been evaluated. The results showed a higher free radical scavenging activity in honeydews than in floral honeys, with the exception of some heather honeys which showed high activities. The analysis of the fractions showed that the highest scavenging activity was obtained when volatile and basic compounds were removed.
On the other hand, the capacity of honeys to inhibit enzymatic browning in fruits has been analysed. Thus, the effect of different honey concentration added to mince apple and to apple juices were evaluated. In general, both studies showed low enzymatic browning inhibitions with floral honeys, whereas some heather honeys and all honeydews yield medium-to-high browning inhibition percentages. The antibrowning effect of honey was more appreciable in mince apple than in juice.
Colour, polyphenol content and acidity had been described as differentiator parameters between floral honeys and honeydew honeys. The statistical analysis of our results showed correlations between total antioxidant capacity or browning inhibition with these three parameters.

THE ANTIBACTERIAL ACTIVITY OF SELECTED PORTUGUESE HONEYS

No 320

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Introduction: Ancient civilisations utilised honey for the treatment of a diverse range of illnesses. Although honey is no longer regarded as a routine remedy, the recent development of honey based wound care products in Australasia and Great Britain is generating interest from modern healthcare professionals. Historical records indicate that honeys used for ancient medical purposes were usually carefully selected but from local sources. This suggests that carefully selected regional honeys might offer potential for modern alternative antimicrobial therapy, and this inference was tested in this study.
Methods: The physicochemical properties (colour, pH, HMF, protein, water and sugar content) of a selection of 30 Portuguese honeys were determined and antibacterial activity of each honey was determined using a bioassay method that discriminates between the antibacterial activity derived from the formation of hydrogen peroxide and the activity not derived from hydrogen peroxide formation and compares them to phenol standards.
Results: All the honey samples the exhibited physicochemical characteristics of unadulterated, natural honeys. All honeys showed hydrogen peroxide-derived antibacterial activity. Seven of the honeys tested possessed non-peroxide antibacterial activity with 4 of them having an activity that ranged between 7-13% (w/v) phenol equivalent. The honeys that showed the non-peroxide activity were mainly derived from Lavandula stoechas.
Discussion: These results demonstrate that there is the potential to find honeys with non-peroxide derived antimicrobial activity in Europe for possible development of wound management products, and demonstrates the need for further screening of the honeys being produced in Portugal and the rest of Europe.

ADVANCES ON PHARMACOLOGICAL STUDY OF BEE POLLEN

No 321

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Bee pollen contains a lot of nutritive and bioactive ingredients. In this paper, a summary is made on the therapeutic effect of bee pollen in treating the following diseases: high blood fat, atherosclerosis, lowered immune function, fatigue, senility, radio-damage, liver-damage, tumor, digestive disorders, prostatitis, diabetes, endocrine disorders, sterility, etc.

Key words: bee pollen; pharmacology; function

TREATMENT OF ARTHRITIS AND OTHER AILMENTS USING BEESTINGS

No 322

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I got to know about the therapeutic effects of bee stings (bee venom), honey, bee pollen and propolis from a personal experience. I use to have serious pains on my waist and backbone whenever I walked some distance in the village. Sometimes I would be tempted to sit down for a while but when I started beekeeping, I learnt that one should not be afraid of bees' stings, which after all takes care of arthritis and other ailments in human body. I was stung on several areas of my body and after few days the pains disappeared. I have tried therapy on a 14year old boy that had a urinary track infection that made it difficult for him to pass urine. Since then I started to treat patients suffering from arthritis, PMS, goitre, golombaron syndromes and other cases. There is a case of stone-like object in the breast of a 50year old woman, which was dissolved through bees' stings. Since I am not a medical practitioner, I would rather refer the patients to a medical laboratory scientist who would certify through laboratory examinations that they have such suspected problem. The knowledge of bee sting therapy is not popular in my country, but I hope to popularize it through paper presentations and other methods at the local, national and international platforms. The use of alternative medicine has been presently welcomed in Nigeria. Apitherapy, a more healthy way of getting well will be appreciated if it is introduced with a professional protections by the medical/alternative body
Problem: A man of 80years old diagnosed with rheumatoid arthritis and a heavy load of Staphylococcus aureas was treated with bee sting (venom) for a period of three months of a 3-sectoins of beestings in one week. He got relieved of the pains and swellings but latter on the pains kept on recurring. I do not know why he could not be freed (healed) like others who have gone back to their jobs? I believe there is going to be some improvements and definitions on how certain cases could be properly handled in the future by the use of bee venom therapy.

PHYSIOLOGICALLY ACTIVE ROYAL JELLY PROTEINS AS A REGULAR COMPNENTS OF HONEY.

No 323

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he presence of royal jelly (RJ) proteins in honey llected from nectars of different plants origin and gions and in honeybee's pollen was detected by lestern-blot analysis using polyclonal antibodies raised gainst water-soluble RJ-proteins. The most abundant J-protein in honeybee products corresponded to a 3kDa protein. The N-terminal amino acid sequence of 3kDa protein was N-I-L-R-G-E. This sequence is entical to the apalbumin-1, the most abundant protein RJ. Apalbumin-1 is a regular component of honeybee oducts and thus is a suitable marker tool for proving ulteration of honey by means of immunochemical tection.

e quality of honey has long been evaluated basing on static properties that can be determined by chemical, ysical, and instrumental analyses. Nowadays, it is enerally understood that quality of honey should be fined in terms of a variety of physiological functions of individual components, mainly RJ-proteins, which are esent in honey. The finding that 1% honey stimulated oduction of TNF-alpha, while artificial honey (mixture of gars similar to those found in natural honeys) failed to cit tumour necrosis factor-alpha (TNF-alpha) release in man monocytic cell line raised a question what gredients of honey were responsible for such ysiological effect. We have found that RJ-proteins of ney stimulate mouse macrophages to release TNF-ha The pronounced stimulation of TNF-alpha release s observed by the most abundant proteins of RJ med as apalbumin-1 and apalbumin-2. It has been eviously described that these RJ-proteins possess teresting physiological activity. These results provide ect evidence that the release of TNF-alpha in nocytes that was observed with 1% honey was mulated by RJ-proteins present in honey while artificial ney failed to elicit TNF-alpha release in human nocytic cell line due to lack of these proteins. The ease of TNF-alpha and probable other cytokines by use macrophages mediated by the apalbumin-1 could plain broad therapeutic properties of honey. The milarities between the immune systems of insects and mmals showed that TNF-alpha might play a role in tokine-induced activation of genes important for mune response of honeybees and humans. In these ocesses TNF-alpha could play a pivotal role as the tor participating on regulation of important cellular ocesses such as cell proliferation and inflammation. w data on physiological properties of RJ and RJ-oteins, such as enhanced proliferation, suppression of ergic reactions, antifatigue effect, and antihypertensive tivity broaden their potential application in pharmacy d food industry. It is proposed that apalbumin-1 as the ajor protein component of honey could be used as tential marker for physiological evaluation of honey as functional food by monitoring cytokines production in a table in vitro system. The ability of apalbumin-1 to mulate production of cytokines release could by used as a tool for valuation of honey as a model for functional nutrigenomics.

Our results showed that apalbumin-1 is a fairly homogenous protein among the RJPs derived from different species of honeybees and is also always present in honey. In light of these findings it is possible to generalize our proposal for immunochemical testing of adulteration of all honeys as well as for evaluation of their physiological properties on the basis of presence of apalbumin-1 in honey.

HIPA HONEY INTERNATIONAL PACKERS ASSOCIATION

NO 329

The poster describes the setting up of HIPA to promote the quality and continuity of the honey supply worldwide. The Association supports beekeeping everywhere and will pursue its objectives by beekeeper training, lobbying governments, promoting sustainable livelihoods and promoting marketing in order to maintain beekeeping economics on a sound basis.

OPTICAL BIOSENSOR DETECTION OF TYLOSIN RESIDUES IN HONEY

No 330

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The emergence of bacterial resistance to Oxytetracycline (OTc) has resulted is a search for new antibiotics to control American Foul Brood (AFB) and European Foul Brood (EFB) in bee colonies. The bacteriostatic antibiotic tylosin is one of the compounds being investigated providing control for OTc resistant AFB. It inhibits bacterial protein synthesis by binding to the 50s ribosomal sub-unit in susceptible microorganisims. The European Union (EU) have set Maximum Residue Limits (MRLs) for tylosin in all food producing species, however no MRL for honey has been set therefore tylosin in currently prohibited for use in apiculture. Confirmatory methods such as liquid chromatography-mass spectroscopy (LC-MS), with detection limits between 0.1 – 2 _g/kg, have been developed insuring compliance to EU legislation. These can be time consuming and expensive therefore screening methods are used to filter out the majority compliant samples. Unfortunately the screening methods have been unable to detect sub 10 _g/kg levels.

A biosensor method has been developed that will detect tylosin in honey. Samples are prepared by dissolving honey in buffer then cleaning an aliquot by passing through a Solid Phase Extraction (SPE) column. The sample is concentrated under nitrogen then re-suspended in buffer before being introduced to the biosensor where tylosin residues can be detected.

Data will be presented revealing a screening method with a detection limit less than 10 _g/kg, complementing current confirmatory method detection limits.

EFFECT OF HEATING AND STORAGE ON HONEY HYDROXY METHYLFURFURAL AND DIASTASE ACTIVITY

No 331

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The composition of honey is depending on produced season, origin of nectar and climatic conditions. The most important factor affecting honey composition is plant origin. The honey contains proteins, enzymes, water, carbon hydrate, acids, dextrin, ash, vitamins, pollen and substance of aroma (Crane, 1975; Yaniv and Rudich, 1996; Silici, 2002; Fallico et al, 2004).
The purpose of this research was to assess the effect of temporary heating the quality characteristics of honey during storage. Honey samples obtain from Hatay were heated at 55oC, 60 oC, 65oC for 6, 9, 15, 20, 30 minutes. Honey samples were left to room temperature (21oC) and stored this ambient temperature for 29 weeks to be assessed. The samples of honey were analysed by TSE (Institute of Turkish Standards)' s and the standard methods of Association of Official analytical Chemists (AOAC, 1990).
The changes in the diastase activity, hydroxyl methylfurfural (HMF) content were observed. Heating treatment applied to honey did not effect on diastase number except the effect storage time. Also, HMF content of honey samples were affected significantly from storage time and heating.

Key words: Honey, diastase, HMF, heating, storage, quality.

METHOD OF ENSLAVED QUEEN

No 332

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A beekeeper's wish is the achievement of higher range in beekeeping. On his way to such an aim, he has been finding out new and interesting methods. This method is one of them.
With this method, a few days before main pasture, to a beekeeping colony on two brooding LR bodies (A and B), mating nook is re-arranged in such a way that the queen has been put on the bottom body (A) on the frames with empty honeycombs and one frame with the young brood. Above the first continuing part (A) a queening screen is put, then the second part (B) with complete brood, and finally the honey super (C). The hive's entrance on the bottom body is closed, and the hive's entrance above the queening screen is opened. So the queen became enslaved, without the possibility of swarming and escape of the old queen with the swarm. In addition to it, only nursing bees are left in the part with the queen, because the foraging bees and the drones are oriented to the hive's entrance above the queening screen.
With this method the continuing part on the bottom body has been changed every 24 days, so that the queen could have enough space for brooding eggs and releasing the newly brooded drones.
With such overtaken measures, all factors influencing the colony in order to give their maximum, have been fulfilled.

CONTROLLING THE QUALITY OF THE FINNISH HONEY: DEVELOPMENT DURING YEARS 1995-2003

No 333

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The Finnish Beekeepers' Association was concerned about the domestic honey quality and induced a first investigation in 1995. Based on these initial findings was started a program to promote the quality of Finnish honey. In this purpose the Association created criteria for the so-called swan labelled honey and started controlling quality of honey produced for the market. Most of the criteria were adopted from the quality control system of the German Beekeepers' Association: HMF content may not exceed 15mg/kg, invertase activity must be more than 35 U/kg (Siegenthaler), water content less than 19g/100g and the honey must be 100% of Finnish origin, according to pollen analysis. During years 1995-2003 1.427 samples were examined.
In the year 1995 the average HMF content of the honey samples was 20,8mg/kg and only 45,2% of the samples had less than 15 mg/kg. The HMF content decreased rapidly and in the years 1998-2003 91,3% of samples had a HMF content of less than 15mg/kg with a average varying between 4,8-9,7mg/kg.
During the examination period the activity of invertase was on average 95U/kg, with a yearly variation of the average between 70-125U/kg. Invertase activity was less than 35U/kg in only 4,1% of the honey samples.
The average moisture content varied in different years between 16,3-17,3g/100g. Only 1,6% of samples exceeded the limit of 19g/100g. Pollen analysis revealed some mixing of foreign honey with the Finnish honey at three packing plants.
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eatly expanding in the late eighties and automated eir honey extracting and processing. The present study ows that in some cases this resulted in the use of cessive heat for prolonged periods of time when oring, filtering, melting or packing honey. It was found at honey which has been heated for processing has to e cooled down rapidly to keep the HMF content low d to preserve the enzyme activity. These findings ould be considered when new honey processing uipment is developed. Some beekeepers had to place their equipment and to change their honey ocessing methods to fulfil the new quality quirements. Based on these results the beekeepers ere educated in honey processing and given personal vice to avoid heat damage in honey. This work has gnificantly enhanced the quality of Finnish honey.

FFECTIVE CONTROL OF RESIDUES IN HONEY – OSTER PRESENTATION

o 334

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e European Commission is focusing on the Quality ntrol of imported foodstuffs especially of animal origin. rough this the regulations concerning the quality ntrol of honey have strongly increased; the honey arket is concerned by an increasing number of residue oblems and the honey trade is influenced by scandals used by residues of not permitted substances in imal food e.g. in case of Chloramphenicol (CAP) - this s led to a complete ban of imports from China from 02 to 2004.
o to now there is no EC legislation to pesticide sidues limits in honey although a proposal for a gulation of the European Parliament and the Council MRL of Pesticides in Products of Plant and Animal igin (2003/0052, COD) is made.Consumers in the EU e extremely sensitive to the issue of pesticides sidues in food. Honey is regarded as natural and pure ould be as free from residues as possible. Therefore e number of analyses increased the last years nstantly. But what about the goals? For the last five-ar period data were collected according to the residues Streptomycins (by HPLC mod. ac. Kocher), tracyclines (by HPLC and LC-MS/MS) and lfonamides (by HPLC), for the last three-year period loramphenicol (by LC-MS/MS) as well as Nitrofuran-etabolites (period October 2003 to December 2004) d recently incorporated analyses of substances like losin (by HPLC or LC-MS/MS) or from the Macrolid-oup (by LC-MS/MS) or other Antibiotics (by LC-S/MS).
e results will be shown in tables and figures. The mber of samples with no residue detected increased most of the tested parameters: Streptomycine, ytetracycline, Sulfathiazole and CAP. It increased only the case of Sulfamethazine (and showed over 90% either) in 2003 but decreased in 2004. For Nitrofuran-metabolites are up to now no comparative data available. The overview on the latest five years show that the fact that control occurs forces the users of medicinal products etc. to observe the law – the maxim "Control leads to confidence" is universal furthermore.

THE DETERMINATION OF HONEY ADULTERATION BY INVERT SYRUPS BY SUGAR ANALYSIS USING HPLC AND GC METHODS

No 335

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Last years progress in range of methods for sugars analysis in honey by high performance liquid chromatography (HPLC) whether capillary gas chromatography (GC) creates new possibilities for the detection of invert syrups (beet, cane, corn) in honey. Canadian researchers did work with the respect to honey intentionally adulterated with invert syrups. They found fingerprint oligosaccharides in invert syrups, which were either not detectable or present in low concentrations in pure honey. There is no literature according sugars composition of product received by transforming of invert syrups by bees. Since this time there has been some controversy on the formation of oligosascharodes in inverts under heat and acid conditions.
The aim of the study was to attempt the determination of honey adulteration by invert syrups by sugar analysis using HPLC and GC techniques. The experimental material were samples of: commercial inverts available on Polish market, product received by transforming of these inverts by bees in the fed experiment conducted in apiary, natural honey harvested in the same experimental apiary. We also analysed the honey samples sent to laboratory by Polish beekeepers and trading firms for routine control. The quality and quantity content of sugars was carried out by GC and HPLC methods.
In comparison with natural honey commercially available inverts had several times higher content of saccharose, a little lower content of glucose and fructose, and trace amounts of other oligosaccharides. The sugars profile of these syrups after inverting by bees was the similar to that of natural honey. The some of commercial honey samples were characterized by improper F/G ratio, higher concentration of saccharose, maltose, isomaltose, erlose and low concentration of di- and trisaccharides. These irregularity of sugar quality and quantity content indicate of honey adulteration by sugars purchased from different plant sources, but the more studies are needed in particular in the area of product received from bee colony intentionally fed by commercial syrups.

ENTEROBACTERIA OF HONEY BEE POLLEN

No 336

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Sanitary-bacteriological analysis of pollen load presented in the market (R.G.Khismatullin and others 2002) detected enterobacteria up to 103CFU/g in pollen load. The results and identifications are given below. Kessler broth with lactose inoculated with pollen load in amount of 1, 10-1, 10-2, 10-3mg, MacConkey broth with lactose bile broth with brilliant green and lactose, the same broth but with glucose were transferred to the Endo agar in 24 hour. Gram-negative oxidase-negative facultatively anaerobic strains were identified as Enterobacteriaceae. The cultures were identified according to «Bergey's Manual of Determinative Bacteriology» (9th edn) using 34 tests.
Cultures of Enterobacter agglomerans heterogeneous species were differentiated within one species according to the tables of the corresponding chapter of the reference-book «The Prokariotes» (2nd edn).
Enterobacteria were identified in 28 samples from among 64 samples.
One kind of species was detected in 6 samples of pollen load; two kinds of species were detected in 6 samples; 3 kinds of species were detected in 5 samples; 4 kinds of species were detected in 4 samples; 5 kinds of species were detected in 6 samples; 6 kinds of species were detected in 1 sample.
Enterobacter amnigenus, E. intermedius, E. sakazakii, E. taylorae, Escherichia hermannii, Hafnia alvei, Klebsiella planticola, K. terrigena, Serratia marcescens, S. plymuthica and unidentified cultures were found in 1-2 samples. Escherichia coli was identified in 4 samples: in 1 sample - 1CFU/g, in 2 samples – 10CFU/g, in 1 sample - 102, non of samples contained 103 (). The representatives of Klebsiella species were found in 8 cases (1.3.2.2). Both species E. Vulneris and the group of Enterobacter cowanii with similar representatives of E. Agglomerans were identified in 6 samples (0.4.2.0 –both groups). Leclercia adecarboxylata with similar E. Agglomerans were found as often as E. Agglomerans which are similar to Pantoea kind (both groups – in 15 samples) but E. Agglomerans were identified in more quantity of samples: 1.8.6.0 _ 0.2.11.2. E. Cloacae was the most frequently found species but not the most numerous found in 18 samples: 3.8.7.0.

A SURVEY OF THE DETERMINATION OF CATALASE ACTIVITY OF HONEY

No 337

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Analysis of honey's catalase is very interesting because this enzyme is inversely correlated to honey's "peroxide"-antibacterial activity. Nevertheless, current methods for the analysis of honey's catalase are, imprecise and thereby, not reliable, as well as extremely tedious and time consuming. A precise and reliable spectrophotometric method, based on Schepartz and Subers' (1966) procedure, has been set up for the determination of catalase activity in a difficult sample matrix, such as honey. A previous dialysis of the samples is essential. Different dialysis' membranes, composition and quantities of dialysis' fluids, temperatures for the dialysis, quantities of sample and times for the dialysis were tested in order to get accurate results. The best data in the dialysis were obtained by dialysing 7.50g sample in a cellulose sack that retains proteins with M.W. 12,000, using 2 x 3 litres of 0.015M sodium phosphate buffer at pH 7.0 as dialysis's fluid at 4oC throughout 22 hours. Final determination of honey's catalase was performed spectrophotometrically at 400nm. Different solvents for o-dinisidine, different H2O2 and HCl concentrations and different volumes for catalase measurement were also studied. The best results were obtained by dissolving the o-dianisidine with 0.2M sodium phosphate buffer at pH 6.1. The optimum H2O2 and HCl concentrations were 3mM and 6N, respectively. The best volume for the assay was 7.0ml The analyses were developed in triplicate. Precision (RSD %) of the method ranged between 0.48% in samples with high catalase activity and 1.98% in samples with low catalase activity.
Note: The details of the method have been published in the Journal AOAC International

STUDY ON SUGARS COMPOSITION OF FRESH AND STABILIZED HONEY DURING STORAGE

No 338

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Enzymes, especially invertase and maltase, change quantitative and qualitative sugars profile of honey during

e storage. The study was conducted on saccharides ontent in some samples of honey in 3 variations as llows: a) after saccharides stabilization by thermal ethod; b) without stabilization, storage at about 20°C; without stabilization, storage at about 4°C. All samples ere examined after 3, 6, 12 and 24 weeks of storage. ontent of saccharides was analysed using HPLC ethod. Stabilization was done according to Polish andard of honey.
omposition and sugars content in the honey samples d not change after thermal stabilization. The sugars ontent was still the same during the period of vestigation (24 weeks). In non-stabilized honey samples ere registered statistically significant differences in ugars content, especially in sucrose contents. In honey ored during 24 weeks in a refrigerator sucrose content ecreased on average by 14% in comparison with its tial value; in 20°C, decreased even by 79%.
btained results suggest some complements to method saccharides analyses of honey, which are as follows: oney samples to investigations of sugars profile should e transported and kept in low temperature;
eference material for HPLC method of sugars content ould be prepared from stabilized honey.

XTRACTION OF HONEY COMBS - CLEARING BEES ROM SUPERS

o 339

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e clearing bees from supers was investigated by four ethods at the extraction of honey combs: classic aking off and sweeping of individual combs, use of ee escapes, use of repellents and use of blowers. The ork time for comb extraction with 100kg honey was corded, further advantages and drawbacks of individual tractions studied, at the repellents a pilot study was ne on the impact on the life length of bees after the pellent application. The study included also repellent sidues content in honey. The comb extraction nnected with bee escapes, repellents and bee blower as by about 70% less time consuming in comparison th bee clearing by hand sweeping. But the repellent duced significantly the life length of bees and its sidues were found in honey. For the honey comb traction from supers by means of blower a net cover as produced and tested at the practical use in the field. e net cover gives back the blown off bees to the top rt of the open hive. The blower was equipped with the gulation - the accelerator at the blowing spout. This evice reduces significantly the time when the engine of e blower runs on full turns at high noisiness.

THE INFLUENCE OF TEMPERATURE ON THE TIME OF DEGRANULATION AND ON THE CERTAIN PARAMETERS OF HONEY QUALITY

No 340

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In this research the influence of different temperatures on the time of degranulation of the meadow, linden and sunflower honey was studied. In the course of the research the change of values of the following parameters was followed during a longer time period:
- hydroximethylfurfural (HMF),
- diastasis,
- water percentage.

The research was conducted in a plant of a large purchase honey station in an industrial chamber of useful volume 15 t, where degranulation of the received granulated honey is conducted. The vessels containing granulated honey were made of prochrome, of different values. The temperature was measured in the chamber itself, on the surface and in the honey honey.
Based on the obtained values of the controlled parameters prior to and after degranulation, we can conclude that:
- HMF value is greater after degranulation, as well as at higher temperatures,
- diastasis value decreases with the time of degranulation and at higher temperatures,
- water percentage mostly depended on whether the vessels in the chamber during degranulation were open or not.

Special significance of this work reflects in the fact that the research was conducted in production conditions, with a large number of samples and during a longer period of time.

RESIDUE OF ANTIBIOTICS AND SULPHONAMIDES IN HONEY

No 341

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In our country and in the world, both legally and illegally, the apiculturists have used various kinds of antibiotics and sulphonamides without professional control in the course of breeding honey and for the preventive or curative purposes. With the aim of examining the presence of the residue of antibiotics and sulphonamides, 100 honey samples were taken directly from the markets and large market centers. On that

occasion with modified microbiological method EEZ (FOUR PLATE) the presence of the tested residues, whose infibition zone was from 0.5 to 4 mm, was established in 18-18% of honey samples. The presence of antibiotics and sulphonamides in honey was proven in the samples taken from markets and the samples taken from large market centers.
The presence of antibiotics and sulphonamides was greater in a larger number of samples of honey bought in the markets (13 samples – 7.8%) and in a smaller number of samples of honey bought in large market center (5 samples – 2%).

ENZYME AND ACIDS IN NOURISHEMENT OF HONEY BEES IN BOSNIA AND HERZEGOVINA

No 342

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Organic acids and microbiologically clean enzyme cultures are used for the split of the complex carbohydrates. Apple acid, citron acid, vinegar acid and other acids are used for the production of non-organic (artificial) fodder li the bee-farming practice in B&H, while the usage of enzymes in this chemical process is very minimal. In our experiment we used oxalic and milk acid, alongside with the set hypothesis about possible impact of those acids on Varrou destructor through bee-food. The purpose of this paper is to exam several types of artificial (non-organic) bee-fodder products and the impact they have on the life expentancy of the bees and honey production in bee communities. To feed the bees, we used sugar sirup, acid and enzym inverted sirup (as experimental groups), while the nourishement done with honey, was a controlling group. Impact of the artifical fodder on the honey bee was followed in three seasons. Experiment itself was conducted in controlled (labaratory) conditiions, using mini cages (capacity of 200 bees) outdoor (production) facilities .
Sugar syrup and enzyme-inverted syrup can be used to nourishe bees. Bees nourished with enzyme-inverted syrup lived longest compared to the bees nourished with artificial fodder (87,23% compared to bees nourished with honey). Acid-inverted syrup significantly shortens life expectancy, especially during winter, and thereby impacts productivity of the bee communities (37,18% compared to bees nourished with honey). Bee fodder, which is subjected to the process of inversion of sugars in it, was stimulating bee communities in the direction of collection of nectar. (increase of honey production from +312% t_ +390%).

Key words: enzyme, acid, honey, syrup and nourishement.

ARTEPILLIN C CONTENT OF BRAZILIAN PROPOLIS

No 343

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Artepillin C is a phenolic acid isolated as the main compound (>5%) of the Brazilian propolis. This phenolic acid has biological properties such as antitumoral, antibacterial and antioxidant activity showing that Artepillin C can be one of the most important active compounds from Brazilian propolis. It is used as a chemical marker for the quality control and exportation. Brazilian propolis contains Artepillin C mainly because the bees visit the Baccharis dracunculifolia plants which contain a large amount of this phenolic acid. The purpose of this work is to evaluate the content of Artepillin C from propolis Brazilian samples. For this, 22 samples were collected in the year of 2004 in four different geographic regions of Brazil. In order to quantify Artepillin C, the RP-HPLC method, based on the procedure described by HAYASHI et al (1999)*. The extraction step was modified using methanol instead of ethanol and for quantification an ODS column and UV detector at 280nm were used. Artepillin C content varied from 0 to 11% depending on the geographical origin. The southeast region of Brazil presented the highest level of Artepillin C (5.0 – 11.0%) while the northeast region did not show any Artepillin-C.

*HAYASHI, K.et al. **Chem. Pharm. Bull.**, v.47, n.11, p.1521-1524, 1999.

EVALUATION OF SIMPLE AND DOUBLE GRAFTING TECHNIQUES FOR QUEEN PRODUCTION OF AFRICANIZED HONEYBEE APIS MELLIFERA THROUGH MORPHOMETRIC MEASURES

No 344

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The honey production can only be evaluated in periods of blooming, therefore, experiments have been accomplished to identify characteristics that are associated with the production and easy of be measured (Souza et al., 2002). The herdability of morphologic characteristics is high (Collins et al., 1984). The superiority among queens is a selection potential and it can be measured through the quality of the same ones in

lation to the weight and size of the body (Tarpy et al., 000). This research was carried out to evaluate the fficiency of simple and double grafting for Africanized oneybee queens production using morphometric easures. The work was performed in Apiculture Sector Universidade Estadual de Maringá, northwest area of araná state, Brazil, from April 2004 to January 2005. ne larvae for the grafting were removed from an apiary mposed of 22 colonies with queens that came from ght apiaries distributed in Parana and São Paulo states. ne Doolittle's method was used for the queen oduction and the system of mini-nucs as beginner olonies (Santos and Message, 1984). The Camargo and onçalves' method (1970) was used for double grafting. the 10th day the queen cells were removed from mini-ucs and placed in an incubator with 34°C, identified operly, in which they emerged between the 11th and 2th days, after the simple or double grafting. Each ueen was anesthetized with CO2, weighed, measured ith digital paquimeter) as for the length and width of e wing and abdomen. The comparison of averages was ade through the Kruskal-Wallis analysis and the earman correlation using the SAS software. We otained 584 queens from 730 grafting, so 368 from mple and 216 from double grafting, showing 80% of fficiency in queen production. The queens presented ger weight (193.074 ± 1.073mg), wider wing (0.384 ± 016cm) and longer abdomen (1.040 ± 0.007cm) from ouble grafting in relation to the simple grafting (weight – 39.288 ± 5.123mg; width of the wing – 0.382 ± 005cm and length of the abdomen – 1.005 ± 0.005cm). ne correlations of the characteristic weight of the queen ith length and width of the wing and length of the domen were 0.25 (P=0.0001); 0.14 (P=0.0007) and 59 (P=0.0001), respectively. The technique of the ouble transfer presented better results, mainly, in lation to the characteristic weight that is correlated th the length of the abdomen.

RODUCTION OF ROYAL JELLY IN QUEENRIGHT OLONIES

lo 345

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e developed a method of production royal jelly in eenright colony without restriction of the queen. The eens were young (less than 1 year old) and at the first nd only the first) grafting a queenless colony was used keep the grafted queen cells for one day and increase e acceptance.
e compared this method with others that produced yal jelly a) without the queen (queenless colonies) and have the queen restricted in triple – horizontal olonies.
e production of royal jelly from three (3) queenright colonies was 0,11 gr / cell and the acceptance 54,8% after 31 graftings. From three (3) queenless colonies the production was 0,19 gr / cell and the acceptance 87,2% after 31 graftings. The two (2) triple – horizontal colonies produced royal jelly 0,13 gr / cell after 30 graftings. The acceptance at this experimental group was 66,5%. The production of royal jelly can occur despite the presence of the queen, when grafted artificial queen cells are used. Although the acceptance and the production is not as high as in queenless and triple – horizontal colonies, this method has some advantages and allow the beekeepers (especially the amateurs) to produce royal jelly by using small number of hives.

MICROBIOLOGICAL CHARACTERIZATION OF ORGANIC AND NON-ORGANIC HONEY OF AFRICANIZED HONEYBEES PRODUCED IN DIFFERENT REGIONS OF BRAZIL

No 346

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The organic honey market is in the middle of expansion and products with that certification receive better remuneration, contributing decisively to the improvement of the beekeepers' income that produce the organic honey. The analysis were accomplished with the objective to evaluate the quality of the honey of the organic and conventional production systems, contributing to its physico-chemical characterization produced in Brazil. It was analyzed and compared 22 samples of honey being 11 organic and 11 non-organic collected at the islands of the area of the triple border between Sao Paulo, Parana and Mato Grosso do Sul states and in different areas of the country respectively, from December 2004 to January 2005. The samples were identified for an abbreviation of each State followed by a number and, studied for the following parameters: water content (%), hydroxymethylfurfural - HMF (mg.kg-1), diastase activity, colour, total sugars (%), reducing sugars (%), sucrose (%), ashes (%), viscosity (mPa.s), electrical conductivity (mS), pH, acidity (meq.kg-1) and formol index (mL.kg-1). The analysis were accomplished according to the methods adopted by Instituto Adolfo Lutz, National Laboratory of Animal Reference and Association of Official Analytical Chemists. The averages of the variables were appraised through the F test and the value level - 5%. We verified in the organic honeys, larger water contents, HMF and diastase index and smaller pH values, protein content, ashes, viscosity, electrical conductivity than non-organic honey. In organic honey, all the analyzed samples presented water content values among 23.5 to 24.4%, according to the Brazilian legislation, the maximum water content of the honey

should be 20%, the definition of water content patterns for this honey should be reviewed because its higroscopicity of the honey depends on the sample composition, mainly in relation to the climatic conditions and the floral origin. In studied area, the summer is hot and rainy with higher saturation of the air and great nectar flow, which can constitute difficulty to the honeybees for removal of the water of the nectar. Two samples of non-organic honey presented apparent sucrose and HMF above the allowed maximum (6% and 60 mg.kg-1, respectively), associated probably to the processing fail. The pH varied among 3.90 to 4.59, for the non-organic honeys, and 3.84 to 3.91 for the organic ones, which is due the particularities of the floral composition in the areas of collections, once the pH of the honey can be influenced by the pH of the nectar, differences in soil composition, or the association of vegetable species for final composition of the honey, that would influence in the physico-chemical composition. The physico-chemical analysis contribute with the fiscalization of produced honey, and it is very important to evaluate and to guarantee the quality of this product in the market.

Key words: physico-chemical analysis, organic honey, Apis mellifera, Africanized honeybee, non-organic honey

MICROBIOLOGICAL CHARACTERIZATION OF ORGANIC AND NON-ORGANIC HONEY OF AFRICANIZED HONEYBEES PRODUCED IN DIFFERENT REGIONS OF BRAZIL

No 347

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The food contamination is a risk for the supplier as for the distributor, and to the costumer's health. In recent years, it increased the interest in natural and healthy products. It was analyzed and compared 22 samples of honey being 11 organic and 11 non-organic collected at the islands of the area of the triple border between Sao Paulo, Parana and Mato Grosso do Sul states and in different areas of the country respectively, from December 2004 to January 2005. The samples were identified for an abbreviation of each State followed by a number and studied for the coliforms presence to 35ºC, coliforms to 45ºC and enumeration of mould and yeasts. Starting from 25 grams of honey, took place the first dilution in 225ml of peptone water buffered 0.1%. The preparations of the subsequent decimal dilutions were accomplished in tubes containing 9 mL of the same diluent up to 1/1000. For each dilution, it was made three replications for the test of the most probable number of coliform (MPNC) in lauril sulphate triptose broth (LST) and three replications for inoculation in Petri dish in depth of 1 mL twice of each decimal dilution, using the potato dextrose agar (PDA) acidified with tartaric acid 10% up to pH 3.5. The incubation gave in bacteriological greenhouse to 35ºC during 48 hours and 25ºC during five days for the tests of MPNC and counting of mould and yeasts, respectively. The averages of the variables were appraised through the Tukey's test with 5% of probability. In all analyzed samples the coliforms enumeration to 35ºC and coliforms to 45ºC presented results <3.0 MPNC/g. For mould and yeasts enumeration, it was obtained maximum value of 1.3 x 103 and minimum 1.9 x 102 colonies former unity - CFU/g for organic honey and maximum of 2.7 x 102 and minimum 1.6 x 101 CFU/g for non-organic honey. Analyzing the results, in what concerns the significant increment of the mould and yeasts content observed in the samples of organic honey in relation to the non-organic, it can be inferred that this contamination is possibly related with the primary sources of contamination, especially with your botanical origin and, consequently, geographical and environmental (islands) The collections take place in the rainy months, presenting higher humidity in function of the saturation of the air and great nectar flow that it happens soon after the rains hindering the water removal of the nectar by the worker honeybees. The microbiological analysis is constituted an efficient tool for the characterization and comparison of the quality of organic natural and conventional products. Through the microbiological parameters appraised, the non-organic honey presented better quality in relation to the organic honey.

Key words: microbiological analysis, organic honey, non-organic honey, Africanized honeybees.

FILTH TEST AS A TOOL TO ASSESS AND IMPROVE HONEY PROCESSING PROCEDURES

No 348

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Filth test has been demonstrated to be an indirect tool to investigate and monitor the compliance of the procedures applied in food processing with the current standard requirements. In fact, the application of the HACCP system to food processing requires to monitor the operations recognised as CCPs. In honey processing, purification step, other than filling, is indicated as CCP. Filth test can then be applied to verify the effectiveness of purification and to indirectly collect information on the hygienic conditions applied during honey production and

ocessing. A total of 74 honey samples of different otanical origin were collected from hobby and ofessional beekeepers of Verona Province (24 samples, eneto Region, northeastern Italy) and Siena Province 0 samples, Tuscany Region, central Italy). Briefly, 300 g each honey sample were solubilised in 500 ml of hot stilled water and vacuum-filtered through black-band aper filter. The filter was examined under ereomicroscope (16x) for extraneous materials. 73 8.6%) of 74 honey samples were characterised by the esence of burnt particles derived from the smoker ed to remove honeybees from the hive during hive spection and supers removal. In 70 (94.6%) samples gments of vegetal origin were present, as a nsequence of poor care during supers removal eration in the apiary. 4 (6.7%) samples contained traneous component of animal origin (hair, insect gments). The results obtained confirmed the fectiveness of filth test to reveal the presence of traneous material in honey, even when not cognisable at naked eye. Beekeepers need to improve eir honeybees removal technique in order to prevent ney contamination due to burnt particles. A less tense use of smoker and more appropriate burning aterial is likely to solve the problem. Furthermore, uch care must be taken of supers removal so that no getal materials could contaminate honey. The limited esence of extraneous material of animal origin is dicative of adequate hygienic conditions in honey room. espite the positive judgement on the hygienic nditions of honey processing, a monitoring programme recommended.

EW KINDS OF COMB HONEY

o 349

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oduction of comb honey in the traditional round or tangular section frames needs special management of lonies. Usual section weight is near one pound of ney, but customer needs smaller dimensions up to e-time portion.
t bees refuse to work in the smaller sections and mber of problems increases together with decreasing section dimensions. On our opinion the main reason this phenomenon is the increasing of the quantity of egular attaching cells. We proposed to use the term ttaching cells" for the cells, which connect the comb th any surface and these cells obligatory have one ne, formed by the material of surface (usually wood or stic in modern frames). Construction of such cells is y complex task for bees and they avoid building mbs with large number of irregular cells.
appropriate mutual disposition of wax foundation and s of section frames bees build attaching cells up to gular pentagonal bee cells, which can be used for bee vae rearing and bee-bread storage.

We proposed designs of several section frames with decreased number of irregular attaching cells and this permits to decrease the section dimensions.
The best way of simplification of comb honey production is to refuse from traditional frame design at all. We propose new "frames" with three planes only. Comb in such "frame" has one open edge and it is possible to bite off small peaces of combs
The simplest variant of comb honey is the comb, attached to the upper bar alone and we propose new name "bar comb honey" for such kind of comb honey (Patent of Ukraine, 2002). It is possible to produce the bar comb honey of different dimensions from 1 pound to one-time portion or even to testing portion (comb on stick). It is easy to insert such honey into standard glass jar and this is the real way to pack comb honey for supermarkets. These new kinds of comb honey will open the way of comb honey to the festive tables, supermarkets and even cafes and restaurants in the form of testing portions

FAST SPE EXTRACTION AND LC/ESI/MS/MS ANALYSIS OF FLAVONOIDS AND PHENOLIC ACIDS IN HONEY.

No 350

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As generally recognized, flavonoids and phenolic acids are the most important components of honey if related to its antioxidant power.
A simple SPE extraction procedure was developed to acquire fractions for the determination in honey of antioxidants components, like phenolics, flavonoids and organic acids. An acified honey solution was passed trough a 500mg C18 and/or SDB polymeric SPE column to obtain a clear fraction containing phenolic acids and flavonoids. Then the filtrate is neutralised and passed on a SAX SPE column to obtain the fraction containing organic acids.
The procedure was validated analysing the extracts with HPLC-DAD methods to determine repeteability r and recovery %.
Coupled reversed phase HPLC-Mass Spectrometry Detection with an ESI (Electro Spray Ionisation) interface in the negative ion mode was then used for analysing the fraction containing phenolics and flavonoids.
Detection and Quantification limits resulted very low. The LC/ESI/MS/MS with full SCAN, DAUGHTER SCAN and MRM methods, permitted so far to identify and quantify, by mean of their specific m/z and fragmentation patterns, eight tipical flavonoids and seven tipical phenolic acids in some species of unifloral Italian honeys (Robinia, Castanea, Eucalyptus, Helianthus, Erica arborea).

TRACE ELEMENTS IN HONEY FROM SIENA COUNTY (SOUTHERN TUSCANY, ITALY)

No 351

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The pattern of trace elements in honey, the product of honeybee workers (Apis mellifera), can be used to characterize this food via specific markers in order to determine the environmental quality of a territory. Siena county, southern Tuscany, is a relatively clean area, since there are few industrial emissions, the cities are small, and the vehicular traffic is low with respect to European standards. These features are associated with good geochemical knowledge of the region, as high-resolution geochemical maps for a number of trace elements are available. In total, 48 honey samples were collected from hobby and professional beekeepers. About 1g of sample was added to 4ml HNO3 and 1ml H2O2 (Baker ultrapure reagents) and the mixture was digested in a Milestone Ethos 900 microwave lab-station. The analytical quality was checked using the certified reference material 8413 Corn (Zea mais) Kernel. ICP-AES and ICP-MS were used to analyse 23 elemental species (Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Sr, Th, Tl, U, Zn). The results revealed significant concentration differences among the honey samples. These differences were also evident within honey samples of the same botanical origin. For instance, in multi-flower honey (representing the bulk of our sampling), the values for Na (59-163mg/kg), Ca (136-344mg/kg), Sr (0.85-2.01mg/kg) and U (4.53-14.82mg/kg) fell within a rather narrow range, while the values for other elements, such as K (160-3050mg/kg), Mn (0.13-16.88mg/kg), Co (1.56-56.59mg/kg), Cu (0.17-5.89mg/kg), Se (2.34-17.34mg/kg) and many others, exhibited much greater variability. The overall contents, particularly of toxic heavy elements (As, Cd and Pb), were very low and consistent with most literature data. The observed concentrations and peak values are discussed in terms of the regional geochemistry and the environmental behaviour of the chemical species considered.

FLUORESCENT SPECTRA OF DEFINED MIXTURES OF HONEY

No 352

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The work concerns new way of fluorescence application to honeys research [Surface Spectrofluorimetry Shapes Analysis (SSSA)]. The results of hitherto existig investigations of identification of floral types of honey, were confirmed by the well-established melytopalynology method. The paper presents next step - results of digital analyses of such fluorescent spectra of blended honeys. Samples of several types of honeys were the subject of investigations. For all this honey samples, according to procedure SSSA, fluorescence spectra were measured and digital analyses regarding their floral origin were executed. The samples of best monofloral honeys were selected. Some various, two-component mixtures of exactly definite contents of earlier chosen and examined monofloral honeys, were executed. For all this honey mixtures fluorescence spectra were measured and special digital analyses regarding two components contents were executed. However obtained results are difficult to interpret so far Howewer it seems possible, that further investigations in this direction will enable important conclusion about mechanism of formation and structure of fluorescence layer of honey surface. It seems quite possible also identification of blended honeys components content.

STUDY OF HEAVY METALS ANALYSIS IN HONEY BY NANO-BAND EXPLORER METHOD

No 354

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Introduction: Honey is contained much sugar, so we have to resolve it before analyze heavy metals. Nano-Band explorer (NBE) method can measure poisonous heavy metals (Pb, Cu, Cd, Hg and As) in honey without preliminaries.
Method: Weigh 5g honey, dilute with HCl solution or acetic acid buffer to 50ml.
If it's needed pretreatment, though sample solution to 0.2_ MF. Calibrate each heavy metals measurement with method of standard additions. When we need total inorganic As analysis, reduce with HCl and thiosulfate before measurement.
Results: We've gotten good results of measurement as heavy metals. The NBE method has high sensitivity, in addition, we could abridge analysis time compare to Atomic absorption spectrometry method.
Discussion: Therefore, the NBE method can analyze plural poisonous heavy metals at once, it is useful for screening and measurement of heavy metals in honey

NITROFURAN METABOLITE IN THE APIARY: STUDY OF THE DYNAMICS AND PERMANENCE IN HONEY

No 355

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ntroduction: Nitrofurans are antimicrobial drugs which 're banned in Argentine, as well as in many other ountries of the world. The resolution SENASA N° 248 – 995 prohibites its use in our country. This resolution stablishes zero tolerance for the nitrofurans metabolites any biological matrix. In this work, we have analized e dynamics and nitrofuran metabolite permanence OZ, 3-amino-2-oxazolidinone) from one honey harvest another.

lethods: We have studied fourteen apiaries with ntamination AOZ in cage-nursery honey (Enzyme mmunoassay for the quantitative analysis of AOZ, dascreen Nitrofuran, R-Biopharm AG Laboratory, ermany). We have established several norms of low st for the producer (as stop the drug administration, place the contaminated honey in the cage-nursery, do t translate honey shallow frame inside the apiary, avoid oney contact with the wax, prevent high temperatures, c) with the purpose of eliminate the residue AOZ in the ture honey harvest. After the application of these rms, AOZ metabolite was determinated in honey from per frame in the following honey harvest. Both results ere compared to evaluate the AOZ dynamics in the iary.

esults: The fourteen apiaries analysed have presented OZ levels between 0.36 and 11.32 mg/kg in cage-rsery honey. The 78.6 % of these apiaries have not esented the AOZ residue in honey from super frame ter the application of the preventive norms suggested. the same moment, in the 21.4%, this residue was tected with levels between 0.58 and 2.14mg/kg.

iscussion: The norms suggested to the producer were ghly effective for the elimination of the AOZ residue in iaries contaminated from one honey harvest to other. It was possible to establish that the apiaries th cage-nursery honey levels below 1.3mg/kg have not esented AOZ residue in honey from super frame, while e ones with levels above this value, have presented a riable behavior. Finally, to obtain a total elimination of s residue, it is recommendable to take others extra easures which required bigger economical inversions.

TUDY OF STREPTOMYSIN ANALYSIS IN HONEY BY IA METHOD

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troduction: PIA is one of the latest analytical method antibiotics in foods. Characteristic of PIA method are nvenient operating activity and quick measurement. hough PIA method has already been used for tibiotics analysis in the milk and meat industries, it 't used in the honey industry. In this time, we searched analysis of Streptomycin (SM) in honey by A method.

Method:
1) Equipment
BiacoreQ(Biacore Corp. Sweden) and SM Kit were used for analysis in this study, and that conditioning was follow as according to instruction of Kit.
2) Experiment
2g of honey or experimental substance were diluted with 2ml of buffer solution, and injected into equipment. Adjust for influence of sugar content (concentration of sugars are 0 to 80%) were fructose, glucose and sucrose. Gluconic acid and plorine were used for adjustment of pH and amino acid.
Result: In this result, there was a much influence of sugar content for measurement but there isn't much influence with pH and amino acid.
Discussion: It was recognized that PIA method is useful for SM analysis in honey.
In this study, sugar content gives much influence with this analysis but sugar content of honey isn't varied so it's not big problem.

MONITORING PROGRAMME FOR HONEYBEE COLONIES LOSSES IN SELECTED AREAS OF NORTHERN ITALY

No 357

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Further to honeybee colonies losses occurred during the last years in some areas of Veneto and Emilia Romagna Regions, a monitoring programme was set up by National Reference Laboratory for Beekeeping - Istituto Zooprofilattico delle Venezie (Padova), C.R.A.-Istituto Nazionale di Apicoltura and DiSTA University of Bologna. The programme was supported by Bayer Cropscience S.r.l., Milano.
On the basis of previous preliminary field studies, the honeybee losses were usually concentrated when the principal agricultural event was the maize seeding. So, the monitoring areas were selected according to common parameters in the both Regions. The areas under investigations were characterised as follows: 1) no maize; 2) only maize; 3) combination of maize with other cultivations. A total of 144 beehives were recruited equally distributed in Veneto (72) and Emilia Romagna (72) Regions. Each of the three areas was covered by 24 hives divided in 3 stations (8 hives). The typical monitoring station was used: beehives characterised by similar strength and equipped with "underbasket cage" to collect dead bees. The weekly monitoring programme started in Winter 2004 and will continue until May 2005. During this period beehives are monitored for strength, development, bee mortality and diseases. Dead honeybees and samples of honey and pollen will be

collected, properly stored and analysed later on. Laboratory investigations were centred on agricultural pesticides routinely used in the areas, according to the information provided by the Regional Phytosanitary Service. Honeybees will also investigated for diseases in order to exclude them as possible cause of honeybee losses. In case of bee losses, pollen collected by traps could be used to trace foraged plants. The proposed programme aims to contribute to the current knowledge on the causes of honeybee colonies losses.

ECONOMIC IMPORTANCE OF APOID POLLINATORS (APOIDEA) AND BEEKEEPING DEPICTED IN POLISH PHILATELIC AND PHILUMENISTIC ISSUES

No 358

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The aim of this study was review of Polish postage stamps, postcards, occasional stempels and philumenistic labels showing bees and apiculture. Presentation was based on author's own collection and national catalogues enumerating some tens of these items issued on the occasion of apicultural meetings, philatelic exhibitions and other events, e.g. XXXIst APIMONDIA International Apicultural Congress, Warsaw, Poland, 1987, national Polish Beekeeper's Days etc. The oldest Polish stamps (2-stamp set, 1956) on this topic were printed on the occasion of the 50th Dr. Jan Dzierzon's Death Anniversary show honey-bee (Apis mellifera L.) visiting clover blossom and a portrait of the world-famous Polish apiarist (1811-1906). Analyses of collected material show that majority of issues in question were devoted to conservation of honey, solitary and bumblebees (Apis mellifera (L.), Bombus terrestris L., Bombus lucorum (L.)). These hymenopterans are presented as beneficial insects of great economic and ecological importance, mainly as effective pollinators of orchards, various agricultural and horticultural cultivars, herbs, weeds and other wild and cultivated plants (e.g. Centurea cyanus L., Matricaria chamomilla L., Papaver rhoeas L., Trifolium pratense L.). Honey-bee and other bee species depicted in the national match-box labels are usually supplemented with very communicative captions and slogans, which run as follows: "Bees grow crops", "Bees in orchard – more fruit", "Bees in orchard – grown fruits", "More bees – more fruit", "Bees grow harvest", "Bees are friends of farmers", "Bees are yours allies", "Bee – useful insect" , "Hymenopteran insects" (concerning bumble- and solitary-bees), "Let's safe bees!", "Protect bees against extermination". These inscriptions are clear, comprehensible and needn't comments. Presentation of bees and apiculture in philatelic/philumenistic values is worthy of recommendation method of popularization of bees, apiculture and idea of nature conservation. It seems to be very helpful in ecological education of society.

PLANT COMPETITION IN POLLINATION OF CANTALOUPE (CUCUMIS MELO, L) WITH HONEYBEES (APIS MELLIFERA L) IN NORTHERN MEXICO

No 359

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The purpose of the research was to determine trough the pollen identification the plants visited by bees during induced cantaloupe pollination, and how many plants can bee competitors for the crop in bloom. This work was carried out in the Comarca Lagunera, which is located in the states of Coahuila and Durango in northern part of Mexico, during the spring and summer. In these seasons, anthers of wild, cultivated and ornamental plant species were collected in order to isolate and identify the pollen, using the acetolisis technique. Plants were photographed, collected and desiccated to be preserved in the herbarium. The pollen was processed and then observed in a microscope Olympus model BH-2, connected to a TV screen and was measured with objective micrometer and 100X immersion oil. The pollen was photographed at 40X and 100X with a reflex Minolta SRT 101 camera, Rokkor lens PF 58 mm in a tripod. Color slide film ASA 100, f/9 obturation and a _ second speed. Were obtained at least 2 images at different angle and scanned in a 3500C HP scanner. During the first blooming month, a six ha commercial cantaloupe crop, were pollinated with 18 bee colonies, half of those had a bottom pollen trap. The pollen were collected twice a week, weighed and frozen. An aliquot of the corbicular pollen was processed and mounted to identify the pollen and counted in the light microscope by fields at 40X. The results showed (number of pollen grain basis): cantaloupe pollen 8.7 %, 9.8%, 17.6 %, 9.3 %, 28.1% and 83.5% respectively. Pollen size was calculate with the formula for volume V =a2b where a is the major axe and b the minor axe, then the percentage of pollen for cantaloupe was: 51.6%, 85.0%, 66.6 %, 84.4%, 68.9% and 95.0%. The cantaloupe, then, is the major pollen source and the main plants present in the sample like mesquite (Prosopis juliflora), alfalfa (Medicago sativa), creosote bush (Larrea divaricata), cucumber (Cucumis sativus), London rocket (Sysimbrium irio) and sorghum (Sorghum vulgare) are a supplementary sources. The number of different plant species including cantaloupe in the samples dates were: 7, 11,13,17, 21 and 15 respectively.

'ALLINOMORPHOLOGY OF SOME MELLIFEROUS .AMICEAE

\lo 360

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Morphological characteristics of polen of Stachys annua ... Prunella vulgaris L. and Lamium purpureum L. were nalyzed in order to contribute to the nelissopalynological investigations and pollen dentification of melliferous plants. These weedy species, elonging to familly Lamiaceae, are characterised with ong-lasting flowering period, and are very abundant in uderal habitats, stubble-fields, crops, and tillages and nus represents constant resource of food (nectar and ollen) for honeybee.
Morphological observations included determination of ollen shape and size by measuring the polar axis (P), quatorial diameter (E), colpus length (CL), and exine hickness (ET). Exine structure and ornamentation were lso analyzed.
ollen from fully matured anthers was acetolysed and nounted in glycerin jelly for light microscopy. For canning electron microscopy (SEM) examination, repared pollen grain specimens were coated with gold. ollen is isopolar, radially symmetric, and either icolporate or hexacolpate. Exine is semitectate and eticulate. The tickest exine was found in Prunella ulgaris (1.2-2.4_m). The pollen grains are monad and nostly medium or small size. Polar axis ranges from 3.32 to 38.02_m and equatorial diameter ranges from 1.24 to 39.29_m. Among the species investigated, the rgest pollen grains on average were observed in runella vulgaris. The polar outlines are more or less rcular, oblate to prolate (P/E= 0.80-1.36). The shapes of ollen in equatorial view are variable among the species. hey are prolate-spheroidal (Stachys), subspheroidal Prunella) and subprolate (Lamium).
hese insect pollinated species, well-known as a good ectariferous-polliniferous plants, have low pollen roduction and poor dispersal, but the plants are so idespread that it could consider them to be a good elliferous plants.

ey words: pollen, morphology, Lamiaceae

NATOMICAL CHARACTERISTICS OF FLORAL ECTARY OF *MARRUBIUM VULGARE* L. .AMIACEAE)

lo 361

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oral nectaries of White Horehound (Marrubium vulgare) ants, grown outdoors in the experimental field, were studied during different flowering stages. This study utilized light and fluorescence microscopy to analyze location and anatomical structure of the gland, and the possible way of nectar exudation from nectary.
The floral nectary is located on the outer surface along the ovary base forming a four-lobed disc. In mature nectaries, according to the anatomical observations, three major zones were identified: the one-cell-layered epidermis, the sub-epidermal secretory tissue and the vascular tissue. The nectary epidermis is covered with a very thin cuticle, and it contains many modified stomata involved in the exudation process. The stomata are situated in the upper portions of the nectary. They lay at the same level of the epidermis. The secretory tissue is composed of small cells with thin walls, relatively large nuclei, dense granular cytoplasm, and small vacuoles. The floral nectary was vascularized exclusively by phloem originating from vascular bundles destined for the gynoecium.

Key words: Ocimum basilicum, nectary structure, modified stomata

SELECTION FOR HONEYBEES WITH HIGH PREFERENCE FOR AVOCADO FLOWERS

No 362

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Intensive activity of honeybees is essential for high fruit set in avocado orchards, but even when hives are located inside the orchard, many bees still search for alternative blooms. We tested for a possible genetic component for a preference of avocado bloom relative to competing bloom. Hives were placed in two avocado orchards in Israel. The honey from each hive was extracted at the end of the avocado bloom, and the concentration of perseitol, a carbohydrate that is unique to avocado, was analyzed. Colonies with the highest and lowest perseitol concentrations were selected to parent the 'high' and 'low' lines, respectively. Queens were raised from the selected hives and were instrumentally inseminated with sperm of drones from similar hives. The hives with the inseminated queens were introduced to the same avocado orchards the next year, together with the surviving selected hives.
Hives of high-line inseminated queens had greater perseitol concentration than those of the low line, and the selected hives that survived from the previous year again had outstanding, high or low concentrations, respectively. Queens with outstanding performance were selected as parents for a second generation of inseminated queens and are presently tested in the field. So far, the results reveal a genetic component for foraging on avocado flowers, which can be selected for.

POLLINATION OF GREENHOUSE CROPS WITH *BOMBUS TERRESTRIS* L. IN TURKEY: NEW PROBLEMS AND PROSPECTS

No 363

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Bombus terrestris has been used as pollinator of tomato, pepper and eggplant in Turkey since 1997. Turkey has over 22,000ha of greenhouse area and 51% of that area is used for the production of tomato. The number of colony used is being increased rapidly year by year. In 2004, approximately forty thousand of Bombus terrestris colonies are used for pollination in 2000ha greenhouse area. Bombus terrestris are widely used in the Mediterranean coastal region, where the greenhouse sector has been developed. It is estimated that 100,000 of Bombus terrestris colonies will use in 5,000ha greenhouse area in 2010. The commercial rearing of Bombus terrestris has not yet been fully developed in Turkey. Some experiments related with pollination efficiency, rearing techniques, life cycle in nature and genetic diversity of Bombus terrestris have been conducted in Turkey. Also there is a considerable concern about the possible ecological impacts of an invasion of Bombus terrestris into natural habitats in the last years.

INVESTIGATION ON THE ALMOND AS HONEY PLANT

No 364

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This paper deals with three years investigation of the almond as honey plant. Phenology of flowering, the effect of climatic conditions on extracted nectar, the production of nectar, sugars, honey and pollen on 10 cultivars of almond growed in Skopje region has been investigated. The investigations showed that there are the differences in the production between the cultivars. In the average investigated cultivars of almond offer feeding source for the honey bee during 30 days and gave 23,63kg/ha nectar, 5,22kg/ha sugars, 6,52kg/ha honey and 6,98kg/ha pollen.

INFLUENCE OF HONEYBEES AS POLLINATORS ON YIELD OF HYOLA 401 RAPE SEED

No 365

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Introduction: Aliabad is a city of Golestan province in Iran and because of numerous natural resources more than 72 crops are cultivaed in this region.
In 1927 Fechner reported cross-pollination in rape seed increase 14% weight of seeds.
Methods: Autum cultivated rape seed hyola 401 was used in this experiment in which the duration of flowering is 22-45 days.
We introduce 2-6 colonies of honeybees per hectare.
Results: In this reseach colonies of honeybees were introduced to rape seed.
The best result of pod number (91 and 76) were obtained.while absolute weight of 1,000 seed (4.2g) was the largest in cross-pollination.the pods were longer containing more seeds and greater weight of seeds. Increasing of yield was 44% obtained by introducing of honeybees to hyola 401 rape seed.

FLOWERING OF IMPORTANT HONEYBEE FORAGE PLANTS IN RELATION TO HONEY FLOW SEASONS AROUND BUDONGO CENTRAL FOREST RESERVE, UGANDA

No 366

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Introduction: This study assesses the relationship between flowering periods of important honeybee plants and honey flow seasons in and around Budongo Forest Reserve, Uganda. Important honeybee plants should be studied since amount of nectar they produce determine the amount of honey produced. A beekeeper should know when flowers bloom, whether they supply both nectar and pollen and how dependable they are.
Methods: Data was collected during the period March 2001 to April 2003 in villages including Biso, Nyantonzi and Nyabyeya in and around Budongo Forest Reserve. Techniques used included direct group discussions, semi structured questionnaires which were used to determine the honey harvesting periods from beekeepers. Observations were taken on the flowering periods of important honey plants. The list of important honey plants was obtained from observations and literature. The flowering periods of important honey plants were then correlated to the honey flow seasons.
Results: A total of 87 plants species belonging to 36 families were visited with Mimosaceae (10 species) and Caesalphiniceae (7 species) being the most important species used. Other important families include Myrtaceae (5 species), Solanaceae (5 species) and Moracese (5 species). A total of 58 species (68%) of the forage plants were located both in the forest as well as in villages. The number of plants visited for both pollen

nd nectar was 50 species (57.5%). Those visited xclusively for nectar were 30 species (34.5%) while ose visited for pollen only were 7 species (8%). Most lants flowered in the rainy seasons i.e. first rain season April to May and the second rain season of August to ovember. It was however, noted that some plants such s Calliandra colotyhrsus and Hibiscus esclentum owered throughout the year. The bee species used ees, shrubs, herbs. There were two major periods of oney harvesting: June to July and November to ebruary. Thus the honey flow season immediately llowed flowering periods.

iscussion: The forest supports a variety of plant milies that provide good forage for the bees. The owering periods of most trees occur in the beginning of e rain seasons while others like agricultural crops epend on the sowing date. Plants like Calliandra llothysurs flowered throughout the year which is very od for sustainable honey flow. The high number of rage plants found both in the forest and village can be tributed to some plant families that are now cultivated farmers and domesticated to serve a variety of rposes. Honey harvesting period lag behind flowering eriods because of the fact that rainfall or cold mperature induce flowering of bee forage plants. After e plants have flowered, bees begin to collect nectar hich is later converted to honey.

OLLEN ISOLATION AND IDENTIFICATION OF WILD, ULTIVATED AND ORNAMENTAL PLANTS IN LA AGUNA DISTRICT, MEXICO

lo 367

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the Comarca Lagunera region located in Coahuila and urango states in northern Mexico, the anthers of wild, ultivated and ornamental plant species were collected in der to isolate the pollen using the acetolisis technique. e collection serves as a reference database for entifying plants visited by honeybees and the plants ooming period in the area. Beginnig in the spring of 02 and through the year 2003 and 2004 were otained, processed and photographed pollen of plants. ants were photographed, collected and dessicated to eserve in the herbarium. The pollen samples were ocessed and observed in a microscope Olympus odelo BH-2, connected to a TV screen. Each pollen ain was measured with objective micrometer mmersion oil at 100X. Pollen grains were photographed 40X and 100X with a reflex Minolta SRT 101 camera, kkor lens PF 58mm mounted in a tripod using color de film ASA 100, f/9 obturation at a _ second speed. least 2 images were obtained at different angle and anned in a 3500C HP scanner. The collection has, up date,105 –wild, cultivated and ornamentals- species.

We found plants of the families Acantaceae, Aloaceae, Ampelidaceae, Apocinaceae, Asteraceae, Bignonaceae, Boraginaceae, Brassicaceae, Cactaceae, Convolvulaceae, Cucurbitaceae, Drupaceae, Euphorbiaceae, Fabaceae, Juglandaceae, Labiatae, Malvaceae, Moraceae, Myrtaceae, Nyctaginaceae, Palmaceae, Papaveraceae, Pittosporaceae, Poaceae, Polygonaceae, Portulacaceae, Punicaceae, Oleaceae, Quenopodiaceae, Rosaceae, Rutaceae, Solanaceae, Tamaricaceae, Ranunculaceae, Umbelliferae, Verbenaceae and Zygophylaceae.

MORTALITY OF HONEYBEE COLONIES INFESTED WITH TRACHEAL MITES (ACARAPIS WOODI)

No 368

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It is one hundred years since the condition known as the 'Isle of Wight' disease was first identified. The tracheal mite (Acarapis woodi) has been associated with this condition that devastated honeybee colonies in Britain and Ireland from the early 1900s and that later spread to Europe, finally reaching North America in the mid 1980s. It is generally accepted that colonies going into the winter with fairly high levels of tracheal mite infestation have a significantly increased probability of dying before the springtime. This is more likely to occur in locations with cooler climates. Recent experience would indicate (particularly from North America) that mortality generally occurs without the presence of other pathogens.
We postulate that the bees in heavily infested colonies have a reduced ability to use their thoracic muscles to heat the winter cluster thus contributing to temperature stress. Also, the reduced brood associated with infested colonies and the resulting reduced bee population further stresses the brood nest. We show that temperature stress gives rise to increased mite infestation in the emerging callow bees and suggest that this further contributes to the decline of the colony. A comprehensive model is proposed to explain the mortality of honeybee colonies with tracheal mite infestation.

HONEYBEES PREFER NECTAR OF COMPETING BLOOM TO NECTAR OF AVOCADO

No 369

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Honeybees are important avocado pollinators, but even

when bee hives are placed in an orchard, bees tend to prefer competing blooms, and avocado pollination is often inadequate. The possible effect of nectar composition on the preferences of bees was tested in this work using three different methods: choice between feeders, crop load and learning. When choosing between feeders containing equal sugar concentrations of sucrose solution, diluted avocado honey and diluted non-avocado honey, bees preferred the non-avocado honey and sucrose solution to the avocado honey. The crop load of bees feeding on avocado honey in the lab was smaller than the crop load of bees feeding on non-avocado honey. A similar trend was found when the crop load of bees feeding on avocado or non-avocado nectar in the field was analysed. In conditioning of the proboscis extension response, the percentage of bees that learned to associate between odour and reward was lower when the reward was avocado honey, compared to when it was non-avocado honey or sucrose solution. Moreover, an increasing percentage of bees refused to consume the avocado honey reward during the course of the experiment. The different methods yielded similar results, indicating that honeybees prefer honey that originated from competing bloom over avocado honey.

THE MONOFLORAL HONEY PARADIGMA REVIVAL IN TROPICS: BIOCHEMICAL AND ECOLOGICAL CHARACTERIZATION OF THE MOST IMPORTANT HONEYS IN VENEZUELA ALONG MANGROVE, DESERT, FOREST, PARAMO AND TROPICAL SAVANNA ECOSYSTEMS

No 370

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We are harvesting Venezuelan honeys in different tropical Venezuelan ecosytems in the last 14 years. We have characterized, making use of organolectic and palinological approach six ecological syndromes in Venezuelan Honeys producing the same flavors along 14 years:
1) Mangrove honey: From estuaries at the mangrove ecosystem coast. Bouquet Avicenia germinans-Conocarpus erectus.
2) Desert Honey: From desert shrub of Lara State. Canapire Bouquet.Croton ovalifolius bouquet (Euphrbiaceae)
3) Alcornoque Honey: From stationary Llanos of Orinoco River. Bowdichia virgiloides bouquet (Leguminosae).
4) Mastranto Honey: From irrigated Orinoco Llanos at east, Mesa de Guanipa, Monagas and Anzoàtegui states. Hyptis suavelons bouquet.
5) Pre-mountain Honey Llano: (Leguminous and Mirtaceae syndrome)
6) Cordillera mountains: Oyadaea verbesinoides bouquet (Compositae).
We present biochemical and ecological dates that open a new classification of honey monotypes considering ecological tropical syndromes. This approach is important to the origin certification of honey and to increase our knowledge about the ecological and therapeutic value of tropical ecosystems: the last source of biodiversity packed in

COMPARISON ON POLLEN COLLECTING OF ANATOLIAN AND ITALIAN HONEYBEES

No 371

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This study was performed to compare pollen collection by Anatolian, Apis mellifera anatoliaca, and Italian, Apis mellifera ligustica, honeybees foraging at the same time from the same apiary. Ten colonies of each race were used in the study, which lasted for about a month. The apiary was located in Bursa, Turkey. Hives with full-bottom pollen traps were used to collect pollen. Pollen traps were kept open at all times during the study. Pollen pellets were collected once a week, homogenized by mixing, transported to the lab on ice and stored in a deep freezer. In order to determine the plant sources of pollens, 500 pollen pellets were randomly taken from each sample and analyzed. According to the color, pollen pellets were classified, and then examined under light microscopy.
Most of the pollen collected (mean 71%) was from Cistus creticus L. (dominant pollen source). Cruciferae, Cistus salviifolius L., and Pistacia L. spp, pollen were the other major types found in the samples (combined: mean 18%). Anatolian and Italian colonies differed on the percentage of Cistus creticus L. and Pistacia L. spp. pollen collected on some dates. However, no systematic effect of honeybee race was found. That is, Anatolian bees on most dates did not differ from Italian bees in their pollen collection.

Key words: Honeybees, Pollen, Anatolian, Italian, Turkey

GENETIC CHARACTERIZATION OF BUMBLEBEES (HYMENOPTERA: APIDAE) IN SLOVENIA

No 372

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About 300 bumblebee (Apidae: Bombus) species in 36 subgenera are known in the world. Nine out of 16 European subgenera of bumblebees can be found in Slovenia based on previous studies using morphological variation. In this study we obtained mitochondrial DNA sequences for assessment of genetic structure and

versity of bumblebees in Slovenia. We collected over 00 bumblebees from 54 different localities in Slovenia nd sequenced 320-bp fragment of mitochondrial tochrome oxidase I. The majority of sequences otained from specimens of the same species were entical. Our sequences have been also compared to 3 sequences of bumblebee mitochondrial COI agments, which have been already deposited in the enBank. Sequences were highly similar or identical. In ddition, species: B. lucorum, B. pascuorum, B. atorum, B. hortorum and B. lapidaries, which are idely spread all over Slovenia, will be studied by icrosatellite analysis.

HYSICOCHEMICAL CHARACTERIZATION AND OLLEN SPECTRUM OF PORTUGUESE HONEYS

lo 373

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e present work was conducted to evaluate the quality honey samples, of a mountain region of central ortugal, from five consecutive harvests.
e qualities of selected honey samples (85) were aluated by determining the pollen spectrum and ysicochemical attributes.
elissopalynological tests were carried out according the ethod proposed by Boletin Official del Estado, Spain 986) and Louveaux, Maurizio and Vorwhol (1978).
oneys were considered to be unifloral whenever the ominant pollen was found to be over 45%.
r the physicochemical characterization, seventeen arameters were selected. They are the most presentative and most often used. The analyses were erformed by methods according to the Codex imentarius Commission 2001 and other international oney standards (2001/110/EC, EU Council 2002), ortuguese regulations (Decreto-lei Nº 214/2003), the OAC (Herlich et al., 1990) and Sancho, et al. (1992).
the samples analysed, 5,88% were unifloral of icaceae, 34,12% unifloral of Erica sp., 14,12% olyfloral with a high percentage of Erica sp. and 45,88% other polyfloral honeys.
e average values, standard deviation and minimum d maximum values of physicochemical parameters olour, water, electrical conductivity, total ash, insoluble atter, pH, free acidity, lactones, total acidity, formol umber, fructose, glucose, sucrose, fructose+glucose, uctose/glucose ratio and diastase, droxymethylfurfural, glucose/water ratio) were timated for the several types of honey.
e samples were found to meet all major national and ternational specifications. However nine samples esent formol number above 1,55meq/100g, indicating at bees were fed with proteins derivatives and seven mples present insoluble matter percentage between 1% and 0,5%.

Seventeen physicochemical parameters were measured (analysed), including colour, water, electrical conductivity, total ashes, diastase, hidroximethylfurfural (HMF), formol number, pH, acidity (free, lactone, total), fructose, glucose and sucrose, fructose+glucose, fructose/glucose ratio and glucose/water ratio.

PHACELIA AS POTENTIAL BASIS FOR HONEYBEE AND ANIMAL FOOD

No 374

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In Serbia there are around 300,000 beehives that are mostly migratory type. Natural vegetation is diverse, but most of the bee pasture is black locust. However, in last few years, buds of this plant are freezing by the spring frosts that lead to absence of abundant bee pasture.
In aim of finding out the solution for missing black locust pasture, we did two years investigation on two Phacelia tanacetifolia cultivars – Blanka and Julija. Examinations were done on experiment plots 2 x 2 x 2 m. Plots were agrotechnicaly prepared and sowed by phacelia in the middle of the March. During flowering time were covered with isolation cages where LR bees' nuclei were placed.
During experimental period phacelia did not suffer any damaged by spring frosts. Results of the investigation are showing that bee visited more Julia cultivar, and occurrence of bigger quantity of the honey expressed in 1/10 frame. There were no difference in quantity of brood and bees in examined cultivars.
Beside beneficial for honeybee, we examined phacelia like fodder base. Considering huge greenery, phacelia was mowed after flowering and used for preparing experimental silage. Results showed that in mixture with alfalfa, phacelia could be a very good food for animals.

THE INFLUENCE OF HONEYBEES AS POLLINATORS ON THE INCREASE OF YIELD OF SOME BLACKBERRY CULTIVARS

No 375

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The purpose of this work was to investigate the significance and influence of honeybee on the yield of two leading blackberry cultivars on a private property. The experiment was set in 2002/2003 in an orchard where blackberry was planted with cultivars Black satin and Dirksen thornless. The soil was maintained in the state of idle land and fertilized annually only with manure

and without irrigation.
Three bushes with certain number of flower buds were selected from each cultivar. In the first variant (anemophyllic-by wind) counting and marking flower buds and isolation of fruitfull twigs with the bags made of tulle was conducted. In the second variant of self-pollination the fruitful twigs with flower buds were isolated with pergament paper bags. In the third variant of entomophyllic pollination with honeybee, after counting and marking, fruitful twigs were left free. In the fourth variant castration of flowers from which anteras were taken manually from the selected flowers. Every seven days the process of fertilization, growth, development and maturation of fruits was followed, fruit mass was measured and the number of kernels in each fruit was established.
The results of the experiment show that the percentage of mature fruits was greater in the cultivar Black satin (77.78%) than in the cultivar Dirksen thornless (74.45%) in the variant of pollination with honeybee. The smallest percentage of mature fruits was recorded in both cultivars in the variant of self-pollination. Fruit mass was the greatest in both cultivars in the variant of entomophyllic pollination, and the smallest in artifical and self-pollination. The number of kernels in a blackberry fruit was the greatest in both varieties in the variant of entomophyllic pollination with honeybee (76 and 74) and the smallest in artificial (70 and 67) and self-pollination (73 and 68). We can conclude that the honeybee is the most efficient and the safest pollinator providing greater yield (of 30%) and better quality of blackberry fruits.

USE OF ANTIBIOTICS IN CONTROLLING THE DISEASES OF BEES AND THEIR PRESENCE IN HONEY

No 376

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Honeybee (Apis mellifera) is exposed to various diseases (of bacterial, viral, parasitical ethyology) and vermin which leads first to the decreased yield, and in the late phase to the loss of bee colonies. In order to mitigate the consequences of diseases in apiculture, as in other branches of livestock breeding, drugs have been applied for a number of years already. That is how antibiotics found their ample use, contributing significantly to controlling the diseases of bees. However, uncontrolled use of antibiotics results in their retention in bee products, and it is a well known fact that the presence of antibiotics in honey, as in any other kind of foodstuff, is not allowed.
In our researches we have followed the retention of oxitetracyclin in honey in the treated colonies, in weak, medium and strong ones in the kernel itself, where development is tumultuous and metabolism and circulation of food (honey and pollen) are intensive, and in the honey extracted from the treated bee hives and stored at an adequate temperature.
Based on the conducted research it was concluded that the retention of oxitetracyclin in weak and medium colonies in a bee hive is between 46 and 40 days and in strong colonies 25 days. The retention of oxitetracyclin in the stored honey is 315 days.

BUMBLEBEES IN DINARIC FOREST

No 377

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Without influence of man Slovenia and most of the Europe would be covered with forest. Because vegetation has a high influence on bumblebee (Bombus) fauna we can conclude that bumblebee's today's distribution, phenology and selection of food plants are influenced by human. Bumblebees are traditionally treated and researched as meadow insects. Because conditions in forest are probably closer to natural conditions we are interested how these properties differ from the ones in meadow.
Sampling was taken in a part of a large area of primary forest in Dinaric region (southern Slovenia). Eighty randomly chosen sampling points were visited one to four times in a season form May to October 2004. Each sampling point (2,000 square meters) was checked for bumblebees and flowering plants.
Eight species of bumblebees all together were found, two of them member of a cleptoparasitc genus Psithyrus. Four most common species differ in time of abundance peak: B. pratorum reached highest abundance in June, B. lucorum in July, B. pascuorum in August and B. hortorum in September. Interestingly, B hortorum's second generation had higher abundance than the first one.
Proboscis length correlated with the length of corolla neck in visited plant species. Bumblebees with long proboscis preferred plants with long corolla neck and similar with bumblebees with short proboscis. Surprisingly, in our investigation in forest, we found majority of bumblebee species living in whole area of dinaric region. Forest does not seem to be unsuitable habitat for bumblebees. Phenology and selection of food plants resembles reducing niche overlaps and therefore minimizing interspecific competition.

USING MICROSCOPICAL ANALYSIS TO IDENTIFY THE BOTANICAL ORIGIN OF GREEK HONEYDEW HONEYS

No 378

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Honeydew honeys represent the 70-75% of the total annual honey production in Greece. The majority comes from pine honey (secretions of Marchalina hellenica) and another part is honey from Abies chephalonica (secretions of Physokermes hemicryphus). Honeydew honeys are discriminated from blossom honeys by electrical conductivity and sugars. Besides the organoleptic characteristics, no sufficient data exists to separate the different honeydew honeys according to their botanical origin. In this study we used microscopical analysis to examine the kind and number of the honeydew elements that were present in Greek fir and pine honeys in order to discriminate the botanical origin of these two types of honey.
During 2004 forty honeydew honey samples were collected from four areas of Greece that are characteristic for the production of the specific types of honey. All honeys had the sensory and physico-chemical characteristics of their type. Ten grams of each honey sample were diluted in 20ml of distilled water and centrifuged at 3,000crp for 10 min. The sediment of the solution was spread in a 22x22mm2 area on a slide and the honeydew elements were identified and counted in 10 optical areas in x200 magnification.
Coleosporium sp. was located in all pine samples while it was absent in fir honeys. Altenaria sp., Cladosporium sp., Capnodium sp. and hyphae were present in all pine and fir honeys, while Heterosporium sp., Stmpylium sp. and Helmithosporium sp. were identified only in a few samples of both types. The fact that Coleosporium sp. was present exclusively in pine honeys may be an indication, which in combination with sensory and physico-chemical characteristics, could be used to distinguish pine honeys from fir honeys.
To conclude, microscopical analysis could be used as an additional method to distinguish honeydew honeys from different botanical origin.

CHARACTERIZATION OF HONEYS FROM THE ISLAND OF RHODES, GREECE

No 379

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Samples of honey were collected during three different periods in two consecutive years (2001-2002) from Rhodes island, and analyzed for their physiochemical, microscopical, volatile, antioxidant and bacteriostatical characteristics.
The first honey harvest in spring is characterized by the presence of Cistus sp., Echium sp., Myrtus communis, Pistacia lentiscus, Sinapis sp., Trifolium sp., and honeydew elements. It's a multifloral honey with no distinct characteristics from other similar honeys produced in other parts of Greece.
The second harvest in summer is characterized by the predominant presence of Thymus sp. pollen grains, accompanied by Cistus sp., Myrtus communis, Sinapis sp., Taraxacum officinalis and Liliaceae. Its physiochemical characteristics are similar to honeys produced from the same source in other parts of Greece. Differences exist a) in the content of pollen grains (Rhodes honey has > 45% pollen grains from Thymus sp., while honey from other areas has >18%), b) in the volatile and semi-volatile characteristics (out of 106 compounds,18 are found in all samples), c) in the high antioxidant activity (averages 777_M/25mg of honey) and d)in the high bacteriostatic activity (MICs 12% for P.syringae and 10% for B.subtilis. MBAs 15% for P.syringae and 12% for B.subtilis).
The third harvest in autumn is really two harvests. During the first one, the remaining thyme honey is blended with pine honey giving a unique mixture of a tasteful honey that has more than 20% pollen grains of thymus and electrical conductivity >1,00mS/cm. This type of honey is characteristic of Rhodes Island and cannot be found in honey from other countries. Finally, honeydew honey from the secretions of Marchalina hellenica in pine forest is harvested. The HDE/P of this honey range between 0.26 and 24.3. More than 70% of the total numbers of honey samples contain Thymus sp., Cistus sp., Echium sp., Eucalyptus sp., Myrtus communis and Liliaceae. Pine honey from Rhodes has similar physicochemical characteristics with pine honey produced in other parts of Greece but differs in volatile and semi-volatile characteristics.

HEAVY METAL CONTAMINATION OF HONEY IN VENETO REGION (NORTHEASTERN ITALY): AN OVERVIEW OF THE SITUATION 2003 - 2004

No 380

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The honeybee is a good bioindicator of environmental pollution and beehive products are also considered an

accumulator of radioactive elements, heavy metals and pesticides. This paper presents the results of the monitoring on the contamination of honey produced in Veneto Region (northeastern Italy) by heavy metals such as lead and cadmium, carried out in collaboration with local beekeepers' associations.
Honey samples (120) produced during 2003 and 2004 were analysed with the electrochemical technique of square wave anodic stripping voltammetry. The results of the analyses showed a contamination level generally comparable to that detected in similar studies carried out in other Italian regions. In fact, the values ranged between 45 and 332ng/g for lead and between 0 and 39ng/g for cadmium.
The comparison of the contamination levels between honeys with different botanical origin revealed in general higher heavy metal residues in mountain multifloral honeys and Tilia honey, if compared with other honey types.
The correlation between the data obtained and the geographic sites of honey production allowed to map the pollution levels of the different area in the Veneto Region. Heavy metals contamination of the honey samples analyzed has never been a threat to human health, but a continuing monitoring is recommended for the future.

WHAT IS THE SITUATION ABOUT ANTIBACTERIAL RESIDUES IN HONEY COMMERCIALIZED IN ITALY?

No 381

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Antibacterial drugs are worldwide used for the control of American and European foul brood even if their use in beekeeping is illegal (Regulation (EEC) 2377/90 and further amendments) because no MRLs have been established. The administration of these antibacterial drugs is applied without approved protocols and instructions for use. As a consequence, this practice is responsible for the contamination of beehive products and contributes to the problem of food safety. According to Council Directive 96/23/EC laying down measures to monitor certain substances and residues thereof in live animals and animals residues, and according to Decree 336/99 (National Residues Plan), honey produced by Italian beekeepers and honey imported from third countries has been investigated for antibacterial substances. 414 honey samples collected in 2004 were analysed for antibacterial residues of tetracyclines (TCs), sulphonamides (SPs), streptomycin (ST), chloramphenicol (CAP) and tylosin (TL). 2.2% of samples wre positive for the antibacterial drugs analysed, in particular 1.2% of honey collected from local beekeepers and 1.5% of imported honeys. Furthermore, local honeys resulted positive only for SPs, whereas in the imported honeys two antibacterial substances investigated were detected ST and TL. The results obtained are indicative of the presence of residues of antibacterial drugs in honey irrespectively of its origin. The situation appears better than that observed in 2003 when 5.0% of honey samples resulted positive to antibacterial drugs. In particular, a rather frequent use of SPs was registered both in imported honey and in that collected from local beekeepers. Furthermore, in the last group, 3 samples out to 150 and 2 out to 12 resulted positive for TCs and for TL, respectively. Finally, a continuous residues monitoring programme is needed, accompanied by an educational activity to beekeepers on hive management, and a wide application of sanitising treatment of beekeeping materials to reduce the spread of bacterial diseases.

HONEY SOURCES OF THE REGIONAL RESERVE "COLLI EUGANEI" (VENETO REGION, NORTHEASTERN ITALY)

No 382

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Honey production strictly depends on botanical species existing in a landscape. The knowledge of the flora of beekeeping interest and the cartographic description of the vegetation are important tools to understand the botanical origin of honey and the potential for beekeeping. This allows us to manage appropriately honey sources and to support the expansion of some botanical species in accordance with the existing vegetation asset. The technical map of the Veneto Region (northeastern Italy), 1:5,000 scale, was used in field surveys. The Ortofotocarta digitale IT 2000 software of the same area was applied. The limits of the different botanical types carried out by means of photointerpretation techniques were transferred to topographic maps. Both spontaneous vegetation types and categories related to the use of the soil were considered. The vegetation analysis was carried out using the phytosociological method (Braun-Blanquet, 1928) in June-July 2004 sampling homogeneous areas representative of the different plant communities. The scientific nomenclature follows Pignatti (1982). The different species were quantitatively evaluated, within each layer, with a 7-value-score. Finally, the map obtained was computerised using the ArcView GIS 3.2 software. The most relevant nectariferous types were as follows: Fagaceae (Castanea), Brassicaceae (Diplotaxis), Rosaceae (Prunus, Rubus), Fabaceae (Robinia, Lotus, Trifolium, Vicia), Lamiaceae (Teucrium, Thymus, Calamintha), Apiaceae (Eryngium, Foeniculum, Bupleurum), Scrophulariaceae (Odontites, Veronica) and Asteraceae (Aster, Carduus, Senecio, Taraxacum). The most represented vegetations are chestnut and black

ocust woods, vineyards and olive-yards with herbaceous ayers. The area was classified on a 4-level-scale basis ccording to the potential honey sources of the existing hytocenoses: extremely high, medium-high, medium-ow, and null interest. The present survey could be onsidered as a pilot-study useful to improve the nowledge of the vegetation of beekeeping interest as vell as to plan a more appropriate use of potential xisting honey sources. Its application to other areas is trongly recommended.

NFLUENCE OF CULTIVAR ON POLLINATOR ISITING, YIELD, YIELD COMPONENTS AND SEED UALITY COMPONENTS OF LUCERNE

lo 383

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wo lucerne cultivars from Krusevac, K-22 and K-28 and ultivar Mediana were compared in this trial. xperimental plot was 2m2 and lucerne was sown in 5cm distant rows. Influence of cultivar on pollinator oney bee, lucerne leafcutter, solitare bee etc.) visiting, eed yield, yield components and seed quality omponents (cluster, pod and seed setting, 1.000 seeds ass and germination) was investigated. Highest umber of pollinators was attracted by K-28 cultivar, 13,3 average within counting time of 30 minutes, by cultivar Mediana was 9,81, and cultivar K-22 9,06. Ratio between oney bee and other pollinators for all examined cultivars as about 3:1. Highest seed yield was with cultivar K-28 5,33g/m2, with cultivar Mediana was 47,28g/m2, and K-2 46,93g/m2. Cultivar K-22 had highest cluster and pod etting. Cv K-28 had highest number seeds per pod, 6,23 average. Cv K-28 was significantly different for seed ield and number of seeds per pod from other cultivars. ifferences between examined cultivars for other seed ield and quality componets were not statisticaly ignificant.

ey words: lucerne, cultivar, pollinators, seed yield, seed eld components

UGAR CONTENT FROM DIFFERENT FLORAL RIGIN OF BEEPOLLEN

lo 384

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ntroduction: Pollen itself is the male gametophyte in owers. The female gametophyte produces nectar, a weet liquid gathered and eaten by insects and other nimals. This important substance, rich in sucrose and water, is the optimal environment necessary for the germination of pollinic tube and the release of its DNA into the female organ. For the fertilization of the flower, minerals are also needed and we suppose that polyphenolic compounds are also important as they are specie-specific (Campos et al., 1996) perhaps in an allelopatic way. On any individual trip from the hive or nest, a bee usually visits flowers of only one kind, ignoring others, unless the supply is very restricted. The flower constancy of bees is one of the factors restricting interspecific hybridization. Our purpose was to establish if the sugar content was also specie-specific as previously determined for phenolic content.
Methods: The method used was adapted from Campos (1989) , HPLC/DRI Method - briefly: 1 ml of CH3CN/H20 (83:17) flow through a LichroSorb CarboHydrate Column. Detection was performed using a differential refractive index (DRI) detector.
Results: Bee pollen samples randomly analysed from Portuguese market show an interval between 1.35% - 9.91% for sucrose, 4.4% - 15.8% for glucose and 7.7% - 20.2% for fructose content. The results lack further analysis to the nectar content of the flora studied.
Discussion: When beekeepers trap the pollen loads, at the entry of the hive, the manipulation of this product by bees is near null because they only agglutinated the pollen grains with nectar in order to make pellets. When they do not harvest nectar from the flowers they carry honey instead from the hive for the same purpose. Supposing that sugar content can be attributed to the nectar and/or honey that bees use to agglutinate bee pollen this causes added difficulties to the interpretation of the results obtained. Further studies need to be done but it seems that for quality control purposes of the sugar content of bee pollen, the limits can be established without include, for now, floral origin identification.

FLOWERING TIMES OF THE PLANTS OF KHARTOUM STATE WITH REFERENCE TO THEIR IMPORTANCE FOR HONEYBEES

No 385

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The survey and evaluation of Khartoum State area for flowering plants lasted for 18 successive months from February 1999 to July 2000. A list of 85 such plants is provided, bee plants abundance and dearth were clearly indicated. The various lengths of flowering periods of the various plant species, flowering density per plant and bees (Apis mellifera L. and Apis florea F.) preference for some of them were recorded. Indigenous plant species are mostly blooming during autumn and winter seasons. Exotic plants which are utilized in the area as shade and ornamental plants, many of them bloom during summer, therefore, they compensate for the lack of flowers in the dearth period.
About a dozen plant species can be referred to as good

foraging plants (key plants) in the area: Grewia tenax, Zizyphus spina-christi, Balanites aegyptiaca, Acacia nilotica, Acacia seyal, Capparis decidua, Tamarindus indica, Mangifera indica, Albizia lebbek, Plumeria spp., Eucalyptus spp. and Acacia mellifera. Guddeim (Grewia tenax) planting in the area is recommended on large scale. The important factor affecting flowering in the area was the availability of water (irrigation water, high under ground water-table and rains).
Khartoum State is rich in flowering plants, with more human efforts for green surroundings will have ample foraging sources for bees and hence suitable as a beekeeping place.

POLLINATION ECOLOGY OF HONEYBEES IN THE SUBMERGED MELALEUCA FORESTS

No 386

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The submerged Melaleuca forests have an important role in the regulation of climate and the protection of wildlife and environment in southern Vietnam. This paper deals with the pollination ecology of the honeybees in the forests. The following aspects have been investigated and data are presented on:

- The rewards of pollen and nectar of Melaleuca cajuputi Powell (Myrtaceae) and Nypa fruticans (Thunb.) Wurmb. (Palmae);
- The distribution of insect visitation to Melaleuca and Nypa flowers.

The results show the partitioning of insects by the two plants, the clear partitioning of visitation time by the two sympatric honey bee species, A. dorsata and A. florea, and also the clear partitioning of visitation time on the two different plants by either honey bee species.
Some questions raised from the above results; therefore, the following patterns of bee visitation to Nypa fruticans flowers under certain conditions were studied next:

- Apis florea while its sympatric honeybee, A. dorsata is excluded experimentally from the flowers;
- Apis florea in areas where it is the only honeybee;
- The two sympatric honey bee species, A. florea and A. cerana;
- The two sympatric species (A. florea and A. cerana) and the imported A. mellifera;
- The two sympatric species (A. florea and A. dorsata) and the two introduced species (A. cerana and A. mellifera).

The results show that in the absence of A. dorsata, A. florea forages earlier on flowers. Despite a competitive behaviour of the native A. dorsata towards the introduced A. cerana, there is temporal partitioning of food source among the sympatric Asian honeybee species. In contrast, the European A. mellifera shows fierce competition to the native A. cerana; in addition, it never visited the flowers on which A. dorsata was foraging.

INSECT POLLINATION AND PRODUCTIVITY OF HIGHBUSH BLUEBERRY CULTIVARS

No 387

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High-bush blueberry (Vaccinium corymbosum L.) is nat... of eastern North America. It is usually self-fertile, but cross pollination often improves berry production; flow... architecture, with a tubular or bell-shaped, downward... opening corolla and anthers that release pollen throug... terminal pore, makes it well suited for buzz-pollinatio... High-bush blueberry was introduced into Italy in 1963 and its cultivation has spread in sub-mountain areas of Piedmont where it is now a not negligible income sou... for local farmers. In order to foster an adequate pollination service for this crop, the effectiveness of native insects and especially of the honeybee in achieving its pollination was lately investigated.
The trials were carried out in a single planting where several of the most interesting cultivars were grown ... different plots; among them Berkeley, Brigitte Blue, ... Duke were examined in the years 2002-2004, Blue C... and Late Blue in 2003 and 2004 only.
Four plants were chosen for each cultivar; on each pla... two fruit-bearing branches of similar size were selecte... One of them was isolated with a net mesh sufficient ... prevent the passage of pollinating insects, without hampering sensibly the action of wind, while the othe... one was left free. For each branch the flowers and t... ripe fruits were counted; the latter were also weighe... individually.
In order to grant an adequate insect pollination, four beehives were placed close to the experimental plan... During the blooming period observations were made ... the presence of wild pollinators, that were however rather scanty.
For all the tested cultivars, fruit set was lower on the caged branches than on the free ones (0.62-54.50% ... 42.45 80.88%, respectively) and, moreover, the fruits ... the free branches were heavier (1.02-2.12g on averag... than those on the caged ones (0.37-1.32g), thus sho... the usefulness of honeybee pollination.

COMPOSITION OF FRESH BEE POLLEN FROM VENEZUELAN ANDES

No 389

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Bee pollen is a highly marketable product of the hive. However, in Venezuela there are no quality control egulation. Our interest is to organize an analytical eference to provide a database with the sensorial and hysico-chemical components of different pollen types roduced in the country. Our sample is from a local piary in Cacute, Mérida State, from the Venezuelan ndes. The botanical origin was identified after screening he sample into four colors and observing the alynological characteristics corresponding to the eference collection. Sensorial evaluation was done on he visual, olfactive, tasting and tactile aspects of pollen oads. Water content, ash, protein and fat content were etermined following official methods for food analysis. ata presented bellow is aimed to support the proposal f Venezuelan regulations for pollen quality control.

Pollen type	1	2	3	4
Color	yellow	orange	brown	creamy
Botanical origin	Brassica napus	Fraxinus americana	Zea mays	Datura arborea
Odour	resin	straw	straw	honey
Flavour	acidic, bitter	sweet, floral	sweet, acidic	acidic, astringent
Texture	sticky	sticky	crispy	powdery
g water/ 100 g pollen	9.05	9.29	16.11	8.74
g ash/ 100 g pollen	2.75	2.55	2.15	3.39
g fat ext./ 100 g pollen	3.36	3.27	2.49	2.00
g protein/ 100 g pollen	19.92	20.31	16.54	26.30

POLLINATION OF OIL-SEED RAPE (BRASSICA NAPUS OLEIFERA) BY HONEYBEES

No 390

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Experiments with rape variety Zeus were performed in 2004 in 3 localities under cold climatic conditions of the orthern Slovakia: Vlachy, Andice and Pribylina. Rape lants in all 3 localities were in good vitality and grew in oils of medium properties. Part of rape plants was agged before pollination.
Using standard methods there were measured, observed r calculated: nectar secretion, nectar sugar oncentration, honeybee density on flowers, flower and liqua set, number of seeds per 1 siliqua and their eight, seed yields of pollinated and bagged plants. In ngle localities there were obtained these basal results, ven as on average, respectively.
Nectar secretion of 10 flowers per 24 hours, in mg: 1,668; 14,606; 8,118
Nectar sugar concentration, in %: 52,6; 44,8; 41,1
Honeybee density per 100 m2: 488,6; 405,6; 288,4
Siliqua set of free pollinated plants, in %: 47,2; 45,0; 38,8
Siliqua set of bagged plants, in % : 44,1; 43,3; 36,6
Number of seeds per 1 siliqua of free pollinated plants: 16,9; 18,1; 13 8
Number of seeds per 1 siliqua of bagged plants: 12,7; 13,9; 10,7
Calculated seed yield per 1 ha of free pollinated plants, in t: 3,31; 3,95; 2,81
Calculated seed yield per 1 ha of bagged plants, in t: 2,48; 3,06; 2,19
Increased seed yield after pollination, in % (unpollinated control 100%): 133,5; 129,1; 128,3

SUNFLOWER AS THE SECOND IMPORTANT BEE PASTURE IN HUNGARY

No 391

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Sunflower is the second important bee pasture in Hungary. There are many sunflower hybrids available worldwide so the choice for migration is not an easy question for beekeepers. Sunflower has grown almost in all parts of the country but the nectar production of the hybrids and the sugar concentration of the nectar may vary extremely on the different agro-ecological sites in Hungary.
In this study we report the results of our analyses from 2004. We studied bee visit and nectar production of 9 sunflower hybrids. The mayor sugar components of nectar (fructose, glucose and sucrose) were determined with HPLC analysis.
The average nectar production ranged from 0,132 to 0,280mg/flower, the refraction values were 40,7-52,6 % and the sugar values were 0,064-0,114mg sugar/flower. Honeybees visited the fields all day even in hot midday hours. Our results show that there are hybrids which have got stable nectar production irrespectively of the weather conditions.

THE EFFECTS OF BROOD COMB CELL SIZE ON THE REPRODUCTIVE BEHAVIOUR OF VARROA DESTRUCTOR

No 392

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Introduction: The newly reclassified ectoparasitic mite

Varroa destructor (Anderson and Trueman 2000) is the most serious problem of Apis mellifera worldwidely. Varroa mites parasitize both adult bees and bee brood. They feed on the haemolymph of adult bee and brood, but reproduction only occurs in the sealed honeybee brood cells. So the fertility of the mites in brood cell is the key factor correlated with infestation level in the colonis. And this aspect has been well studied. Many Studies found that the size of cell strongly affected the number of invaded mites per cell.

Calis et al (1993) and Ramon et al (1993) found more mites in the smaller cells. Goetz and Koeniger (1993) found more mites in shortened worker cells. Willem J Boot (1995) reported that the type of cell affected the attractive period of the cells to the mites and the distance from larva to cell rime preceding cell capping. When this distance was larger in comparison to control cells of the same age, the attractive period of the brood cells was shorter and vice versa.

Maria H. Correa-Marques et al (2003) pointed out that the number of viable offspring that per female reproduced in a brood cells is very important. Stephen J.Martin and Per Kryger (2002) reported that reproduction of Varroa destructor is affected by the space between the developing bee and cell wall, but there is no more data in detailed.

In our study to determine the mechanism why varroa mites do not reproduce on worker brood of Apis cerana (the Asian honeybee), we found by chance that honeybee queens laid worker eggs in drone cells in the fall. We then compared the reproductive output of mites between workers reared in worker-cells (ww) and workers reared in drone-cells (md) and investigated the effects of brood comb cell size on the reproductive behaviour of Varroa destructor. Furthermore, we compared the body weight, length and width of worker broods and drone broods of the same age.

Methods: 1, Apis mellifera recently sealed (within 6 hours) brood cells were selected as transfer-hosts. We obtained phoretic mites from adult workers and transferred them into brood cells with a paintbrush after each cell was opened with a small pin. The opening was sealed with melted bee wax immediately after mite introduction. The brood frames were incubated for 9 days at 35°Ê and relative humidity 70%, after which each cell was opened and mite progeny scored.

2, The body weight of worker broods (n=100) and drone broods (n=100) with the same age was weighed with 1/1000g electronic scale and the body length and width of worker broods and drone broods with the same age was measured with a alliper with aprecsion of 0.05mm.The inner width of each worker cell (n=50) and drone cell (n=50) was also measured with the same alliper mention above. The measurements of width of a cell were made three times for each cell corresponding to the distance between the parallel sides of the hexagonal cell in all three directions. The mean width of three measurements for each cell was used for the width of cells.

Results: 1, It was found that 94.4%(51out of 54) of mites reproduced on ww but only 27.7% (13 out of 47) of mite reproduced on wd (X_c^2= 45.9 p<0.001). In other words, the percentage of reproduction of Varroa mites in workers cell rearing workers brood (ww) (94.4%) is significantly greater than that in the drone cell reareing workers brood (wd)(27.7%) (Fig.1). Further more, the number of female mite offspring of workers cell rearing workers brood (ww) averaged 3.3519±1.5560 is significantly higher than that of drone cell rearing workers brood (wd) averaged 0.4894 ± 0.9295 (t`=11.38, p<0.01). (Fig.2)

Fig 1 Comparison of Varroa mites reproduction

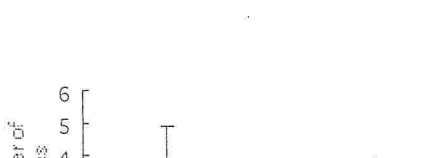

Fig 2 Comparison of offspring number of Varroa mites

2, The body weight ,body length and body width of worker broods are significantly greater than that of drone broods respectively. (Table 1)

Table1 The body weight length and width of worker brood and drone brood

	Body weight_g_x±s	Body length (cm) _g_x±s	Body width (cm)_g_x±s
Worker brood	1.68±0.11 n =100	1.15±0.06 n =100	0.55±0.03 n =100
Drone brood	4.1±0.18 n =100	1.451±0.0601 n =100	0.73±0.05 n =100
t	-114.32	-35.29	-32.10
	P<0.01	P<0.01	P<0.01

3, The inner width of each worker cell is significantly larger than that of drone cell (t=65.39 p<0.01). (Fig 3)

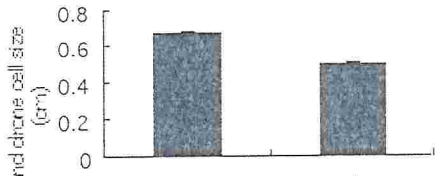

Fig 3 Comparison of worker and drone cell size (cm)

Discussion: From test 2 and test 3, we could find that the body weight, body length and body width of drone broods are significantly greater than that of worker broods respectively and the inside width of each drone cell is significantly larger than that of worker cell. suggesting that if the same age worker brood developed in worker cell and drone cell, the space inside the two type of cells are significantly different.
To our best knowledge, this is the first study to show that varroa mite reproduction can be affected by cell size of the host. It is not clear why mites would reproduce less in the identical hosts that are housed in large cells. One possibility is that workers reared in drone cells are fed a different diet by nurses. The other more plausible mechanism is that workers spin large cocoons in drone cells and mites detect this "geographic" change and somehow change their reproductive behavior accordingly.
This study supports previous studies (Calis et al 1993, Ramon et al 1993, Willem J Boot et al 1995, Stephen J Martin & Per Kryger 2002, Maria H. Correa-Marques et al 2003) which reported honeybee brood cell size affects the reproduction of Varroa destuctor. Our results shows that Varroa mites prefer to live in smaller size brood cell and Varroa mites reproduce less on identical hosts that are housed in large cells. Giancarlo A. Piccirllo and D.De Jong (2003) reported that in Brazil, as in other countries beekeepers have tried to make bees bigger than they are naturally by inducing them to build large comb cells from foundation wax stamped with cell patterns larger than they would make themselves naturally. Larger bee has an advantage in producing honeybee products and resisting diseases. So we should extend such a management practice, in one hand we could get bigger bees, and in another hand the colonies' varroa resistance can be improved.
Conclusion: Taken together, our results suggested that varroa destructor reproduction be affected by cell size and Varroa mites reproduce less on identical hosts that are housed in large cells.

Key words Varroa destructor, reproduction, honeybee comb cell

TURE OF AMERICAN FOULBROOD WITH NTIBIOTICS

No 393

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the summer of 2004 we obtained from another eekeeper 100 deep boxes of drawn comb in which the ees had died the previous year due to American oulbrood (AFB). We could see the spores of the dead rvae in the bottom of the cells. The first of July is the iddle of summer in Idaho, which is in the northwest ection of the United States. For our experiment we put a box with three frames of mostly sealed brood without bees above an excluder, on top of the parent colony using the before mentioned diseased boxes and AFB contaminated frames now mixing the AFB frames into the parent hive. The following morning after the bees had come up through the excluder to cover the brood, we removed the top box with three frames of brood and adhering bees and relocated them about four miles away. As we unloaded the hives we gave them a newly mated caged queen and a gallon of corn syrup. We now had a total of 200 AFB contaminated hives since both the parent and the nuclei have AFB frames. Each of these hives received a generous 2 tablespoons of Tylosin® and Terramycin® mixed with powdered sugar. We treated all of the contaminated hives every 10 days with the Tylosin® -Terramycin® mix for the rest of the summer and into the fall. In October, we reduced the colony to two hive bodies and gave each hive a gallon of corn syrup medicated with Fumidil-B®. These hives were middle to late summer nuclei. They did not make any honey, but cleaned out most, if not all of the AFB spores and made a good cluster to go into winter.
In beekeeping in the western United States with cheap or non-existing honey prices those commercial beekeepers that are still in business rely heavily on pollination, especially the almonds in California, to stay in business. This requires bees being held in staging areas of 500 to 5,000 hives in a one-mile radius. Since there are so many bees in such a small area and very little bloom the bees often rob one another thus spreading American Foulbrood spores.
Before Tylosin® became available the AFB colonies that we found each fall were on the increase. Since we have started using Tylosin® in our

A CASE OF ACUTE INTOXICATION WITH CHLORPYRIFOS IN BEES

No 394

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In 2002 in a forest region situated near Bucharest a high and drastic mortality (85 – 100%) of bees from many apiaries has been recorded. This mortality was registered in the day of the phytosanitary treatments effectuated to the forest.
Bees and spontaneous mellifera flora samples harvested from skirt were taken for the laboratory investigations. The exam effectuated on the collector apiaries zone revealed 100% mortality in gathering worker bees in the first 24 hours. To all colonies, more than 80% of hive adult bees had chitins color alteration, because it became dark with metallic bright appearance. All dying bees presented nervous syndrome: uncoordinated movements, ventral exposition, own axe rotations, flying incapacity, wings extension, posterior feet paralyses, intermittent needle and oral system expulsion.

Bacteriological exam made from dying bees and sealed and unsealed broods were negative for the principals' species of pathologic bacteria. Parasitological exam was negative for the identification of the following mite species: Varroa destructor, Braula coeca, Acarapis woodi, Nosema apis and Malpighamoeba mellificae.
Toxicological exam was performed for pesticides using gas chromatographic method. Chlorpyrifos was identified both in bees and plants.
The cause of mortality was an acute chlorpyrifos intoxication.

A CASE OF ACUTE INTOXICATION WITH DELTAMETHRIN IN BEES

No 395

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In May 2002, in a mellifera zone situated in the east part of Romania a high mortality of bees colonies from all apiaries has been observed. The damages situated at 90% from colonies were registered during and 24 hours after, when phytosanitary treatments were effectuated to rape plantations.
Examination of all apiaries has relived many colonies organized by an average of 7-8 brood frames on different stages of development, dead worker bees and drones with no pathological modifications, massive grouped in the front of hive entrance and on whole harvested zone. Hive moribund bees had normal chitin, but presented uncoordinated movements, ventral exposition, own axe rotations, flying incapacity, wings extension, posterior feet paralyses, intermittent needle and oral system expulsion.
Usual bacteriological and parasitical exams and toxicological determinations regarding pesticides were effectuated on bees, brood and mellifera flora harvested from affected area. The results of bacteriological and parasitical exams were negative. Using gas chromatographic method deltamethrin was identified both in mellifera flora and bees.
The cause of mortality was an acute deltamethrin intoxication.

DUSTING VARROA IN CONJUNCTION WITH THE SCREENED BOTTOM

No 396

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The main objective of the project was to determine how to combat Varroa destructor with sugar. Notwithstanding the fact that the development of highly efficient method to control V. destructor was not the only outline of these trials. Safety of individual adult worker bees undergoing such sugar treatments as well as their colony development was equally as important.
Super-fine ground pure white sucrose (with no additive) was implemented in all trials (including preliminary since 1990) and are referred to as "confectioner sugar" or "powdered sugar" with a nominal mean particle size of 25 - 40µm. A simple apparatus assisted in air dusting the bees with 35g of sugar per colony treatment. Sugar dusting bee colonies is efficient tool in both the diagnosis and control of V. destructor. It was concluded that sugar dusting bees as described was safe for individual bees and colony development and should be included to the integrated pest management (IPM) program.

MITE COMPLEX ON HONEYBEE SPECIES

No 397

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A study was done to identify the types of mite and their population level on Apis mellifera, Apis cerana and Apis dorsata honeybee species at Chitwan, Nepal during rainy, autumn, winter and spring seasons from June 2002 to March 2005. Samples of hundred sealed broods (worker, drones and queens) were collected from each 100 colonies of A. mellifera, 50 colonies of each A.cerana and A. dorsata at monthly interval from 5 different apiaries and locations. The left combs of A.dorsata, A. mellifera and A. cerana and fallen mites on the bottom board of A.mellifera and A.cerana colonies were also collected after putting apistol between the brood frames. The broods and combs of A. dorsata were available from the month of October to April only. The collected samples were examined and studied under the microscope for the identification of mites and data for their population number at different seasons was analyzed statistically. Out of 100 A. mellifera colonies studied, 75 were found infested only with Tropilaelaps clareae mite and 4 with both T. clareae and Varroa destructor. The highest numbers of T. clareae per 100 A. mellifera brood and on bottom board samples were 31.8±5.5 and 49.4±15.2 during late winter and lowest 7.8±2.8 and 9.0±2.1 during autumn season respectively. Out of 50 A. cerana colonies studied, 35 were found infested only with V. destructor. The highest numbers of V. destructor per 100 A. cerana brood and on bottom board samples were 26.9±4.2 and 28.6±2.9 during spring and lowest 3.8±0.4 and 4.5±0.7 during autumn seasons respectively. Out of 50 A. dorsata colonies examined, 25 were found only with T. clareae mite with the highest number 12.1±1.4 during late winter season. The mite V. destructor and T. clareae was found on worker, drone and queen broods. The mite Tropilaelaps clareae is identified as the major pest of bot
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Key words

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No 398

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oest of both A. mellifera and A.dorsata and V. destructor of A.cerana honeybees in Nepalese condition. The mite V. destructor of A. cerana and T. clareae of A. mellifera colonies did not damage A. mellifera and A.cerana bee colonies respectively even when kept close together or on the same apiary for several years. The number of V. destructor in A.mellifera colony was found below 4 and did not reach at damaging level. The inability of V. destructor mite to multiply and reach at significant damaging level for A. mellifera colonies in Nepalese condition is not clearly understood. The presence of mite species was regular throughout the year with the significant population fluctuation during different seasons. The climate in the plains and mid hills of Nepal favors the honeybees to be active throughout the year and also provides a suitable condition for the mite to multiply and damage the honeybee colonies at any time of the year.

Key words: Mite, Mellifera, Cerana, Dorsata

DISTRIBUTION AND PROPERTIES OF GLUTATHIONE S-TRANSFERASE IN APIS CERANA CERANAN AND A. MELLIFERA L.

No 398

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Introduction: Glutathione S-Transferases (GSTs) (EC 2.5.1.18) represent a multigene family of multifunctional proteins, widely distributed in almost all animals and plant kingdoms. The enzymes have been recognized to play an important role in the detoxification of xenobiotics, in both vertebrates and invertebrates. The presence of GSTs activity was reported in honeybees. Smirle and Wisnton (1988) confirmed the presence of GSTs and mixed function oxidase activity in the adult worker bee and reported that as the worker bee forages the specific activity of GSTs activity increases and reaches its highest levels in the adult organisms. GST activity is present in all developmental stages of A. mellifera macedonica. The highest activity towards the substrate 1-chloro-2,4-dinitrobenzene (CDNB) is found in the adult stage and the lowest in the egg. The kinetic characteristics of the whole enzyme change as the insect develops.
We are studying the distribution and properties of glutathione S-transferases from A. cerana and A. mellifera, which represents the main species of China. This study deals with a view to determining eventually their role in the metabolism and excretion of pesticides. In the present work, the result of some of the physical and catalytic properties of this enzyme are reported.
Methods: The ability of the enzyme preparations to catalyse conjugation was examined using the assay procedure described by Habig et al. (1974) with the substrates of CDNB.
Results: Subcellular distribution of glutathione S-transferases in A. cerana and A. mellifera
The GSTs are preferentialiy present in cytosol fraction. The occurrence of a microsomal glutathione transferase activity lower than cytosol was also demonstrated in A. cerana and A. mellifera homogenates. The enzyme activity in A. cerana microsomes was the 50% of the specific activity in mitochondrion and only the 40% of the specific activity in cytosol. In A. mellifera, the activity in microsomes was the 154% of the specific activity in mitochondrion and only the 43% of the specific activity in cytosol.
Tissue distribution of enzyme activity in the A. cerana and A. mellifera adult worker bee
Midgut represented the highest activity per insect organ in both species, then the order of glutathione S-transferase activity A. cerana was head, thorax and abdomen except midgut in descending order. No serum albumin was obtained from Beijing Tongzheng Bio. Com..
2.2. Insects
Western honeybees (A. mellifera ligustica from Australia, A. mellifera caucasica, A. mellifera anatolica, A. mellifera carnica, A. mellifera ligustica H) were supplied from the apiary of the laboratory Apiculture in The Institute of Apicultural Research ,CAAS of China. A. cerana cerana were supplied from the apiary of the College of Agronomy and Biotechnology laboratory of China Agricultural University. All colonies were healthy. Samples of bees were shaken off frames at random and were kept in the incubator at 34.3°Ê and 70% relative humidity for 4h to rid their bowel contents before being used for enzyme assays. Samples were always collected in the late morning to reduce possible diurnal variations in enzyme activity that could obscure differences between colonies.
2.3. Enzyme preparation
Adult A. cerana and A. mellifera worker or isolated organs or body sections, were homogenized in phosphate buffer at pH 6.5.
After centrifuging the homogenate at 10.000g for 20min (4°Ê). The supernatant was collected for determination of enzyme activities and Km .
The enzyme during postembryonic of A. cerana and A. mellifera was prepared from whole bodies of 8-10 individuals.
#The cell debris was prepared from midgut of 90 individuals, as described previously (Kostaropoulos et al., 1996), using a modified homogenization medium (100mM potassium phosphate buffer, pH 6.5, 1mM EDTA).
2.4. Determination of enzyme activities
The ability of the enzyme preparations to catalyse conjugation was examined using the assay procedure described by Habig et al. (1974) with the following substrates: CDNB and DCNB. Routine incubation mixture contained 0.02ml of enzyme preparation in 0.9ml of 0.1M phosphate buffer pH 6.5, 0.03ml of GSH 30 mM in buffer and 0.03ml of CDNB 30mM in acetonitrile. Enzyme activity was determined by monitoring change in absorbance at 340nm, and 25°C, was recorded for 2 min with the control solution as the instrument blank. The activity unit was converted to nmoles of CDNB conjugate using the extinction coefficient·min-1.mg-1pro.

All assays were performed at room temperature and were run in triplicate. Each experiment was repeated at least three times.

2.5 Enzyme activity during A. cerana and A. mellifera development

Enzyme activity was determined with 10,000g for 20 min supernatants of every insect developmental stage. Each assay contained 0.03ml 30 mM CDNB, 0.03ml 30mM GSH in 0.1 M phosphate buffer pH 6.5 at 25°C. Homogenates of nymph, larvae and adult of A. cerana and A. mellifera worker bee were performed at 2.5 insect per ml, nymph of A. mellifera drone 2 nymphs/ml, larve of A. mellifera drone 2.5 larves/ml.

2.6. Localization of the enzyme activity in A. cerana and A. mellifera

All the designated tissues used for localization studies were excised from A. cerana and A. mellifera worker bee from ice-chilled insects. Tissue (head, thorax and abdomen without midguts) homogenates were performed in 0.2 ml of phosphate buffer pH 6.5, midguts in 0.4ml and centrifuged at 10,000 g. Enzyme assays were done using optimum ml of supernatants and 30 mM CDNB, 30 mM GSH in 0.1 M phosphate buffer pH 6.5 at 25°C.

2.7 Enzyme activity in the adult of A. mellifera worker bee development

To obtain worker honeybee of known age a single frame of capped brood were removed from a hive and incubated in darkness for 24h at 34.3°Ê and 70% relative humidity to emerge after shaken off adult bees. Emerged adult insects were transferred to a honey frame and collected randomly at desired times using a pair of tweezers. The abdomen was used for preparation enzyme insect develops. The number of isoenzymes and their rate of expression vary as the insect develops (Athanasios et al., 2004a). The enzyme is heterodimeric with subunit molecular masses of 29 and 25kDa, respectively. Two main isoenzymes with distinct kinetic properties are present, with isoelectric points of 7.40 for the alkaline and 4.58 for the acidic forms, respectively. The two enzymes are induced independently by factors such as insecticide treatments and environmental conditions, including low temperatures or starvation (Athanasios et al., 2004).

FIELD TESTING A "PUSH-PULL" IPM SEMIOCHEMICAL-BASED TRAPPING SYSTEM FOR VARROA MITE CONTROL

No 399

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Varroa mites (Varroa destructor) rapidly changed beekeeping and beekeepers following their U.S introduction in 1987. Beekeepers, once largely chemophobic, quickly adapted to placing synthetic acaricides, and increasingly a host of other chemcial substances (i.e. acids, botantical oils, petroleum derivates), within their colonies. The varroa mite has subsequently developed tolerance/resistance to such compounds and residues from some of these materials have appeared in honey and wax products. Untreated colony infestations are considered fatal to colonies, usually within 1-2 years, although non-chemical control methods may alter this outcome, at least in the short run (Caron & Hubner 2003a & citations therein). Annual colony losses, once below 10% run 50% or higher (Caron & Hubner, 2003b) putting in jeopardy adequate pollination of several crops in the $14 billion U.S. pollination rental business.

We held tested in 2004 and plan to repeat again in 2005 prior to Apimondia a "push-pull" IPM stragedy to varroa mite control using bee produced semiochemicals in conjunction with IPM Technolgies of Portland OR (supported by a USDA SBIR research grant "Development of Semiochemical-based Trapping System for the Varroa mite – 98-00199). Using commercially developed colony bottom board sticky traps (Caron & Hubner 2003a), we independently tested Nasanov gland attractants to "pull" mites to traps and semiochemicals demonstrated in smaller-scale lab studies to "repel" mites, to "push" mites from bee bodies making them vulnerable to capture in bottom board traps. In lightly infested colonies, increased varroa capture should reduce the rapid buildup of mite populations. Our field test in 2004 produced mixed results with analysis not showing hoped for increased capture rate. We will have 2005 field test results by Apimondia to compare with our 1st season field tests.

EVALUATION OF A NEW VARROA TREATMENT IN ROMANIA

No 400

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In Romania, varroosis represents one of the most important parasitical diseases of bee colonies. A new veterinary product, VARACHET FORTE has been tested for the treatment of this disease. It was administrated by fumigation. This medicine contains two acaricide substances: amitraz and fluvalinate. Recommended doses for administration don't affect the vitality of bee colonies or the quality of hive products.

The tests have been effectuated on 360 colonies, from vertical beehives with multi-storeyed possibilities, belonging to the Institute for Research and Development in Apiculture. After annual applications in spring and autumn, it was established the efficiency of the treatment by clinical exams in apiaries and by laboratory analyses.

The veterinary medicine is authorized by the National Veterinary Authority for the Control of Drugs and by the Romanian State Office for Inventions and TradeMarks

UNDULY AGGRESSIVE BEHAVIOUR IS GENETICALLY MORE RELATED TO DEFORMED WING VIRUS RATHER THAN TO KAKUGO VIRUS

No 401

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Iflavirus RNA was detected by RT-PCR in honeybee colonies displaying unduly aggressive behavior and with no evidence of morphological alterations. Sequence analysis of the 3' end of the genome (RNA-dependent RNA polymerase, RdRp) revealed that the iflavirus strain was more similar (> 99% aa) to Deformed wing virus (DWV), usually associated to morphological alterations of bees, rather than to the newly-described Kakugo virus (KV) (about 95% aa), that has been associated to increased aggressiveness. Although genetically resembling DWV, the iflavirus strain detected in the Italian hives was apparently associated to a KV-like phenotype. RT-PCR detected the iflavirus RNA in the abdomen of the workers, and only in one case in the head. Unexpectedly, no viral RNA was detected in the drones, a pattern of virus distribution across the honeybees casts that is in apparent conflict with the higher rates of infestation of drones by the mite Varroa destructor. The identification of a virus with apparently intermediate features between DWV and KV open new perspectives on the patho-biological role of iflaviruses in the honeybees.

AMERICAN FOUL BROOD CONTROL IN HONEY BEE COLONIES

No 402

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Preface: AFB make difficulties in all over the world. Because its spore is resist to normal disinfectant and also disinfectors in colony against spore is not possible. So at contaminated area it must be treated because destroying all infected colonies isn't successful and economic.

Controlling principle: The fundamental point is to control the bacteria growth and prevent spore producing by bacteria. So that bacteria will be disappear after a period and the sequent of producing bacteria and spore will be stopped. Therefore spore destroying is not possible so the bacteria growth must be stopped by oxy tetracycline.

Treatment method: first of all dividing infected colonies and non infected colonies by clinical signs (symptom) is necessary. An intensive treatment at infected colonies for treating and normal treatment at non infected colonies for prevention of disease appearance is the basic. So one dose oxy tetracycline 20% in sugar syrup 3-6 repeat with 7 days interval for infected colonies and one dose 1-2 repeat for second group is enough.
It is important to clean the colonies and remove visually infected combs with larva and burn out to prevent spreading spore around area. Change the colonies place and quarantine rule at both groups is necessary and useful. Also for wax (comb sheet wax) and reused combs (empty combs) prevention treatment must be done.

Conclusion: AFB would be controlled by this procedure successfully. However the waxes contaminated with spore and / or clinical signs at colonies before treatment must be removed and before each treatment monitoring is necessary. Treatment after 2 times monitoring at colonies with no clinical signs observed completed.

A SURVEY ON AMERICAN FOUL BROOD IN CHAHARMAHAL AND BAKHTIARY PROVIANCE FROM JAN 2003 TO MAR 2004

No 403

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Introduction: American foul brood is a kind of brood diseases. It is caused by a spore-forming bacterium called Paenibacillus larvae. It is one of the most destructive brood disease in our beekeeping industry .In our province (Chaharmahal and Bakhtiary) it is one of the causes of deaths at apiaries for this reason, we tried to investigate the spread rate of this disease. In our province, from Jan 2003 to Mar 2004 honey and larvae were collected from 99 apiaries .The samples were taken from 10 percent of the colonies. The result showed that 93 cases of honey and 33 cases of larvae were infected with bacillus larvae.

Methods: The determination of pollution of broods has done through Hanging Drop (M.H.D) and bacterial culture of honey and brood in MYPGP Agar and colombia blood agar.

Results: The studies during these months include below results:
1860 sample which were examined during14 months about 93 cases in honey and 33 cases in brood, were polluted by P.bacillous larvae.
In the apiaries which we recognized the A.F.B, we have done some hygienic care, prophylaxis treatment by drugs such as oxytetracyclin.
It is necessary to explain that this drug which is used for removing the disease in polluted beehive is effective on the vegetative form, and suppress signs of the disease

without eradicating where as it have any effects on the spore.
Some of the infected colonies were destroyed by burning. The bees were killed, and together with the combs were burned in a deep pit.
Discussion: American foul brood is one of the most destructive brood diseases. Through out the world,In different countries, different prevention and control strategies are used. This study which was carried out in had the following results:
From among the samples which were examined during 14 months, 93 cases(5%) of honey and 33 cases (1.7%) of larvae had infection symptoms. In the apiaries in which American foul brood was identified, hygienic, preventive and antibiotic treatment measures were taken. When the disease was identified and the beekeepers were informed, antibiotic treatment began. Oxytetracyclin was administered to the infected colonies. (OTC) is effective in the vegetative form of the bacillus larvae. It masks the signs of the disease.and dosen't have any effect on the spores. Therefore the prevention is more important and more effective than treatment.

NEW METHOD FOR DEVELOPING NATURAL DRUGS AGAINST BEE DISEASES: NEW AND HIGHLY EFFECTIVE REMEDIES AGAINST CHALKBROOD AND THE NOSEMA DISEASE

No 404

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Remedies created from natural ingredients, unlike antibiotics and untested chemicals, can be effective without threatening to pollute the honey. This is the reason why Chemor Ltd has chosen to focus its development efforts on products that contain no antibiotics or untested chemicals.
We have developed two new and highly effective remedies, one against chalkbrood, and the other against Nosema disease. One of them, called Beepharmacy, prevents chalkbrood and successfully treats the already developed disease, while significantly diminishing Varroa destructor external parasite infections. The product has been marketed in Hungary since the year 2000. The other, called Nonos, prevents Nosema disease and successfully treats the already installed disease. The product has been marketed in Hungary since 2004.
The development process starts with identifying hives that have historically been more resistant to one of the diseases than an average hive. Afterwards, we identify the plants and fields that the more resistant hives tend to visit. The end product of this stage is an extensive database of hives, health record and plants contacted. This is followed by a careful factor analysis to identify the likely drivers of relatively good resistance record. The number of selected factors is decreased through systematic testing. The final phase is another round of in vivo and in vitro experiments designed to identify the mos effective treatments.

ELIMINATION OF AFB INFECTED COMB, IN ALL STAGES, FROM 15,000 FRAMES USING HIVE MANIPULATION, A SPECIAL DIET, AND A SMALL AMOUNT OF ANTIBIOTICS.

No 405

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American Foulbrood is a bacterial disease referred to as Paenobacillus larvae, gram positive, that affects larvae one to two days of age. When bees receive Caspian Solution (liquid protein), their hypopharyngeal glands produce surplus jelly and the pheromone in Caspian Solution encourages pollen consumption. The result is higher jelly production, which is used for larvae and queen feeding. Larvae develop stronger immunity to bacterial disease due to higher nutrition. As adult bees clean cells and old pollen, they consume AFB spores. Some of the spores are defecated outside the hive. Some spores are fed to larvae. Spores fed to larvae germinate into active foulbrood, which is killed by the antibiotic before it affects the larvae. The amount of antibiotic is miniscule, approximately 4% of the amount used in preventative feeding in North America. During treatment of 15,000 frames of infected comb, all hive boxes were scorched with fire. Three treatment methods were used as follows:
A: 5,000 frames containing scale and spores. Diseased frames were of two sizes, Dadant and Langstroth. Dadant frames were assembled into three-high colonies (30 frames) and Langstroth frames were assembled into two-high colonies (20 frames). Each colony was provided with a 5 kilo package of bees and new queen and fed 200 ml of Caspian Solution every fourth day for three weeks, then 100ml of Caspian Solution every eighth day for two weeks.
B: 10,000 frames with honey containing spores but no scale. Each box of 10 frames were added to one healthy single-brood box colony, in early spring, and fed 200ml of Caspian Solution every fourth day for 21 days.
C: 200 frames with active foulbrood. Brood cappings were removed by scratching. Each box of 10 frames was provided with 2 kilograms of package bees and a new queen and fed 200ml of Caspian Solution every fourth day for three weeks, then 100ml for two additional weeks.
In all treatment methods, AFB disease was completely eliminated. At no time were the hive boxes, frames, or comb irradiated.

PRACTICAL EXPERIENCE IN DISEASE CONTROL IN IRAN AND CANADA

No 406

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Caspian A powdered different a concluded manufactu four comm residues. 2 used and most of th The techni strains. 4. specialists cobalt 60 g radiation o disease, b procedures practical fo experience burning as diseases re considered control ste poor proce Apiary tear involving b from privat The colonie and southe Apiaries pr disease co report the disease co royal jelly, and a new

STUDY OF ETHEREAL

No 407

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Trakia Univ

Email: izhe

The acaricid sclarea L.), (Origanum graveolens candy) is in the autumn groups are Bee colonie

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Our family has been beekeepers for 165 years. In 1980 migratory beekeepers brought disease and varroa mite to our home region for the first time and 98 percent of our bees died. These pivotal events inspired the family to research and develop pest and disease control strategies to protect our apiaries and other beekeepers from similar crises.
Caspian Apiaries has conducted experiments with powdered and liquid antibiotics incorporated in many different application techniques. The authors have concluded that the protocols suggested by medication manufacturers and most government specialists have four common problems. 1. Many methods lead to residues. 2. Large quantities of the chemical must be used and wasted, as the pathogen remains isolated from most of the medication that is placed in the colony. 3. The techniques promote the development of resistant strains. 4. Most techniques are very expensive. Many specialists suggest physical techniques such as: shaking, cobalt 60 gamma radiation, high velocity electron beam radiation or, in the case of American Foulbrood [AFB] disease, burning of combs and boxes. Obviously these procedures are: expensive, labour intensive and not practical for large commercial beekeepers. It is our experience that beekeepers view shaking, radiation and burning as their "last desperate choice", therefore, diseases reach epidemic levels before they are considered. In addition, operational problems in disease control stem from lack of information, misinformation, poor procedures, and insufficient education. The Caspian Apiary team is unique as it is a collaborative effort involving beekeepers, microbiologists and bee specialists from private, academic and government research groups. The colonies included in the studies are from northern and southern Iran, British Columbia and Alberta. Caspian Apiaries promotes the use of natural and biological disease control as the future in this field. This paper will report the successful application of two biological disease control products: Caspian Solution, a blend of royal jelly, pheromones, and other natural ingredients, and a new bacteria phage.

STUDY ON THE ACARICIDAL EFFECT OF SOME ETHEREAL OILS ADDED TO THE FOOD OF BEES

No 407

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The acaricidal effect of ethereal oils of salvia (Salvia sclarea L.), basil (Ocimum basilicum L.), white marjoram (Origanum heracleoticum L.) and dill (Anethum graveolens L.) added to food of bees (honey – sugar candy) is investigated. The experiment is carried out in the autumn of 2003. Two control and four experimental groups are formed from equal bee colonies.
Bee colonies are fed three times at an interval of seven days with honey – sugar candy (100g single dose), including 1% ethereal oil for experimental groups. The extensinvasion among bee colonies at the beinning and the end of the experiment and the number of mites (Varroa jacobsoni) fallen at the bottom of the hive at an interval of seven days are detected. Colonies from first control group (K1) are treated with RODOVAR (active substance amitrase) and those from second control group (K2) are not treated with acaricidal preparation aiming detection of the number of naturally fallen mites. Control treating with APIPROTECT (active substance coumafos) is done at the end of experimental period. The effectiveness of the tested ethereal oils as acaricidal means is calculated based on the results.
It is found that ethereal oils of salvia, basil, white marjoram and dill, added to honey – sugar candy in a dose 1%, have an acaricidal effect on the mites Varroa jacobsoni. The current lower effectiveness (37,38 – 43,21%) than the effectiveness of treatment bees with RODOVAR (99,07%) is as a result of the attachment of the tested ethereal oils to the food of bees.

STUDY ON THE ANTIBACTERIAL AND ANTIMYCOTIC ACTIVITY OF SOME ETHEREAL OILS TO STRAINS OF MICROORGANISMS CAUSING DISEASES IN BEES AND BROOD

No 408

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The antibacterial and antimycotic activity of the ethereal oils of savoury (Saturea montana L.), thyme (Thymus vulgaris L.), white marjoram (Origanum heracleoticum L), salvia (Salvia sclarea L.), dill (Anethum graveolens L.), chamomile (Matricaria chamomilla L.), Hyssopus officinalis, basil (Ocimum basilicum L), peppermint (Mentha piperita L.), lavender (Lavandula angustifolia Ch.) and thymol (crystals) to some strains of microorganisms has been studied. The experiment was conducted in 2004.
A total of 25 strains of the various microorganisms isolated from sick bees, brood and bee honey: Paenibacillus larvae var. larvae, Paenibacillus alvei, Paenibacillus paraalvei, Ascosphera apis. The antibacterial and antimycotic activities have been established by determining the minimum inhibiting concentrations (MIC) by method approved by NCCLS.
High antibacterial activity (MIC = 0,012 - 0,025%) to the tested microorganisms has been established in ethereal oils from savoury, thyme, white marjoram and thymol (crystals). Salvia, dill, lavender, basil and peppermint oils have MIC = 0,1% to all agents causing disease in bees and brood. Low antibacterial activity (MIC ≥ 0,2) to all tested strains has been recorded in chamomile and Hyssopus officinalis oils.
With regard to the antimycotic activity ethereal oils from savoury, thyme, white marjoram and thymol (crystals) show MIC = 0,025%, basil and peppermint oils – MIC =

0,1% and lavender, dill, salvia, chamomile and Hyssopus officinalis oils – MIC ≥ 0,2 to the Ascosphera apis strains.

AEROSOL TREATMENT OF BEE COLONIES AGAINST VARROOSIS

No 409

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The experiments in the autumnal months compared the efficacy of the treatment of honeybee colonies against varroosis by fumigation, by aerosol based on water solution and by aerosol on acetone solution at the use of minimalized dose of amitraz (6-7 mg per colony). Method of cross treatment was applied, outdoor temperatures ranged from 11 °C to 15 °C. No significant differences between the efficacy of individual application methods were found, the efficacy reached values 95%.

AGAINST VARROA ALL YEAR ROUND IN THE CZECH REPUBLIC, INTEGRATED CHEMICAL CONTROL WITH MINIMALIZED DOSES

No 410

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For more than 15 years on the territory of the Czech Republic there is applied an organized system of varroosis control based on following scheme. At the summer end beekeepers on exposed areas monitor the natural fall of mites on double pads. If daily falls also at individual hives are about 5 and 10 mites per a colony, on the whole bee yard and as far as possible also on neighbouring bee yards after the last honey harvest medicaments are applied on carriers with long time effects (1,5g acrinathrin on a strip). In the months October to November bee colonies are treated twice to three times by fumigation or by aerosol of medicaments with the active substance amitraz in the dose 6mg per colony and the treatment or by fluvalinate in the dose 1mg per colony. In November and December at temperatures below 10°C these medicaments are applied in the aerosol form. Winter debris of all colonies is investigated as to the presence of mites. If on average more than 3 mites per colony are found, the whole site is treated by painting the sealed brood by fluvalinate water emulsion in maximal dose 3mg per colony. In the crop period no chemical medicaments are to be applied. The implementation of this system in the practice is based on the close co-operation of the Czech Association of Beekeepers and State Veterinary Administration as well as in close co-operation with the Bee Research Institute Dol. Up to the present time no mass mortalities due to the varroosis have been recorded. 2003 and 2004 at the investigation of winter debris 39 and 42% of sites respectively were without find. The regular residues monitoring has not recorded any case of the content of the applied substances above the limit of applied methods. The values of amitraz and its degradation products in the beeswax have not exceeded 20ppb.

SURVEY ON THE _13C VALUES OF DIFFERENT HONEY TYPES

No 411

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In 1979 the first official method for adulteration of honey with C4-sugars by stable carbon isotope ratio analysis (SCIRA) was established in the US as AOAC 978.17. In 1991 the method was improved by adding the internal standard procedure (ISCIRA, AOAC 991.41) as with the difference between delta 13C honey protein and delta 13C honey adulteration can be detected more accurately. In 1992 (Roßmann et al.) and in 1998 (White et al) different data for honey worldwide have been published. Results of the QSI database are compared with these published data. Basis are the results of imported honey tested by QSI for private industry in Germany within their quality control during the last six years (honey source as declared by the clients). The maximum, minimum and the average _13C honey and _13C protein values for all samples resp. for selected honey types as well as the main range are presented. Differences resp. correspondence with published data are discussed.

THYMOVAR CONTAINS THE NATURAL SUBSTANCE THYMOL TO CONTROL THE VARROA MITE – FIELD RESULTS FROM DIFFERENT COUNTRIES.

No 412

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THYMOVAR is a natural means of controlling the varroa mite that is well tolerated by bees. It consists of the essential oil Thymol loaded onto a sponge (rectangular wafer) allowing for a slow release of this active substance. The THYMOVAR wafers can easily be placed on the top bars of the combs.
Several field studies from different countries confirm the good efficacy, if the treatment is optimally adapted to the prevailing conditions (especially temperature) and to the different types of hives.

CONTROL OF THE VARROA DESTRUCTOR WITH OXALIC ACID

No 413

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In sequence of several treatments made in apiaries with registed products, we have noticed that varroa is still destructing hives. Therefore we have decided to experiment the application of oxalic acid with Varrox vaporizer.
Treatments took place in winter, because there are less closed breeding and also because bees are in period of hibernation. We have made treatments using 2grams of oxalic acid by colony, totalizing 60 hives. Two treatments have been made with a 15 day break, due to the existence of one to two breeding frames.
During 3 years of study we have verified that bees tolerate the oxalic acid. There are no signs of queens' death and the average efficiency in reducing varroa population was 93%. According the following field investigation we have concluded that this method might be a good alternative to the control of Varroa destructor.

INTEGRATED CONTROL STRATEGIES AGAINST VARROOSIS IN HUNGARY

No 414

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The Millennium has brought serious new challenges to the apiculture and honey production. Honey as human food of animal origin has to meet increasingly strict quality requirement, therefore, strategies of bee disease prevention, including varroosis, have to be managed accordingly, in the light of such requirements.
Early hopes about the eradication of Varroa using chemotherapy have vanished in the passing years. This work offers options for solutions of general approval (as have been achieved in some countries already), acceptable for both the Hungarian veterinary authorities and apiculturists securing the reputation of quality of Hungarian honey.
Two types of integrated control strategies are recommended here against varroosis. Type „A" version consists of oxalic acid and formic acid treatments which suits to ecologic apiculture guidelines. Type „B" version allows amitráz fumigations and coumaphos diagnostic treatment along with the oxalic acid and formic acid treatments.
Integrated strategies can be effective only if the work is based on organized diagnostic procedures. The continuous observation of the natural mite fall, conforming the number of foretic mite populations, and in scheduling optimally timed treatments is equally critical as well as to constantly monitor the efficacy of the management care progress, and to scrutinize the drug resistance of the mites.

DETECTION OF DRUGS AND ACARICIDES IN HONEY

No 415

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Hungarian honey has an excellent reputation in the European market. Because of the presence of some bee diseases regular control measures have to be used in our country. To prevent drug contamination a modern honey analytic laboratory started working in our institute at Gödöll_, recently.
We have adapted separation and concentration methods to detect different antibiotics. Special Hungarian honeys as linden honey contain flavonoids that components disturb the detection of tetracyclines. That is why we had to look for new resolutions absent in the literature. The determination was performed by High Performance Liquid Chromatographic (HPLC) method. Using micro extraction column this method is able to separate nine different antibiotics in our conditions. Samples were washed and solved from that column and evaporated with vacuum concentrator later on injected into HPLC system under isocratic condition. HPLC separation was carried out by simple acetonitrile/water = 25/75 mixture and U.V. detector. We were able to determine 200ppb concentration of each antibiotic compound.
To determine amitráz in honey a simple method has been adopted recently. Honey samples were mixed with hexane and the upper phases separated subsequently twice in each case. Than we united hexane fractions and dried with vacuum concentrator and at last injected into HPLC system to detect this akaricid often used to combat Varroa. By this method we could detect 300ppb of amitráz as well as from beeswax. Calibrations of determinations under our conditions were linear.

DETERMINATION OF 1, 4-DICHLOROBENZENE IN HONEY AND ROYAL JELLY

No 416

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Wax moth Galleria mellonella attacks and destroys honeycombs during storage. Beekeepers to avoid this damage use several insecticides. Among them 1,4-dichlorobenzene (PDCB) is the most worldwide known.

However, this substance is lipophilic and absorbed in wax, so it is carried in honey.
In this work, we examined the transfer of PDCB in honey and royal jelly. For this purpose, four new combs treated with PDCB, ventilated and placed in two hives. The colonies fed with syrup and when broad appeared in the treated combs the queen was removed. Queen cells were formed and the royal jelly was collected.
Simultaneously ripe honey was harvested from the same frame. After the collection, the combs return into the hives and the process restarted. All samples were stored at -18_C until analyzed. The experiment repeated twice.
A Purge & Trap system was used for the extraction of PDCB. Detection and the identification of the analyte were performed on a Gas Chromatograph attached to a Mass Spectometer system. The calibration curves were carried out by spiking aliquots of residue-free honey and royal jelly with known concentration of PDCB acetonic solutions. Each sample of honey and royal jelly analysed twice
1, 4-dichlorobenzene was detected in all samples. The quantitation shown that the concentrations of PDCB in honey were significant lower than in the royal jelly. In some cases, the contaminated royal jelly had some hundred times more residues than the honey from the same frame.
In conclusion, PDCB not only can be found in honey, but also may appear in royal jelly in high concentration, especially when it is collected from queen cells that bees construct on frames that previously had been treated by PDCB.

HOW SMALL HIVE BEETLE (*AETHINA TUMIDA*) DENSITY AFFECTS BEETLE OVIPOSITION IN BEE BROOD AND SUBSEQUENT REMOVAL OF BROOD BY EUROPEAN HONEYBEES (*APIS MELLIFERA*)

No 417

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In this study we determined how small hive beetle (Aethina tumida) density affects beetle oviposition in bee brood and subsequent removal of brood by European honeybees (Apis mellifera). In 32 Langstroth colonies, beetles in each of four densities (5, 10, 15, 20) were allowed to oviposit on a 10-cm2 section of capped bee brood for 24 hours. The location of individual brood cells in which beetles oviposited (determined by identifying beetle-made perforations in brood cappings) was marked with a sheet of transparent acetate; brood was then returned to the colonies for an additional 24 hours, removed, and proportion of cells removed by bees determined by examining the acetate reference sheets. Bees removed more perforated brood (brood in which beetle oviposition perforations were present) than control brood (brood in which beetles were not allowed to oviposit) – 35% and 0.6%, respectively. Further, bees removed more perforated brood if the brood cell was bordered by at least one empty cell (44%) than if the brood cell was totally surrounded by other brood (25%). This probably occurs because brood bordering empty cells offers beetles two oviposition sites – through the cell capping and through the cell wall. On average, perforated cells bordering empty cells were more likely to contain beetle eggs and contain more eggs (57% containing eggs with 25 eggs/cell) than perforated cells completely surrounded by other brood (32% containing eggs with 16 eggs/cell). Concerning beetle density, bees removed more brood exposed to 15 and 20 beetles (40% each) than brood exposed to 5 or 10 beetles (29% each). Oviposition rates were similar for all beetle densities except at 10 beetles (44%, 60%, 47%, and 49% for 5, 10, 15, and 20 beetles respectively) as were the number of eggs/cells except at 5 beetles (13, 24, 25, and 21 eggs/cell for 5, 10, 15, and 20 beetles respectively). Because oviposition rate and number of eggs/cell varied only slightly among the four beetle densities, it is likely that the total number of cells in which oviposition occurred (6.7, 6.3, 9.6, 10.3 for 5, 10, 15, and 20 beetles respectively) played a more critical role in the number of perforated cells removed by the bees. The data suggest that bees can detect and remove all brood in which beetles have oviposited.

DETERMINING AN ECONOMIC THRESHOLD FOR THE SMALL HIVE BEETLE (*AETHINA TUMIDA*) / VARROA (*VARROA DESTRUCTOR*) PEST COMPLEX IN HONEYBEE COLONIES OF THE SOUTHEASTERN UNITED STATES

No 418

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We report preliminary data on determining an economic threshold for the small hive beetle (Aethina tumida, SHB) / varroa (Varroa destructor) pest complex. The experimental design was a split-plot ANOVA blocked on state (Georgia or South Carolina USA). Within each state, each whole plot consisted of one of 5 apiaries in which average colony SHB populations were manipulated to achieve 0, 150, 300, 600, or 1200 adults. Within each whole plot (apiary) each colony was randomly assigned one of three fluvalinate treatments (continuous, August, October, two colonies per treatment) in order to experimentally vary varroa numbers (0, 3172, and 6662 mites respectively). Colony strength parameters were sampled bi-monthly to determine SHB/varroa effects on colonies. These parameters included cm2 brood, adult bee population, bee weight, number of varroa on a 24-hour sticky screen, number of beetles in a 12 hour sample jar, level of tracheal mite infestation and colony weight.
In 2004 there were no significant effects of any SHB population on colony weight ($F = 2.5$; $df = 4, 26$; $p = 0.10$), number of adult bees ($F = 0.7$; $df = 4, 26$; $p =$ 0.61), or c
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0.61), or cm2 brood (F = 2.7; df = 4, 26; p = 0.08), nor was there an effect of varroa treatment time on colony weight (F = 1.6; df = 2, 26; p = 0.25) or cm2 brood (F = 1.7; df = 2, 26; p = 0.22). There was an effect of varroa treatment time on bee population (F = 4; df = 2, 26; p = 0.04). Trends in the data suggest that colonies having few (150) or no SHB were heavier and contained more adult bees by the end of the first season than were colonies having $300 SHB. Colonies receiving continuous fluvalinate treatments were heavier and contained more adult bees and more cm2 brood by the end of the first season than did colonies receiving fluvalinate treatments in August or October (both decreasing respectively). Data from one season show no conclusive evidence that any tested population of SHB negatively affected colonies in any of the measured strength parameters, although trends exist. A second season of data should more conclusively illuminate how SHB and varroa interact to the detriment of colonies.

CLASSIFICATION AND QUANTIFICATION OF THE DAMAGES TO *VARROA DESTRUCTOR* AS A CONSEQUENCE OF GROOMING BEHAVIOR OF SYENICHKO-PESHTERSKI HONEYBEE ECOTYPE

No 419

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Behavioural defense of honeybees against Varroa destructor implies grooming behaviour, an important mechanism which enables individuals and groups of bees within a colony to remove dust and pollen from their bodies, to disperse pheromones, and to remove ectoparasites. In grooming, adult bees detect and remove phoretic Varroa mites from themselves (auto-grooming) or from nestmates (allo-grooming). In the process, the legs of the mite may be cut off or the cuticle of the idiosoma may be damaged by the bees' mandibles, causing the damaged mite to fall to the bottom of the colony. Grooming behaviour involves biting and licking with the mouthparts and movements of the mesothoracic legs (Boecking and Spivak, 1999). As differences in the rates of specific types of mite damages, such as damaged legs, may be indicative of tolerance capabilities by the bees, such investigations were undertaken in this work. Varroa mites were collected from bottom-boards of 20 potent honey bee colonies (10 with one-year old queens and 10 with two-year old queens) of of Syenichko-Peshterski honey bee ecotype). Classification and quantification of the damage to Varroa destructor were done in accordance with the criteria established by Correa-Marques et al. (2000). The most frequent category of damage was damaged legs (53.38% in potent colonies with one-year old queens and 52.02% in potent colonies with two-year old queens), while other types of damages were less frequent. In potent colonies with one-year old queens there were: 22.25% damaged shields + damaged legs, 17.03% hollow in the dorsal shield + damaged legs, 3.00% depression or hollow in the dorsal shield, 2.74% carcass empty dorsal shield, 1.60% damaged shields. In potent colonies with two-year old queens the analysys revealed: 21.16% damaged shields + damaged legs, 16.23% hollow in the dorsal shield + damaged legs, 5.74% depression or hollow in the dorsal shield, 3.53% carcass–empty dorsal shield, 1.32% damaged shields.

PHYLOGENETIC DIVERSITY OF CENTRAL-EUROPEAN BLACK QUEEN CELL VIRUS GENOTYPES.

No 420

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The phylogenetic relationship of Black Queen Cell Virus (BQCV) genotypes from Austria, Hungary and Poland was investigated in this study. Larvae, prepupae and pupae of queens, and adult worker bee samples were homogenized and from the supernatants viral RNA were extracted. Two primer pairs amplifying partial genomic regions of the helicase gene and the structural polyprotein gene were designed, based on the complete BQCV sequence published in the GenBank database. Amplicons were produced using one-step reverse transcription polymerase chain reaction (RT-PCR). The nucleotide sequences of the RT-PCR products were determined in direct sequencing reactions. The phylogenetic analysis was performed employing the ClustalX and TreeView softwares.
The European BQCV genotypes showed 82-84% nucleotide (nt) identity and 93-95% amino acid (aa) identity in the helicase domain region; and 91-93% nt identity and 98-100% aa identity in the structural protein coding region to the South-African reference strain. The European genotypes were 83-96% similar to each other in of the helicase domain, and 90-98% in the structural protein region. The Hungarian and the Austrian genotypes were more similar to each other in both regions, than the Austrian and the Polish genotypes or the Hungarian and the Polish genotypes.
Phylogenetic trees were constructed to demonstrate the relationship between the investigated genotypes. The genetic diversity of the investigated viruses reflects to their geographical origin: the Hungarian and Austrian genotypes are phylogenetically closer to each other, than to the Polish ones. The South-African reference strain is unambiguously separated in each tree. Interestingly, the position of some Hungarian and Polish isolates differs in the two trees, which might be explained by genetic recombination. Further investigations are needed to determine the factors influencing the genetic diversity of BQCV, as well as its role in the pathogenicity, and

therefore the possible economical impact of BQCV in queen rearing.

OCCURRENCE OF SIX BEE VIRUSES IN HUNGARIAN APIARIES

No 421

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A survey on the occurrence of the six honeybee pathogen viruses, the Acute Bee Paralysis Virus (ABPV), the Black Queen Cell Virus (BQCV), the Chronic Bee Paralysis Virus (CBPV), the Deformed Wing Virus (DWV), the Kashmir Bee Virus (KBV), and the Sacbrood Virus (SBV) was carried out using single tube one-step reverse transcription-polymerase chain reaction (RT-PCR) method. Samples of adult bees were collected between 1999 and 2004 in 52 Hungarian apiaries situated in different regions of the country. Samples were checked for the presence of Varroa destructor. Mite samples were also collected from the varroa-infested bee samples. Specific primer pairs were designed from the complete or partial genomes of the investigated viruses, published in the GenBank database. One-step RT-PCR reactions were performed on the RNA extracts of 65 honeybees, and 11 mite samples to detect the aforementioned viruses in separate reactions. Positive results were verified by direct sequencing of selected amplicons.
The majority (94%) of the apiaries were infected with at least one of the investigated viruses. DWV was found in 60%, BQCV in 54%, ABPV in 37%, and SBV in 2% of the apiaries, respectively. Neither CBPV, nor KBV was detected in the investigated samples. Single virus infection was found in 36% of the apiaries, while in 46% two viruses, and in 12% of the apiaries, three viruses were found. In mite samples only DWV and ABPV were found; simultaneous infections were detected in these samples too.
According to the results of the survey, DWV is the most widespread in Hungarian apiaries. Interestingly, compared to the occurrence and distribution of these viruses in the Western-European countries, the Hungarian apiaries show slightly lower frequencies of infections, and diversity of viruses. Further surveillance might reveal the changes in the occurrence of bee-infecting viruses in the country in the following years.

ACARICIDE RESIDUES IN GREEK AND CYPRIAN HONEY

No 422

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Acaricides residues have been detected in honey samples analyzed in various countries at ppb levels. The most often reported residues found in honey, are the acaricides bromopropylate, coumaphos, malathion and tau fluvalinate. A survey for pesticide residues in honey was carried out between honey producers, beekeepers and commercial samples from Greek and Cyprian market during the years 2003-2004. Moreover, the compliance of beekeepers with Good Apicultural Practice was investigated.
Analyses were performed by a multiresidue method including a C18 Solid Phase Extraction procedure for the isolation of acaricides and GC/ ECD detection, covering over 40 pesticides. A HP6890 gas chromatograph equipped with a _ECD, an intermediate polarity DB-608 capillary column and a HP7683 autosampler was used for the determination of acaricides. Confirmation of the results was performed by analyzing the samples on a HP5890 GC, equipped with an ECD, a non-polar HP-5 capillary column and a HP7673 autosampler. A total number of 183 Greek and 148 Cyprian honey samples were analyzed.
In 74.6% of samples collected from both countries (a total of 331) at least one pesticide was detected. The most often found acaricide was coumaphos, present in 68.0% of samples while tau fluvalinate was determined in 32.3% of all samples. Finally bromopropylate was not found in any sample. In 0.8% (1 out of 129) of samples from market and 3.0% (6 out of 202) of samples collected from beekeepers, concentrations of coumaphos residues were exceeded the MRL, which is 0.1mg/kg. Totally, 2.1% of all samples was exceeded the E.U. and national MRL of coumaphos. Furthermore, residues of malathion, a non-registered for apiculture insecticide, were found in 6.6% of samples.
Consequently, 29 of 331 (8.8%) samples were not compliant with the EU regulation.

AN IFLAVIRUS OF HONEYBEES ASSOCIATED TO UNDULY AGGRESSIVE BEHAVIOUR IS GENETICALLY MORE RELATED TO DEFORMED WING VIRUS RATHER THAN TO KAKUGO VIRUS

No 423

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Introduction: The aggressive behavior of the bees was not correlated to specific gene(s) but to the presence of a novel picorna-like virus, genus iflavirus, termed Kakugo (ready to attack). Kakugo virus (KV) RNA has been

detected in the brains of aggressive worker honeybees. KV is similar to another iflavirus of honeybees, Deformed Wing Virus (DWV) that is transmitted via the bee mite, Varroa destructor. The aim of the present study was to investigate the presence of KV/DWV in the honeybees, where aggressive behavior of honeybees had been observed.

Methods: Total RNA was extracted and reverse transcribed. PCR was performed with gene specific primers 8388-8415 and 8745-8765. In order to obtain additional sequence information, an additional primer, ValR, spanning from nt 10110 to 10135, was selected. PCR fragments, 378 bp, were sequenced.

Results: Nucleotide (left side) and amino acid (right side) comparison of the iflavirus strain identified in Italy with other iflaviruses. The matrix of comparison was inferred on a fragment of about 1750 bp.

	Viral strain					
Strain/Country/Year	PA	DWV	DWV	VT	KV	VDV1
PA USA 2003	*	100	99.77	99.32	98.65	95.71
DWV Italy/Brescia 2002	99.33	*	99.77	99.32	98.65	95.71
DWV France 2003	99.41	99.49	*	99.55	98.87	95.94
VT Italy/Basilicata 2004	98.82	98.45	98.67	*	98.65	95.71
KV Japan 2004	95.05	94.82	94.89	94.82	*	95.71
VDV1 Holland 2003	84.46	84.31	84.68	84.31	85.12	*

Discussion: The present study contributes to the knowledge of iflaviruses in honeybees. The presence / persistence of KV/DWV-like viruses in Italian honeybees requires an extensive, continual surveillance, as changes of pathogenicity to the DWV-like disease could occur, that is characterized by severe malformations of the bees, or even to new diseases, by acquisition of a few nucleotide/amino acid mutations.

VARROA MITES IN IRAN

No 424

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Varroa was first found in Iran in the 1980s and for two decades Iranian beekeepers have had to deal with this mite.Various treatements were evaluated and Apistan® became the most popular. However , in 1996 their problems worsened when Apistan® resistant populations of varroa emerged . The parasitic mite varroa destructor is well known to beekeepers becaause in many countries it is the most common cause of death of Apis mellifera colonies.It was fist found in Iran in the 1980s,and we have been faced with this problem for over two decades. Mothods of controlling the mite have been investigated and several products are now approved for use.A recent difficulty in Iran as well as in other countries has been the development of resistance in varroa to tau-fluvalinate
(Apistan) . This has led to high mortality of colonies worldwide,and we have therefore investigated various new control products on sale.

BENZETHONIUM CHLORIDE AND CETRIMONIUM BROMIDE IDENTIFICATION BY MASS SPECTROMETRY IN GRAPEFRUIT EXTRACTS USED IN BEEKEEPING

No 425

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Grapefruit seeds extracts (GSE) were used by some beekeepers, because of their antimicrobial activity, to fight American foulbrood of honeybees.
Sixteen samples of GSE were analyzed for the detection of inhibiting agents; 4 of them were marketed as powder products while the remaining 12 were sold as solutions.
Benzethonium Chloride and Cetrimonium Bromide identification was carried out using a high resolution gas chromatograph coupled with a low resolution mass spectrometer (HRGC-LRMS).
Results showed a variable concentration of Benzethonium Chloride (from 0.003% to 21.50%) in 14 samples. Beside Benzethonium Chloride, 5 samples showed also a variable concentration of Cetrimonium Bromide (from 3.20% to 11.65%), while only two samples resulted negative to the presence of the two chemicals.
The antimicrobial activity of the 16 GSE samples was also analyzed in order to assess its efficacy against Paenibacillus larvae subsp. larvae, the causative agent of American foulbrood of honey bees and against Bacillus subtilis BGA, Bacillus cereus 11778, Bacillus cereus K250, Micrococcus luteus 9341.a, germs routinely used in labs for the detection of inhibiting agents in food.
The samples containing one or both preserving chemicals inhibited the bacterial growth in the five test organisms, while the two samples where the growth occurred were the samples negative to the presence of Benzethonium Chloride and Cetrimonium Bromide.
On the basis of the results relevant to the analyzed samples it could be assumed that the antimicrobial activity of GSE may be due to the presence of the two preservative chemicals.

NOSEMA APIS AND *VARROA DESTRUCTOR* FROM HONEYBEE COLONIES OF EUCALYPTUS SPP. FORESTATIONS IN URUGUAY

No 426

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In Uruguay there are more than 500.000 ha of Eucalyptus spp forestation that means a huge potential for honey production. Although higher honey yields, the beekeepers found great honeybee colonies mortality

after the finishing of flowering. A study for determining the incidence of Nosema apis and Varroa destructor on the weakening of the colonies was done. Sanitary samples were done at different Eucalyptus' flowering moments for identification of N. apis spore presence in young and foragers bees, and varroa infectations. During this period we also obtained samples of corbicular pollen, for an estimation of pollen resource disponibility. Results indicate a significant increment of Nosema at the apiary associated with a drastic diminution of pollen resource variability. Nosema presence, which was insignificant at the beginning of flowering, affects all the colonies at the end of this period. V. destructor presence also increases along the flowering period, from 2.9% at the beggining to 11.9% through the end. The two sanitarian problems control, specially Nosema, is crucial for the nectar potential explotation of Eucalyptus forestations, reducing colonies mortality.

ANTIMICROBIAL IMMUNE PROTEINS OF THE BUMBLEBEE, *BOMBUS TERRESTRIS* (APIDAE)

No 427

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In insects, humoral antibacterial factors are induced upon injury and bacterial infection. Generally, bacterial infections or experimental injections with particulate and soluble foreign bodies induce appearance of de novo synthesized or increase in previously present antibacterial activities. Antibacterial activity of native (non-immune) haemolymph of the bumble bees is associated primarily with lysozyme and the acquired immunity is associated with the de novo synthesis of apidaecins. The low innate level of lysozyme (about 5µg/ml) in hemolymph of the worker bumble bee, increased drastically following infection with bacteria (Escherichia coli D31) The highest level of this enzyme was noted after 24 hr since infection (11.9±1.9_g EWL/ml) and persisted up to 96 hr since bacterial induction (10.1± 1,2_g EWL/ml). The enhanced activity of lysozyme together with haemocytic defense reactions reduces the risk of generalized bacterial infection during the first 24-48 hr after the penetration of bacteria in the insect body cavity. Apideacins are the most prominent component of the bumblebee's inducible defense against bacterial invasion. A sharp increase of apidaecin transcript levels occur 4-6 hours after infection with living cells of Escherichia coli, followed by a steady rise for several more hours. Peak concentration of apidaecins in the bumble haemolymph was within 48-72 hour post-infection, and then the concentration of the apidaecin compounds declined in blood gradually and it disappeared completely after 144 hr since the bacterial induction.

CELL-FREE IMMUNE RESPONSES OF THE WINTERING HONEY BEE, *APIS MELLIFERA* L.

No 428

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The honeybee developed various specific and effective strategies against microbial infections, attacks from parasites and predators. Among the mechanisms of the bee resistance to bacterial infections a key role play cell-free mechanisms involving antibacterial activity of lysozyme and secretion of apidaecins into the hemolymph. The activity of lysozyme and the level of apidaecins were determined every two weeks in the worker bees one month before (group A), during (group B) and two months after wintering (group C). The mean level of the native antibacterial activity of lysozyme in bees was low, but it was significantly higher in the wintering bees (3,0±0,6µg EWL/ ml). After bacterial induction with Escherichia coli D31 (15x103 cells injected into haemocoel) the antibacterial activity of lysozyme slightly increased in the wintering bees comparing to group A and C. Only trace amounts of apidaecins were found in the wintering bees. Immunization with Escherichia coli D31 significantly increased the level of apidaecins in the haemolymph of bees before wintering and during wintering.

KEY MECHANISMS OF HEMOCYTIC IMMUNE RESPONSES IN BUMBLEBEES

No 429

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The immune responses of the bumblebee (Bombus terrestris; Apidae) show an interesting originality in that they include the rapid appearance in the haemolymph of a potent antibacterial activity that protects efficiently an individual against a great number of microbial pathogens. Cellular defense reactions that appear in insect body cavity are associated with haemocytes. In normal, non-immune haemolymph, haemocytes appear to be mostly passive as they float in the circulating haemolymph or residue on tissue surfaces. In phagocytosis, the most active are plasmocytes and adipohemocytes whereas prohemocytes and granular cells are less active in this cellular defense reaction. Phagocytic index increased significantly after 24h since bacterial induction (4.1±1,0 cells/haemocyte), peaked at 72h (6.0 ± 0.8 cells/haemocyte). Phagocytosis was accompanied by changes both in the number of circulating haemocytes and in the relative proportions of the different haemocyte

ypes in blood. Generally, the infection initiated a premature differentiation of haemocytes and increase of he percent of basophils asnd granular haemocytes. The ercent of haemocytes participating in phagocytosis Wright`s number) increased significantly after infection r artificial injection of bacteria into the body cavity of the umblebee. At the peak that is noted after 72h since acterial induction more than 10% of blood haemocytes s active in phagocytosis. After 120h since the induction, he number of phagocytic cells decreases to the level oted before the bacterial induction.

RIALS TO EVALUATE THE LEVEL OF NTIBACTERIAL IMMUNITY IN THE WINTERING HONEYBEE, *APIS MELLIFERA* L. USING THE ROTECTION TEST

lo 430

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honeybees, host defence is efficient and relies both n innate and adaptive immunity. Bacterial challenge in he wintering honey bee, Apis mellifera L. triggers two pes of immune response, which cooperate to fight the fection: the haemocytic response involving mainly hagocytosis of the pathogen and the humoral esponses involving activation of the fat body to produce mmune-proteins (lysozyme and apidaecins) secreted into he haemolymph. The intensity of the response to rtificially occurring aerosol infection of Pseudomonas eruginosa H5, pyocyanine producer (2x103 cfu/ml) was vestigated in the naïve wintering worker bees (BI, BII), ees before (AI, AII) and after wintering (CI, CII) and in he bees injected into the haemocoel with 14x103 cfu of . coli D31 /ml (AIII, AIV, BIII, BIV and CIII,CIV).

ETECTION OF *PAENIBACILLUS LARVAE* FROM ONEY

lo 431

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etection of spores of Paenibacillus larvae from honey is good method for the preliminary diagnosis of American oulbrood. Honey sample is easy to take and send to the boratory, and it gives a reliable result whether spores e present in the hive. American foulbrood is common Finland. Last year we analyzed more than 1,500 honey mples and 37% contained spores of Paenibacillus rvae. In 2003 our culture method was validated and credited.
validation, undiluted natural honey samples were oiled for 30 min and 10_l of the samples were cultured on bovine blood agar and T-HCl-YGP-agar plates, both with and without nalidixic acid (Steinkraus and Morse 1996). In addition, culture of diluted and undiluted natural and spiked honey samples using different boiling times was analysed.
Altogether 295 natural honey samples were cultured in validation. Seventy of these were positive on T-HCl-YGP agar and 52 on blood agar. A total of 75 honey samples were positive when results obtained with both agar plates were combined. Thus T-HCl-YGP agar was superior to blood agar in the routine culture of P. larvae from honey samples.
Boiling times of 5, 15 and 30 min were tested with undiluted natural honey samples and samples spiked with spores (RSK-16 spore standard, Celle, Germany). The boiled samples were streaked onto T-HCl-YGP agar plates. The spore count decreased dramatically between boiling times of 15 and 30 minutes. The use of diluted and undiluted honey was also compared, and dilution was not found to improve detection.
We decided to use 10 min boiling time of undiluted honey before culturing 10_l onto two T-HCl-YGP agar plates, one with and the other without nalidixic acid to prevent the swarming growth of Paenibacillus alvei. The threshold value between high and low spore counts was estimated to be 40 spores in 10µl of honey. This method was accredited during spring 2004 (Decision T014/M13/2003).

POLISH HONEY – METHODS OF PESTICIDE RESIDUE CONTROL

No 432

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Honeybee, the most important beneficial insect, is inseparable part of the agricultural ecosystem. The contact of bees with pesticides that also play an important role in agriculture is unavoidable. During the last years several chemicals have been used as acarides to Varroa control. Wrong utilization of such preparations leads to the presence of residues in bee products. Honey possesses valuable nourishing, prophylactic and healing properties and must be free of objectionable contents. The aim of our study was the optimisation and validation of analytical methods for determination of residues of acaricides used in the control of Varroa in Poland as well as determination of pesticides causing serious losses to beekeeping.

EVALUATION OF SYNTHETIC ACARICIDE RESIDUES IN BEESWAX

No 433

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Introduction: Many synthetic acaricides are fat-soluble substances and as such tend to accumulate in apiculture products. They can be found in parts per million levels in beeswax, and could be the origin of contamination of honey and other products. This background makes the analysis of synthetic acaricides in wax especially important.
The objective of this work is to evaluate the sanitary risk derived from the synthetic acaricides treatments (bromopropylate, coumaphos, 4,4 -dibromobenzophenone and fluvalinate) of beehives.
Beeswax samples have been analyzed with an analytical method, which was developed and validated in our laboratory.
Methods: Twenty-two samples of beeswax from different parts of Spain were taken and analysed after different treatments. Method for the analysis of synthetic acaricides consists of a sample extraction with an n-hexane solution using a test tube heater for dissolution of the wax. Then repeated freezing and centrifugation eliminated high molecular compounds. The n-hexane supernatant was purified with solid phase extraction (SPE) using a Florisil column. The elution of the synthetic acaricides was made with acetone/hexane (3:1). Eluate was concentrated to dryness and dissolved in acetonitrile. Determination of the synthetic acaricide, bromopropylate, coumaphos, 4,4 -dibromobenzophenone and fluvalinate is made by HPLC with a DAD detector. For the method validation, repeatability and reproducibility studies have been carried out, as well as a recovery analysis.
Results: Validation of the analytical method in our laboratory was satisfactory. The statistics of results is still in process.
Discussion: The analytical method allows the reliable and precise determination of residues of bromopropylate, coumaphos, 4,4 -dibromobenzophenone and fluvalinate in beeswax. According to European Union regulation Nr. 2377/90 EEC, coumaphos has a Maximal Residue Limit (MRL) of 100ppb in honey. For fluvalinate, 4,4 dibromobenzophenone and bromopropylate MRL for honey and beeswax are not established.

THE SURVEILLANCE OF HONEYBEE DISEASES IN ROMANIA BY LABORATORY EXAMS

No 434

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Romania is one of the most important honey producers from Europe and it has many melliferous zones of acacia, lime and sunflower plantations, all over the country. In this way, in Romania, in 2004, there were registered 723,014 bee colonies of Apis mellifera carpatica species. There were obtained 19,275.5 tones of honey and 8,756.9 tones from this quantity, in value of 17,718.9 thousand represents export in the European Community countries. The surveillance of notifiable diseases is carrying out by laboratory investigations, at the Institute for Diagnosis and Animal Health, in the National Reference Laboratory for Honey-Bee Diseases and in the other 41 county laboratories.
The bee diseases are surveyed by laboratory exams in accordance with the National Programme of Medical Veterinary Surveillance, which is financed from the state budget. In the National Reference Laboratory for Honey-Bee Diseases are used diagnostic methods from the O.I.E. Manual of Diagnostic for Terrestrial Animals, for Acariosis, Varroosis, Nosemosis, American foulbrood and European foulbrood. Ascosferosis is other disease which is included in the National Surveillance Program, due of its economic impact to bee colonies. There are presented the laboratory tests which are performed in our Institute, statistic data regarding the number of samples worked between 2002-2004, notifiable diseases, and the other major causes of bee mortality encountered in colonies, in this period.

THE VETERINARY MEDICAL SURVEILLANCE OF THE BEE COLONIES' HEALTH IN ROMANIA, BETWEEN 1998-2004

No 435

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The surveillance of health and the prevention of diseases at bee colonies represent a permanent concern of the veterinary services in Romania. The Romanian state sustains beekeeper through tax fee policies and other fiscal facilities established by normative measures. The National Programme of Surveillance of Animal Diseases, including at bee, is financed from the state budget.
The surveillance and the bee diseases are monitored at regional and national level. The main monitored diseases are those notified at O.I.E.: Acariosis, American foulbrood, European foulbrood, Nosemosis, Varroosis, as well as those with economical implication at national level. The registered prevalence in Romania for these diseases between 1998- 2004, has been conditioned by:

- The growth in the monitored period of the number of bee colonies;
- The practice of pastoral beekeeper and the constituency of some temporal agglomeration of apiary with different epidemiological situations:
- The effectuation of incomplete treatments for the fighting against diseases with inobservance of treatment diagrams indicated by the veterinary authorities at national level;
- The application of chemical products used in the phyto-sanitary domain;
- The unilateral and on long term use of ox tetracycline which has determine the growth of resistance of

pathogenic bacteria strains;
- The elimination from use of certain antibiotics (streptomycin, nalidixic acid) for fighting against bacterial diseases;
- The inapplicability of obligatory hygiene and sanitary measures imposed by law.

EXOMITE™ APIS: A PRODUCT FOR VARROA MITE (*VARROA DESTRUCTOR*) DEVELOPED FOR INTEGRATED PEST MANAGEMENT

No 436

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Exomite Apis is a new thymol based product for Varroa mite. It employs a natural wax powder, Entostat™, as a delivery system for small quantities of thymol. As bees enter the hive, they pick up the powder from a bespoke applicator and distribute the powder and thymol combination throughout the hive.
Generally, thymol is not thought to be as effective in cold climates, however studies have shown high efficacy with this product in cool conditions. Product development will be discussed, together with field trial results.

CHRONIC SUB-LETHAL IMPACT OF SPINOSAD, CLOTHIANIDIN AND THIAMETHOXAM ON MICRO-COLONIES OF BUMBLEBEES, *BOMBUS TERRESTRIS*

No 437

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Pollinators are often impacted by chemical pesticides used in agroecosystems. There is a plethora of scientific information available on the impact of agricultural pesticides on honeybees, however this cannot be said of other insect pollinators, including bumblebees. To address this, we determined the chronic sub-lethal impact of the biopesticide – spinosad (doses = 0.35 g/kg (low) & 3.5 mg/kg (high)), and 2 systemic seed treatment insecticides - clothianidin (doses = 0.006 g/kg (low) & 0.036 mg/kg (high)) and thiamethoxam (doses = 0.001 mg/kg (low), 0.006 mg/kg (medium) & 0.4 g/kg (high)), on bumblebees (Bombus terrestris) using modified micro-colony laboratory bioassay. Micro-colonies, consisting of 3 worker bees, were fed pollen contaminated with the insecticides doses (=20/treatment) indicated above for 35 days and then monitored until only one worker was left in the colony or 63 days, whichever came first. Results indicate there was no significant effect of any of the treatments on initiation of oviposition, mean weight and number of larvae discarded, mean weight of drones produced, and overall survival time of the micro-colonies. We did determine that worker longevity was significantly decreased in the high clothianidin (42 days (d)) and high thiamethoxam (40d) treatments compared to the untreated control treatment (51d). The first day sealed larval cells were seen in micro-colonies was significantly delayed in the high spinosad dose (23d) compared to both doses of clothianidin (low= 13 & high=16d) and the high thiamethoxam dose (11d). However, the remainder of the treatments, including the untreated control (21d), were not significantly different from the high spinosad dose. The first day drones were seen in the micro-colonies was significantly earlier in the high clothianidin (22d), low spinosad (25d) and high thiamethoxam (17d) compared to the untreated control (32d). None of the other treatments were significantly different from the untreated control. We feel that micro-colonies are an extremely useful lab bioassay technique. With fewer bumblebees per unit, replication can be increased, allowing for the generation of statistically accurate and valid scientific results.

FUNGICIDAL PROPERTIES OF EXPERIMENTAL SAMPLES OF MEDICINAL AND PROPHYLACTIC WAX FOUNDATION

No 438

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Fungi Ascosphaera apis, Aspergillius niger and others are the source of brood diseases of honey bees. Effective medicines against fungi diseases are absent now and weakening of honeybee colonies with corresponding losses of profit often takes place.
We propose to use the native protective drugs for prophylactic and treatment of fungi diseases. Natural honeybee combs contain propolis, which is the main protective component in the nest of bees. But its properties are lost after heat treatment of wax at processing and sterilization.
We propose to return the natural protective properties to wax foundation by adding of propolis extract to wax with the aim of prophylactic of the brood diseases (Patent of Ukraine No 33532 A 01 K 51/00)
It was founded in the laboratory investigation in the Prokopovich Institute of Apiculture that the addition of propolis extracts to the wax foundation killed 85-95% of fungi Ascosphaera apis and Aspergillus niger during 5 days. Different concentrations of propolis in wax were tested and the optimal one was found.
The method of addition of propolis extracts to the wax foundation without loss of fungicidal properties was elaborated. These foundations were tested during 4 years at the apiary with 200 colonies. We didn't have cases of fungous diseases at the experimental apiary while usually up to 5% of colonies at the neighboring

apiaries, using common foundation, had different stages of brood damages by stone brood disease. Our investigations gave possibilities to recommend the wax foundation with propolis extracts for the wide use with the aim of prophylactic and even as the medical treatment at fungi diseases of the honeybee brood. The advantage of proposed method of prophylactic of fungous diseases is based at the use of natural substances. The use of natural drugs excludes pollution of the hive products.

CONTROL OF AMERICAN FOULBROOD DISEASE WITHOUT ANTIBIOTIC USE

No 439

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With regard to the prohibited use of veterinary preparations containing antibiotics and sulfonamides in apicultural practice in the Republic of Bulgaria, attempts for healing apiaries affected by American foulbrood without recourse to these drugs were performed. Three apiaries with a total of 119 bee families were healed. The healing of bee colonies was achieved via quarantine, destruction of affected bee families via burning and disinfection of hives with 4% sodium hydroxide.
Following two negative examination at 15-day intervals for clinical signs of diseased bee families, a microbiological examination of bee honey, sampled from all families in the apiaries, for contamination with Paenibacillus larvae ssp. larvae spores was performed. The bee families, contaminated with spores, were moved as an "artificial swarm" in disinfected hives on new frames with wax foundation. Prior to moving, the bees were kept for 48 hours without food in a cool premise.
In bee families, diagnosed as diseased at the end of the active season, the examination of honey for contamination with spores and the transfer of swarms was done in the spring of the next year. The old combs of these families were melted and the nests were broadened with new frames for building combs.
The apiaries were considered as healed and the quarantine was removed one year after the last destruction of a bee colony and negative results in the examination of honey samples for contamination with spores.

VARROACIDAL ACTIVITY AND APITOXICITY OF THE NEW ANALOGUES OF COUMAPHOS

No 440

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Coumaphos is a known insecticide, and due to its varroacidal activity, it is used in the protection of bees against Varroa destructor. Unfortunately, coumaphos has relatively significant toxicity to animals (LD50 for rats: 60 mg/kg), as well as an unnegligible oral and contact apitoxicity (LD50: 20.5 and 316.3 mg/kg, respectively). The aim of this work is to examine the above mentioned biological properties for a number of the new derivatives of coumaphos, as active as coumaphos itself, but simultaneously without its above described, undesired features.
Over one hundred (112) analogues of coumaphos were prepared and evaluated for their varroacidal activity in in vitro tests against mature females of Varroa destructor. The twenty compounds, that had shown the varroacidal activity equal or higher than coumaphos itself, were tested for their apitoxicity (both oral and contact).

EFFICACY OF THYMOL TO VARROA CONTROL IN AN EXPERIMENTAL NETWORK AT NATIONAL LEVEL

No 441

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Our Apicultural Research Center has set in motion a experiment network at national level to devise a strategy designed to fight against varroa. This strategy must be based on several products combination and a treatment timetable in accordance with the different apicultural realities.
The first results achieved from four experiments with thymol in representative commercial apiaries located in different places of the country are presented.
Efficacy differs according to the study area. It was around 80-90% in two regions and below 50% in another two. Bearing in mind influential factors, the type of hive revealed as the most important factor to explain these differences.

BIOLOGICAL CONTROL OF *VARROA DESTRUCTOR* – IMPACT OF SPORE INOCULUM ON BEES.

No 442

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We are investigating entomopathogenic fungi as potential microbial control agents of V. destructor. Initial laboratory bioassays identified isolates of fungi that were pathogenic to V. destructor under the abiotic conditions of the honeybee colony, but that had low impact on bees and other beneficials. Isolates of Beauveria bassiana, Metarhizium anisopliae and Lecanicillium spp. are being assessed further for impact on bee and mite populations. We are examining the effects on V. destructor and bees of fungi applied as spore powders to bee populations. Honeybees dusted with conidia powder are likely to acquire inoculum orally as a result of grooming behaviour or by the ingestion of contaminated pollen loads. To evaluate the susceptibility of bees to fungal infection by this route we fed honeybee adults and larvae spore powders mixed with pollen or in suspension. Adult bees fed high doses of spores in suspension (1 x 108 spores ml-1) showed a range of survival from 10 to 98% after 5 days. Differences in the susceptibility of bees were observed between and within species of fungi. However, bees are unlikely to ingest such a high dose when preparations are applied topically for varroa control so we also fed powdered spores mixed with pollen to cages of bees. At a dose of 1 x 109 spores per cage of 25 bees, survival rates for most isolates were above 95%. This indicates that anti-fungal properties in pollen could be preventing infection of bees by this route. A method has been developed to feed suspensions of conidia to honey bee larvae and their susceptibility is being tested for a selection of candidate isolates. The methods and results of these experiments will be presented and the potential of fungi for biocontrol of varroa will be discussed. Since the honeybee is used widely as a representative beneficial organism in toxicological tests, we also discuss the importance of using the feeding techniques developed here in such tests.

METHOD FOR THE CONTROL OF *VARROA DESTRUCTOR* INFECTION USING CELLULOSE STRIPS SOAKED IN OXALIC ACID

No 443

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The control of Varroa destructor infection using oxalic acid (OA) is a common practice in central Italy area. The most practiced method applied to control the Varroosis in honey bees is the direct application of an oxalic acid sugar solution trickled with help of a syringe into each space between the occupied combs. We describe here a new method of administrating the OA utilizing cellulose strips to deliver the drug, as initially suggested by the Toscany Region beekeepers association. To verify the efficacy of this new method, a field trial was performed during April, May, June and December 2004 and January and February 2005. During this period, the drug was administrated in 6 different experimental apiaries placed in various localities of the Toscany and Latium region. OA was administrated twice at a 14 days interval.
The evaluation of the new cellulose OA administration method, was realised using the dead mites count for all the beehives included in the experiment. An equal number of beehives were keept untreated. The comparison between treated and untreated beehives was realised by daily count of the dead mites subsequently to the administration of anti-varroa chemichals of known efficacy (coumaphos and trickled AO).
The values obtained in the treated beehives using the new method were not statistically different from those obtained in the untreated beehives where the varroa mites natural fall could be evaluated.
The OA is a well known effective compound against the varroa infection if sprayed, trickled or vapourised. Consequently, it was tought a promising candidate to develop an easier beehive treatment method, which could reduce the expences connected to the time consuming and more labourious classical treatments. Unfortunately, the method chosen in this study, proved to be not effective, most probably, because of the uneffectiveness of this method in creating a sufficient acidic environment.

THE IMPORTANCE OF BEE POLLINATION IN THE CONSERVATION AND PRESERVATION OF WILDLIFE AND BIODIVERSITY IN SOUTH AFRICA

No 444

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The fauna and flora of southern Africa is one of the richest in the world. Seed and fruit produced not only ensures the survival of plant species but directly or indirectly plays an important role in the nourishment of invertebrates, birds and mammals. When mature seed and fruit are seen on a plant, the importance of the pollinating agent is long forgotten.
Southern African has a rich indigenous bee population, which includes nine families with about 135 genera and more than 1600 species. Bees are believed to be responsible for more than 80% of all insect pollination. Special behavioural and structural features enhance these bees' ability as flower pollinators.
As plants are sessile, various specialised mechanisms have evolved to ensure genetic variability by preventing self-fertilization. Dioeciousness is the simplest method, but even in bisexual plants self-fertilization is effectively controlled. Good pollen movement is required to prevent self-fertilization. This is more often than not facilitated by insects of which bees are the most specialized pollinating agents. During this desk study more than 800 South African plant taxa were recorded which were

visited by bees. Various plant taxa have different pollinator requirements, but all these plants benefit to a lesser or greater extent from these bee visitations. This report brings together our knowledge of indigenous plants known to be visited by bees and their pollination requirements. This information is significant to botanists and agricultural extension workers in the fields of Rural Development Programmes and various Land Care Programmes and to practicing beekeepers throughout South Africa.

ASSOCIATED FORM STONEBROOD AND VARROA

No 446

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In these latter years there have been not infrequent cases of originating mycoses (chalk brood, stonebrood) against development of a mite Varroa. We carried out some researches of seasonal dynamics of the pathological process at the mixed run of aspergillomycosis and varroatosis. An object of the researches was colonies of bees which have some signs of infection by associated form of these activators. Two groups of 4 colonies consisting of 4-5 and 6-7 beeways between combs were formed. Then during the season (May-September) after each cycle of reproduction of worker-bees we selected the tests of brood and bees for identification of disease activators according the established procedure (O.F. Grobov, 1987). In parallel they did accounting of the quantity of sealed brood for determin-ing a degree of damage of a bee inclusion. The received results showed that the peak values of a mixed damage due to aspergil-lomycosis and varroatosis occur in the middle of June. Then a level of fungal infection of colo-nies of bees decreases, but varroatosis after summer decreasing displayed an active develop-ment already in September. It is accounted for a turbulent development of colonies in the period of disease anteceding the peak values of development, and later on it is accounted for the time of main honey flow. In the group with a start strength index of a colony of 4,5 beeways the dam-age due to fungus increased 42% and varroatosis – 40 %, while analogous factors for stronger colonies of bees (6,5 beeways) were 25 and 14% relatively.
So the analysis of the received results showed that the development periods of activa-tors of basic diseases of bees during beekeeping season coincide rather often. The given circumstance should be taken into consideration when developing the means and modes of treat-ment-prophylactic measures.

DEVELOPMENT OF FUNGUS *ASPERGILLUS NIGER* IN DIGESTIVE TRACT OF BEE LARVAE

No 447

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Stone brood is a dangerous disease of honeybees, causing significant damage to beekeep-ing. While developing the means of treatment and the preventive measures of contagion of fun-gal etiology, it's necessary to study the character of communication and distribution of causative agent in organism. The purpose of the present work is to study development of a causative agent of bee asper-gillomycosis in a midgut of larvae. Artificial infection was run by means of spraying the comb frames with fungus (Aspergillus niger Tieghem) suspension in concentration 20 _ 104 cl/ml in sugar syrup. The larvae were collected from the honeycombs and exhausted their intestines, the midguts of which were separated and placed into a fixing solution (3%-s' glutaric aldehyde on a phosphate mixture) for 24 hours. The treated area of the midguts was lavaged in a buffered solution of neutral reaction and conducted an additional fixation of glutaric aldehyde. Then water depletion by ethyl alcohol was carried, after that the healthy and infected areas of the midguts of bee larvae were grinded up and selected with the help of a microscope (_ 400).
In result they established that penetration of conidium of stonebrood causative agents into the larvae's intestines occurs on the 4th day after infecting. In the experiment preparations of the midguts 2 hours after aspergillus got inside, assembly of conidium was found on the surface of the mucous, without any traces of epithelial tissue's damage. In 10 hours we recorded intensive development of fungus, accompanied by the beginning of destructive processes of epithelial colony-forming of intestines' mucous. The developmental prototypes of the infected larvae' intestines, recorded in 72 hours, showed already considerable destruction of epithelial tissue and intestine's villuses, as well as pullulation of fungus's mycelium into a cavity of a larva's body.

PATHOGENS OF HONEYBEES IN THE HUMID FOREST OF NIGERIA

No 448

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Apart from production of honey whose use had become unlimited, part of which are food values, medicinal and

high economic value, honeybees also produce wax, pollen and propolis and much more act as a pollinator. As any other insects, honeybees are subject to infection leading to high mortality. So, this study is designed to investigate the pathogens that affect honeybees in certain part of Nigeria.

Thirty five dead honeybees and thirty five dead larvae, obtained from eight different apiaries at four different ecological locations in the humid forest of southern Nigeria, were surface sterilized in sodiumhypochlorite for one minute and rinsed in four successive changes of sterile distilled water and blot-dried. These were then plated on sterile solidified potato dextrose agar (PDA) in an inoculating chamber and incubated for seventy-two hours. Another ten dead honeybees and ten dead larvae were singly placed in 10ml of sterile distilled water. These were serially diluted and the suspension streaked on PDA and incubated for seventy –two hours.

The microbes found associated with the dead honeybees and larvae are Aspergillus flavus, A. niger, Rhizopus spp. and Bacillus spp. The percentage occurrence for each micro-organism are as follows: A. flavus – 22.2% for dead honeybees and 32.2% for the dead larvae; A. niger - 4.4% for dead honey bees and 8.9% for the dead larvae; R. spp. – 4.4% for the dead honeybees and 2.2% for the dead larvae; and B. spp – 17.8% for the dead honeybees and 7.8% for the dead larvae.

Identifying microbes associated with the death of adult honeybees and brood can assist in instituting a control measure so as to avoid subsequent mortality and consequent extinction. This can also help in controlling honeybees where their existence becomes inimical. The effect of these microbes on honey with respect to toxin production cannot equally be overlooked.

EFFICACY ROTATION OF PREPARATION AGAINST *VARROA DESTRUCTOR* MITES

No 449

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0 fields experiments were conducted in 1994-2004 at the apiary of the authors (Ukmerge region, Lithuania) The research objective is to find optimum rotation of preparations use for killing Varroa mites in order to prevent the formation of resistant mites, residue accumulation in bee products and manage with one treatment of bee colonies in autumn. Every year in the second half of August honey was extracted and mites infestation of bees and brood was identified. Based on the obtained data groups Caucasica x Carnica hybrid were formed. All bee colonies of each apiary were treated with the same preparations: two strips Apistan, Apifos or Gabon for one bee colony. Formic acid was used 2-3 times in Czech type packets, changing them every 7 days. Oxalic acid was used at the end of September. After the strips and treating in October mite infestation of bees and brood was identified again.

Apistan and Gabon PA 92 were very effective against Varroa mites. Their average efficacy for seven years (1994-2000) – 98,2%. In the eighth and ninth years (2001-2002) their average efficacy decreased. Mites resistant to them started to form. 20% of bee colonies preparations did not work. Further use in the same bee colonies this preparations is not advisable. As a result of preparations, to take no notice in their efficacy , is need every 2-3 years to change to other preparations. One of them is produced in Poland under the name Apifos. Its average efficacy according to the data mean of 6 years is not different from Gabon and Apistan. To rotation of preparations is necessary to introduce oxalic and formic acids. They efficacy is similar, but is lower than the average efficacy of Gabon, Apistan and Apifos. The use of formic acid together with one strip of Gabon, Apistan or Apifos to destroy Varroa mites reduces the possibility of accumulating residues in bee products.

In 2002 the average samples of experimental apiaries honey, bee breed and wax were submitted to the laboratory of Dr.C.Lüllman from the Quality Services International GmbH to investigate the residues of the preparation used to kill Varroa mites. In 2004 the average samples of 4 experimental groups were submitted to the laboratory University of Hohenheim to investigate the residues of fluvalinat, acrinathrin, amitraz, thymol, and bromfenwinfos. Residues of this preparations were identified in average sample of wax 2003 from the experimental apiaries. In the average samples of honey, bee bread, and wax taken in 2002 neither acrinathrin, nor fluvalinat was found. 2004 in the average samples of honey obtained from bee colonies in witch for treatment preparations was exchangeable on neither fluvalinat, acrinathrin, clorfenvinfos nor amitraz was found. 0,9mg/kg of fluvalinat in wax 2003 of experimental apiaries was found. To use in apiaries rotation of preparation for control Varroa mites we can have bee products without residues. EU laws regulating the registration of the preparation for controlling Varroa mites. These preparations should be registered as a disinfectant for the bee colonies.

EFFCIENCY USE OF BACILLUS THURINGIENSIS (A MICROBAIL INSECTICIDE)IN CONTROLING WAX MOTH PET ON THE BEEHIVE.(A CASE STUDY IN NIGERIA

NO 450

Moth is the most severe and common problem to beekeepers in Nigeria,this
is so because moth strive well in temp of 15-30 centigrade(59- 86 F)
above and when temperature is below wax moth tend to perish.

Arising from this study ,20 bee farmers was selected from each of the 6 geopolitical
zone in Nigeria.a total of 60 beefarm was visited.in each of the beefarm
visited ,between 2-5 beehive were found to be affected with wax moth.Bacillus Thuringiensis
was introduced to each of the affected hive.

Random sampling procedure was used to chose 60 respondents 9apiarist).
descriptive statistics was used to the methods of usage.
It was reconmended among others that wax moth can be effectively control
with adequate farm planing strategies in order to minimize the spread of moth.

BEEKEEPING IN PORTUGAL. AN UPDATED OVERVIEW FOCUSED ON COPING WITH VARROA

No 451

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In Portugal, there are no official, statistically validated, records that can allow an objective data-based analysis of the national beekeeping sector. This was the first study that set out to try a first nationwide characterization of beekeepers and beekeeping operations most frequently carried out in the context of our apiculture, particularly the type of operations expected to impose some selection pressure on national populations of varroa. The starting point of this project (2003) was the package of approximately 1200 interviews/enquiries carried out/answered by beekeepers well distributed across the whole continental part of the country. As a very superficial overview of the obtained results, we can say that:

- The Portuguese beekeeper is, on average, a 56 years old male;
- Most beekeepers (62%) have less than 4 years of official general education and their level of specific beekeeping training is, at best, very deficient;
- Each beekeeper has a mean number of 2 apiaries, were circa 48 colonies are kept. The 2 most used hive models are country-specific ("Lusitana" in the north, and "Reversivel" in the southern part of Portugal), followed by Langstroth hives. It is not rare to find beekeepers that build their own hives;
- Treatments against Varroa have been based on Apivar (43%), Apistan (26%), Klartan (17%) and the Acadrex (10%). Other substances are becoming increasingly more frequently used, such as the alarming Supona (chlorfenvinphos) or the welcome timol;
- On average, 2 annual treatments against varroa are introduced into honey bee colonies for 4 to 6 weeks, predominantly between January/March and later on in July/September (after honey harvest); and
- Most beekeepers (83%) annually replace 3 old drawn combs by newer wax foundations sheets, particularly during spring time.

ACTIVITIES INVOLVED IN *APIS MELLIFERA* HYGIENIC BEHAVIOR IN PRESENCE OF BROOD AFFECTED BY ASCOSPHAERA APIS

No 452

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Hygienic behavior of honeybees involves cell uncapping and affected brood cell removal from comb. The objective of this work was to study the activities performed by honeybees of different ages on cells containing brood affected by Ascosphaera apis in hygienic (H) and non-hygienic (NH) colonies. Four observation hives (two H and two NH) were used. Emerging honeybees were numerated and introduced in observation hives. Pieces of comb containing mummies obtained by inoculation with A. apis spores were introduced in each observations hive (H and NH) and the cells were filmed. Observer Video-Pro was used for analyses. It was registered the frequency of numbered honeybees doing different activities on cells with mummies. Inspection, Uncapping, Removing and Inactivity were considered. Honeybees age, frequency and duration of activity were analyzed. Honeybee age was analyzed with a t-test. Percentage of honeybees performing an activity were compared with a Chi-square test. The average age of honeybees performing inspection was 15 and 16 days for uncapping and removing and no difference was detected between H and NH colonies. Percentage of bees that performed hygienic activities was higher in H colonies ($p<0,0001$). The average frequency of inspection, uncapping and removal by a single bee was greater in NH colonies. Honeybees that were registered uncapping and removing brood in NH colonies performed more than one visit to the cells more frequently than in NH colonies ($p=0,0159$ for uncapping and $p= 0,1650$ for removal). Time invested for each bee to uncapping ($p=0,0012$) and removal ($p=0,0206$) was greater in NH colonies. From a total amount of 67 mummies, H colonies removed 98 % and NH 70 %. Filming allowed to describe the sequence of hygienic behavior.

HONEY MONITORING FOR *PAENIBACILLUS LARVAE* SUBSP. LARVAE SPORES IN THE STATE OF RIO GRANDE DO SUL, BRAZIL – 2003 TO 2004

No 453

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American foulbrood (AFB), one of the most significant diseases of honeybees, has not yet been detected in Brazil. Since the disease is widely spread in some Latin American countries, including some bordering Brazil, the Brazilian authorities and beekeepers are concerned about the major economic implications due to the risk of AFB introduction to Brazilian beehives. Accordingly an improved method of detecting spores of Paenibacillus larvae subsp. larvae spores in honey has been developed (Schuch, Madden and Sattler, 2001) and officially adopted by Agriculture Ministry of Brazil. As part of the Brazilian animal health authorities strategy, the national monitoring of Paenibacillus larvae subsp. larvae spores programs have been implemented since 1998. Accordingly to Schuch, Tochetto and Sattler (2002), in the year of 2000 few P.larvae subsp. larvae spores were found in a healthy beehive in the State of Rio Grande do Sul (RS). This finding resulted in a variety of governmental actions. Since the analysis of honey from beehives for the presence of Paenibacillus larvae subsp. larvae spores is the most effective measure to achieve an early detection of the colony infection and to avoid the spread of American Foulbrood, it was implemented by the animal health authorities of Rio Grande do Sul State, as the first strategy, a wide official AFB State Monitoring Program, which is based on analysis of honey samples from all apicultural regions in the State. From September 2003 to September 2004, 1,315 samples of honey from 427 townships of RS were analyzed by Brazilian official method and all (100%) were found to be negative for Paenibacillus larvae subsp. larvae spores. Results are indicative that no spread of P.larvae subsp. larvae spores from the previously studied area occurred. As four years passed from the first isolation of P.larvae subsp. larvae spores in a comb from a healthy beehive, and as no spread to other areas was observed, we conclude that this fact is probably due to the higher disease resistance of the africanized Brazilian bees.

PERFORMANCE COMPARISON OF NESTED PCR PROTOCOL AND THE BRAZILIAN OFFICIAL MICROBIOLOGICAL METHOD FOR THE DETECTION OF PAENIBACILLUS LARVAE LARVAE SPORES IN HONEY

No 454

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Paenibacillus larvae larvae is the casual agent of the disease "American Foulbrood", the most important disease of Appis mellifera broods. This disease occurs in some Latin American countries, including some bordering to Brazil, but not yet in Brazil. The availability of sensitive methods to be used in the national programmes of Paenibacillus larvae larvae spores monitoring is essential to avoid the entry of contaminated products in the country and to monitoring the possibility of beehives infection and the spread of the disease. With the aim to control the presence of spores in imported hive-on-products by Brazilian sanitary authorities it was developed at Laboratório Nacional Agropecuário (LANAGRO/RS), previously known as LARA/RS, a highly sensitive and specific microbiological method (Schuch, Madden and Sattler, 2001) to detect P.larvae larvae, which is based on concentrating spores by centrifugation, inactivating vegetative cells and then inoculating onto a newly developed selective solid medium: Paenibacillus larvae agar (PLA). Suspect colonies are then selected and cultures confirmed by biochemical identification. The method presents enough sensitivity to detect fewer than 10 viable spores of P. larvae per millilitre of honey. This method was adopted as the Brazilian official method. To improve the laboratorial performance and to reduce the time to get a negative result it was implemented the nested PCR accordingly to Lauro et al, 2002, using the sequence SSU rDNA (AY030079 and AY03008). The original protocol was optimised with the objective of be carried out in our laboratory and all changes were validated. Resulting protocol presented satisfactory detection limit and excellent reproducibility. The present work shows the performances comparison of the validated nested PCR protocol and the official microbiological method. McNemar test for marginal homogeneity demonstrated that there was no difference between results produced by both methods.The calculated Kapa index accordingly to Fleiss (1981), reinforces our conclusion and is indicative that there was an excellent agreement between methods.

DECLINE OF FLUMETHRIN RESISTANCE IN VARROA DESTRUCTOR AFTER ABANDONING USE OF SYNTHETIC PYRETHROIDS TEMPORARILY

No 455

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Fluvalinat resistance in Varroa destructor has been found in some areas, since some years. As Flumethrin, the active substance of Bayvarol®, belongs to the same group of substances of the synthetic pyrethroids it was affected similarly. For a period of 5 years, the CVUA Freiburg made examinations at 10 apicultures in South West Germany to verify the development of this

resistance. All beekeepers, even those who formerly had utilised synthetic pyrethroids for Varroa control, dropped using any substance of this group during the whole examination period. Always in August, one brood sample was extracted from each of the constant number of 10 colonies to determine the extent of resistance. During the two last years, the effect of Bayvarol® was simultaneously tested in the field. During the first years, the effectiveness of Flumethrin varied considerably between the individual apiaries. Also on the apiary itself, there were differences between the colonies. On one part of the apiaries, the effectiveness was so low that from this a resistance could be concluded. In the course of the years, this resistance decreased more and more. This was also confirmed by the examinations in the field. However, in the last year, one apiary still showed a reduced effectiveness. This leads to the conclusion that after stopping treatment with synthetic pyrethroids resistance will decline already within a few years. In singular cases, however, the effect can be reduced because of a transfer of resistant mites from the environment. The beekeeper can identify those colonies from the persisting mite fall-off over a longer period. When Bayvarol® works fully effective the mite fall-off increases significantly during the first days, before it decreases correspondingly afterwards. The beekeeper can use Bayvarol® for a save Varroa control if he controls the mite fall twice in the first week.

BEESWAX FOUNDATIONS WITH IMPREGNATED THYMOL FOR VARROA CONTROL

No 456

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The use of essential oils and organic acids is generally accepted as an alternative tool for the control of the Varroa Destructor levels in bee's colonies, avoiding mite resistance and reducing the residues contaminations resulting from the systematic application of synthetic chemicals.[1]
Under all the alternative substances, thymol is the most studied and used, presenting under certain application conditions an acaricide efficiency close to 100 %.[2] Due to the non-polar properties of these organic compound it is mostly insoluble in water, but dissolves easily in fat substances like beeswax. Nevertheless, its high volatility leads to a quick concentration deflection in wax, specially if under hive conditions.[2] These properties took as to explore the use of beeswax as a potential matrix for the application of thymol in Varroa control.
The study was made using 21 Langstroth hives, divided in three groups, with bottom boards for mite fall counting. One group was used as the control, where no treatment was applied, while on the other groups two different methodologies were tested, changing the thymol dosage and the number of impregnated beeswax foundations. The infestation level was accessed counting the natural mite fall before treatment, and the efficiency was measured counting the mite mortality during the treatment and after the applications of Apivar.
The acaricide effect of the beeswax foundations impregnated with thymol is evident, with a mite fall increasing between 3 and 10 times more after inserted in the hive. In terms of efficiency the use of two foundations impregnated with 9 grams of thymol and inserted with a 10 days interval showed better results than the use of one foundation with 18 grams.
[1] Imdorf S.; Charrière J.; Kilchenmann V.; Bogdanov S.; Fluri P. (2003); Alternative strategy in central Europe for the control of Varroa destructor in honey bee colonies. Apiacta 38, 258-285.
[2] Bogdanov S,; Imdorf A,; Kilchenmann V, (1998) Residues in wax and honey after Api Life VAR treatment. Apidologie 29, 513-524.

STUDIES TO ASSESS THE EFFICACY OF BACILLUS CBB AND APIGUARD® AGAINST ASCOSPHAERA APIS UNDER FIELD CONDITIONS

No 458

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In order to control Chalk brood disease, the bacillus CBB, developed by Dr Yacobson in Israel, was found to inhibit the growth of Ascosphaera apis in vitro. It was also found to be harmless to bees. Another environmentally friendly product, Apiguard® (Vita-Europe LTD) containing thymol crystals and applied against varroa mites, was also found to inhibit the growth of this fungus.
To assess the efficacy of CBB alone or in combination with Apiguard®, against chalk brood disease in field conditions, two experiments were contacted during spring and summer of 2003 and 2004 in the area of Thessaloniki, North Greece. In 2003, 30 colonies of Apis mellifera macedonica, artificially infested by A. apis, were divided in three batches for the trials. In batch 1, there were four applications of 1 liter syrup (60%) containing CBB. In batch 2, there were four applications at weekly intervals of 1 liter syrup (60%), containing CBB plus one application of 25 g Apiguard®. In batch 3 (control) there were four applications at weekly intervals of 1 liter syrup (60%). In 2004, another batch was added on which one application of 25 g Apiguard® was contacted.
For the 2003 treatments, in batch 1 the decrease of the infection was estimated at 77.2%, in batch 2 at 83.9% and in batch 3 (control) at 7.8%. Furthermore, the growth of colonies (number of bees and brood frames) was significantly better in colonies of batches 1 and 2 compared with control.
For the 2004 treatments, the efficacy of the bacillus was lower than in 2003. In batch 1, the decrease of the

infection was estimated at 58.9%, in batch 2 at 61.1% and in batch 3 at 9.1%. In batch where only Apiguard® was applied, the decrease of the infection was estimated at 53,9%.
Results of the two experiments indicate that both CBB and Apiguard®, alone or in combination, demonstrate fungistatic action against A. apis.
In order to estimate efficacy under real conditions, a third experiment, (using the same treatments as in 2004) is being conducted in the spring of 2005 at 5 different apiaries, naturally infected by A. apis. Results of these applications are expected in June, 2005.

PERFORMANCE OF ALTERNATIVE ACARICIDES IN ORGANIC BEEKEEPING UNDER PORTUGUESE NORTHEST CONDITIONS

No 459

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The use of chemical acaricides in organic beekeeping is legally restricted to natural compounds such as essential oils and organic acids. Generally, these alternative methods present good efficiency to control Varroa destructor levels in bee colonies and avoid residues contaminations of honey.[1] Their main disadvantage lies in the chemical hazard of this compounds and in the efficacy dependence on natural conditions. Therefore, refined methodologies used in northern or central Europe countries cannot be applied directly to southern countries without further testing. In Portugal the difficulties to apply these products seem a major obstacle to the attraction of beekeepers for the organic production.
To stimulate the Portuguese organic honey production in the Northeast areas, several natural acaricides were tested on field under different conditions. Four organic apiaries were established in two regions with distinct climatic conditions. In each apiary, four groups of Langstroth hives were positioned. One group was the control (without any treatment) while others were tested for formic acid, oxalic acid and thymol. The colony vitality was accessed in the spring based on honey/pollen frames, bee population and brood combs. Varroa infestation was evaluated by counting mite fall on bottom boards. Treatment was applied in spring and autumn, after honey harvest. The results from the first year indicates clearly that all the natural compounds can be used for Varroa levels control in the hive with good efficacy, however under the conditions used in this study, the oxalic acid treatment shown high level of bee mortality, diminishing the colony strength on the next spring. Despite this effect, no queen loss was observed. In terms of honey quality, no unusual levels of acaricide was found in harvested honey, presenting chemical parameters values similar to honey collected from hives without treatment.

[1] Imdorf S.; Charrière J.; Kilchenmann V.; Bogdanov S.; Fluri P. (2003); Alternative strategy in central Europe for the control of Varroa destructor in honey bee colonies. Apiacta 38, 258-285.

OBTAINING *APIS MELLIFERA* CAPPED BROOD AFFECTED BY *ASCOSPHAERA APIS* USING PURE STRAINS

No 460

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Chalkbrood is a nice model for testing hygienic behavior and the use of compatible Ascosphaera apis pure strains could mantain homogeneity among experiments. The short viability of A. apis in synthetic media has been a problem and integral rice (IRK) is a promising for A. apis maintenance. Mycelium aging, viability, purity and capacity to produce spore-cysts were evaluated in MY20 and IRK medium. A. apis strains on MY20, developed aging symptoms at the 30th and 45th day of growing, and developed pure colonies until the 77th day of growing. These strains on IRK showed aging symptoms at the 30th day of growing, but they produce pure colonies during the 360 days of preservation. The possibility of using compatible pure strains preserved as mycelium in IRK to obtain mummies in a control way was tested. Spore-cyst obtained from pure strains preserved in IRK and spore-cysts from wild black mummies obtained from honeybee hives were used to inoculate fifth instar larvae. Pathogen inoculated treatments gave more than 82% of infected larva. Ascospores from black wild mumies or spore-cysts obtained from pure strains preserved in IRK were equally effective to reproduce the disease and this has main advantages: permanent inoculum availability and genetic homogeneity.

HONEYBEES HYGIENIC BEHAVIOR IN PRESENCE OF BROOD AFFECTED BY ASCOSPHAERA APIS OR BROOD PUNCTURED

No 461

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Most research on hygienic behavior have used pin-kill test or freezing techniques to kill the brood. The objective of this work was to study the activities performed by H and NH honeybees in presence of brood affected by Ascosphaera apis or pin-killed brood. In observation hives containing Apis mellifera hygienic (H) and non-hygienic (NH) colonies one piece of comb

containing sealed mummies (MO) and other containing punctured brood (CP) were introduced and they were filmed. Capped, inspection, uncapping, removing, honeybee on the cell and inactivity were registered. Initial and final time of uncapping and removing, frequency and total duration of each state were analyzed by PROCLIFETEST of SAS and Kruskal-Wallis. H colonies started uncapping activities earlier than NH colonies in both treatments ($P<0.0081$). For end of uncapping, start and end of removal, NH colonies and CP treatment registered significant greater times. Time taken for NH colonies in MO treatment did not differ from H colonies in both treatments. H colonies removed a greater percentage of dead brood in both treatments ($P<0.0001$) and in both groups colonies removed significantly more brood affected by A. apis ($P=0.0168$). Removal of the whole brood did not differ between groups ($p=0,2079$) but it was more frequent in MO than in CP ($p=0,0250$). H colonies were more efficient in the start of uncapping, with a fast response to the stimulus of dead brood independent of the method used to kill it. Once uncapping begun, NH colonies reacted in a similar way to MO treatment than H colonies. This would indicate a different stimulus level in both treatments and a better response when the brood is affected by a pathogen. H colonies removed a greater percentage of dead brood than NH colonies.

EFFECTIVENESS OF ORGANIC ACIDS IN VARROA (ACARINA: VARROIDAE) MITE CONTROL

No 463

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The effectiveness of some organic acids in Varroa (Varroidae) mite control during the broodless period was tested on honeybee colonies. Autumn field assays were done on ninety Langstroth hives with propionic, malic, citric, acetic and oxalic acids. Hives trickled with 50% sugar solution, Perizin", with Apivar" strips or untreated were the four control groups. Laboratory toxicity tests to determine the field doses to be used were carried out prior to the field trial. Only oxalic acid showed rates of success, similar to commercial control products, and no satisfactory acaricide effectiveness occurred with the other organic acids used. All the treatments, including control sugar solution caused some honeybee mortality higher than the natural rate. The higher mortality caused by propionic and acetic acids advises caution when increasing the dose to enhance the efficacy.

DETERMINATION OF MITE INFESTATION INTENSITY USING NATURAL MITE FALL AND DYNAMICS OF VARROA POPULATION IN NORTHERN AFRICA

No 464

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The relationship between total varroa mite population in colonies and natural mite fall has been followed in many instenses, sites, and seasons in North Africa. The accuracy of such parameter and its interest for beekeeping is discussed.
The dynamics of development of Varroa destructor in North Africa is described. The particular of the local climate is discussed concerning its the strong influence on varroa population dynamics.

ORGANIC *VARROA*-TREATMENT IN SEMI- AND PROFESSIONAL BEEKEEPING

No 465

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Varroa destructor was first found in Denmark in 1984. But the mite was not distributed all over Denmark until the beginning of 1990. Since then the Danish Beekeepers Association has promoted the organic way of varroa-treatment. With organic treatment we mean the use of the organic acids and bio-technical methods (drone brood removal, queen-exclusion, heat-treatment an so on).
Over the years the varroa-treatment strategies has been well adopted by the Danish Beekeepers. 82% of the beekeepers are using the organic way. We developed a "safe strategy" – which means fighting varroa "wearing both belt and braces". The Beekeepers Association recommended to make a three step treatment. spring treatment with drone brood removal, summer treatment after last honey harvest with formic acid and late summer treatment using oxalic acid trickling. Some beekeepers with a large number of colonies have over the years claimed that these methods are to time consuming and have preferred the use of the pyrethroid Bayticol on wooden sticks.
This examination is an interview with 20 semi- and professional beekeepers (managing more then 100 colonies) using the safe strategy. The aim was to find out:

- Why are these beekeepers using the organic methods?
- What is the time consumption?
- How have they adopted the organic methods to their beekeeping practise?

• What kind of alterations have they made?
Conclusion: Professional and semi-professional beekeepers using the organic way are determined to make a high quality product with no residues of any kinds of medical drugs. They are very much aware that the use of medicals does not provide a long-term solution. They fear the build up of resistants to the drugs and the problem of shifting over to a new product, which is probably not allowed.
The "safe strategy" is well incorporated into the beekeeping practice. There is a clear tendency that drone brood removal is substituted by a spring-oxalic acid trickling. The use of the Krämer board is too expensive for beekeepers who are not producing them by themselves. The use of free formic acid or nassenheider evaporator has been preferred. The beekeepers do not regard the time spent on the use of the organic methods as a waste of time. The beekeepers experience only a slight increase in time consumption.
This interview shows that it is possible to make a profitable beekeeping, even for beekeepers using the organic way of varroa-treatment.

INTEGRATED PEST MANAGEMENT OF THE PARASITIC MITE *VARROA DESTRUCTOR* IN HONEYBEES (*APIS MELLIFERA* L.) UNDER IRISH CLIMATIC CONDITIONS.

No 466

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Varroa destructor is a serious pest of Apis mellifera L. In Ireland, Bayvarol, is still effective against the mite, but the need for alternative management methods is essential, as resistance will develop due to selection pressure. Previous studies have shown that botanical oils, especially thymol and the organic acids can be effective against Varroa destructor. Non-chemical control methods also have an effect on Varroa destructor populations when used alone, but their efficacy when used in combination has not been examined. This study examines the control effect of different floor types on Varroa mite populations over a foraging season. Alternative controls methods such as formic acid and apiguard are examined for efficacy as single treatments, in addition to an integrated pest management, which includes open mesh floors, drone brood trapping, formic acid/apiguard/oxamite strips as autumn treatments followed by oxalic acid as a winter treatment. Adult bee population, brood area, mite population and honey production were measured over the entire season to determine the overall colony health and treatment effect. The results indicate that open mesh floors and drone brood trapping have a positive effect on reducing mite populations in honeybee colonies early in the season. As an autumn treatment, formic acid and apiguard were more effective than oxamite strips, but oxalic acid was essential as follow-up winter treatment to reduce mite populations in test colonies. No large differences in adult bee population, brood area or honey production was apparent in any of the treatments. The relatively high mite populations remaining in colonies after autumn treatments is discussed in relation to the parasitic mite syndrome.

RADIOCHEMICAL INVESTIGATION ON THE METABOLIC FATE OF OXALIC ACID IN THE HONEYBEE

No 467

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The oxalic acid (OA) metabolisation within the honeybee colony was investigated. Forty-one millilitres of 60% sugar syrup containing 4.2% of OA were trickled onto a nine-comb colony as a control means against varroa mite. 14-C labelling and further radiochemical analyses allowed the contaminating OA being detected in various kinds of samples collected from the hive in the subsequent one-month period.
A relatively high beta-radioactivity level was measured in wax from freshly built combs and from newly secreted scales. Being the hydrophilic nature of the substance inconsistent with a direct heavy contamination, further investigations were made by radiometric TLC. The elution with different solvents put into evidence a composite structure of the radioactive fraction of wax.
A trap containing hyamine hydroxide was used to sample the CO2 from the hive and liquid scintillation was used to analyse the trap content. An early peak of radioactivity was detected, which faded soon but did not extinguish within the following month. In a laboratory trial, an homogenate of the full body of adult honeybees was put into contact with a 14-C labelled OA solution. A sharp decrease of the radioactivity was seen in the following days.
The above results agree with the hypothesis that the honeybees can metabolise the OA coming from the treatments. Intermediates may follow the pathway leading to the synthesis of wax compounds. The in vivo and in vitro trials seem to support a metabolic OA decarboxylation, whose enzymatic nature must be investigated further.

SURVIVAL AND INCLINATION TO FEEDING OF CAGED HONEYBEES CONTAMINATED WITH OXALIC ACID

No 468

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Mortality and food consumption were observed in caged honey bees that had been contaminated with oxalic acid (OA) in the field. A preliminary stage was performed to determine the time when the highest OA amount was present in the intestines. Two administration methods were considered: trickling (1.7g OA in sucrose solution) and sublimation (1.4g OA). They were applied to two different colonies of similar size from which samples of 50 adults were taken at 0, 24, 48, 72, 96 and 168h. After gentle washing, the bee intestines (except honey-sacs) were slipped off and macerated. Analyses were made on both intestine pools and washing waters to measure intestinal and external OA, that were summed up to calculate the overall OA contamination. At 24h, the bees treated by trickling and sublimation had similar total OA load (about 8.5 microg per bee). Lower amounts were detected later, but a distinctly sharper decrease occurred for sublimation, which also implied a lower proportion of the total OA being in the intestines. A further step was made on bees collected from a colony 24h after an OA treatment by trickling that previously showed the highest intestinal OA amount. 30 bees were introduced into each of 4 laboratory cages and ad libitum fed with 1:1 honey solution. Pre-treatment bees from the same colony served as a control. Food consumption and bee mortality were registered for 16d. At 24 and 48h, the food uptake was significantly lower in treated, but the average individual consumption in the whole period (1,022.5mg per bee) was not significantly different. At 16d, the cumulative mortality was 45.8 and 42.8% in treated and controls respectively. The difference was not significant. The mortality over the time in the two groups did not fit the model of probit analysis of correlated data according to Throne et al., 1995. The trial showed that the OA contamination due to the treatment may play a temporary influence on the bee attitude to feeding, that is likely to be associated to intestinal aliquot. No significant effects on the bee mortality were recorded; the results do not agree with the hypothesis of an acute OA toxicity at the usual treatment dosage.

IMPORT RISK ANALYSIS AND THE SURVEILLANCE FOR AND DIAGNOSIS OF HONEYBEE DISEASES

No 469

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We live in a global economy with trade and international exchange including honeybees and hive products increasing all the time, both in terms of means of transport and its rapidity. Movements of bees around the world has and could continue contribute to the spread of pests and diseases. Trade is now governed by the Sanitary and Phytosanitary (SPS) agreement under the auspices of the World Trade Organisation (WTO). Under this agreement the OIE (Office International des Epizooties) is the international organisation for developing standards, guidelines and recommendations relating to animal health. The aim of this the SPS agreement is to ensure that measures are applied only to the extent necessary to protect human, animal or plant life or health, i.e. they do not constitute a disguised restriction to international trade. Trade is therefore based on managed or acceptable risk, rather than zero risk, and is permitted unless there are valid scientific based grounds for restricting it. Risk Analysis is a systematic aid to decision making in support of this process. The robustness of the risk analysis depends on the quality of the available data both in the exporting and importing country. The accuracy of these data will depend on the level of and standards and systems of surveillance employed, the sensitivity of the diagnostic methods used by the appropriate authorities responsible for bee health policy and disease control. Import policies, which may include prohibition recommendations, based on the apparent absence of a pest or pathogen needs be supported up by robust surveillance data. An important element of this is a standardized approach to both disease diagnosis and surveillance for pests and diseases. A diagnostic tool that CSL routinely uses for disease identification and surveillance is TaqMan real time PCR. This approach allows delivery of very rapid, comprehensive and large scale testing services for beekeepers or and in the case of survey work to regulatory bodies.

MELISSOCOCCUS. PLUTONIUS ISOLATION FROM HONEYBEE BROOD SAMPLES WITH EUROPEAN FOULBROOD IN SOME ITALIAN REGIONS

NO 470

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During the last years, in some Italian regions, brood mortality cases recurred, often caused by European foulbrood, but sometimes absolutely atypical.
During 2004, brood samples were examined by EFB Diagnostic Kit (Vita Europe). Then, microbiological tests for Melissococcus plutonius isolation were performed. Most of the examined samples were positive for M. plutonius.
The screening confirms the seasonal presence of European foulbrood with a variable distribution and an irregular course.

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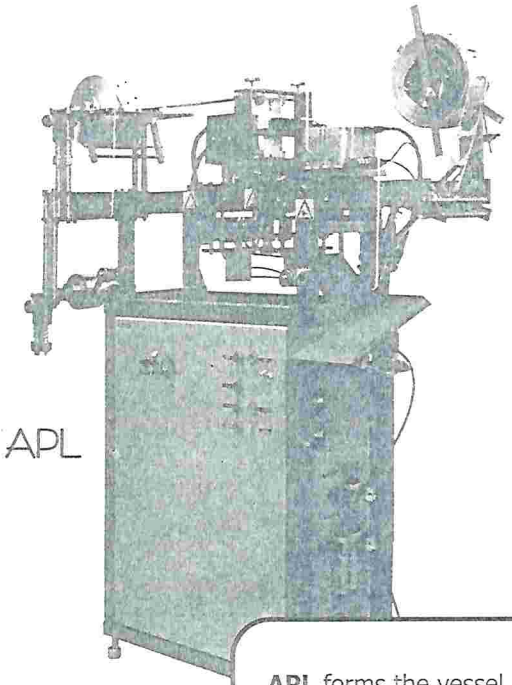

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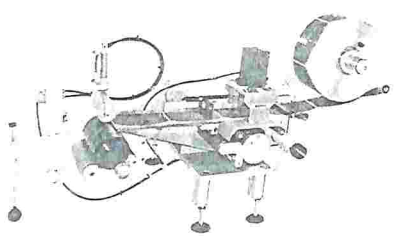

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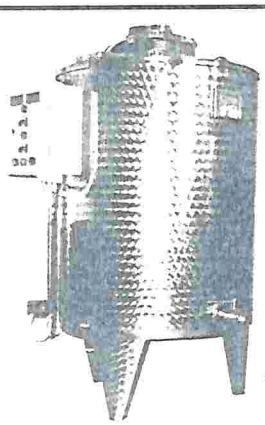

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