

**GRIMAUD FRÈRES SÉLECTION**  
**La Corbière**  
**49450 ROUSSAY**

**REARING GUIDE**  
**ROASTING CANEDINS R51**

## CONTENTS

- Health precautions
- Cleaning - Disinfection – Clean-out
- Drawing of an installation for starting up
- Densities
- Temperature - Ventilation
- Lighting schedules
- De-beaking - De-clawing
- Feed - Water
- Feed characteristics
- Constraints in the use of feed ingredients
- Prophylactic programme
- Growth charts - R51 consumption
- R51 growth charts
- R51 product sheets

## HEALTH PRECAUTIONS

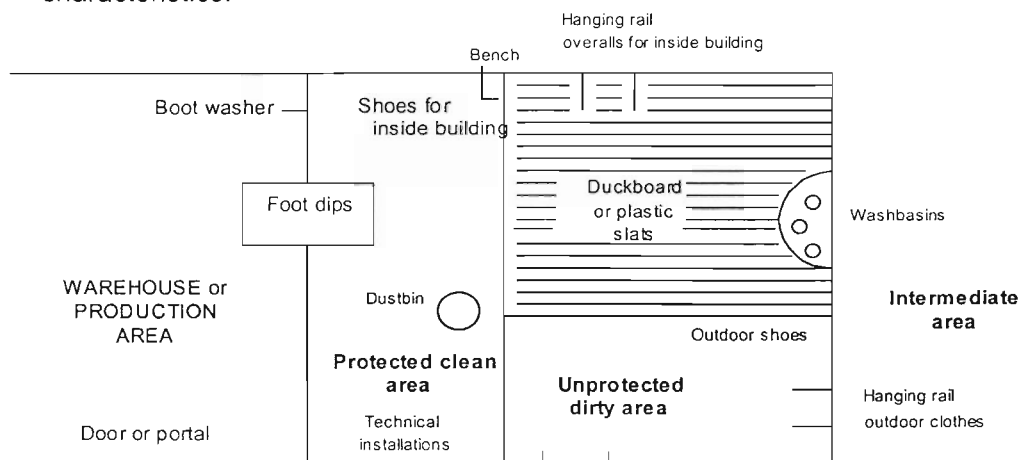
- Its aim is to prevent external contamination by preventing potential vectors from entering the building.

### Exterior protection :

- Fenced site.
- A clean ground surface around the building that can be disinfected.
- A building that is bird and rodent proof.
- No poultry on the premises.
- No feed or other trucks should enter the protected area.
- Concrete area for washing.

### Personnel :

- Man is the principal vector of contaminating agents. A well-designed enclosed vestibule that is always properly used should conform to the following characteristics:



- Its use should enable those entering to take off their outer clothing and shoes, which are potentially contaminated, in the dirty zone and to put on clean overalls after washing their hands. It should be kept clean and regularly disinfected.

### Active protection :

- Treatment should be administered to the youngest birds first and to others in rising order of age. In instances of disease, those who are ill should be treated last.
- Active controls should be organised against rodents and insects.
- Dead birds should be removed without entering clean areas and they should be stored in an air-tight and refrigerated area.
- The egg room, feed storage, feeders, drinkers nipples and the water distribution system should be regularly decontaminated.

## CLEANING – DISINFECTION – CLEAN-OUT

- The aim of this group of operations is to bring the building up to a level of hygiene which is essential to the reception of a new batch.
- All these operations must be carried out efficiently in a logical order, otherwise they will not be effective.
- Particular care should be taken with washing. No disinfectant is effective where organic matter is present.

### Order of the operations :

- Spray insecticide as soon as the manure is removed.
- Take down all movable equipment then clean it and disinfect it.
- Remove all organic material from the building.
- Clean the building and its equipment, in particular the water distribution system.
- Disinfect walls and floor by spraying.
  - ⇒ Following this, install sanitary barriers (the enclosed vestibule, clothing, etc.)
- The sanitary interval then begins: its duration should be long enough to ensure that the building is completely dry.
- This period should be used to maintain the surrounds, clean and disinfect the feed storage areas and put down raticides.

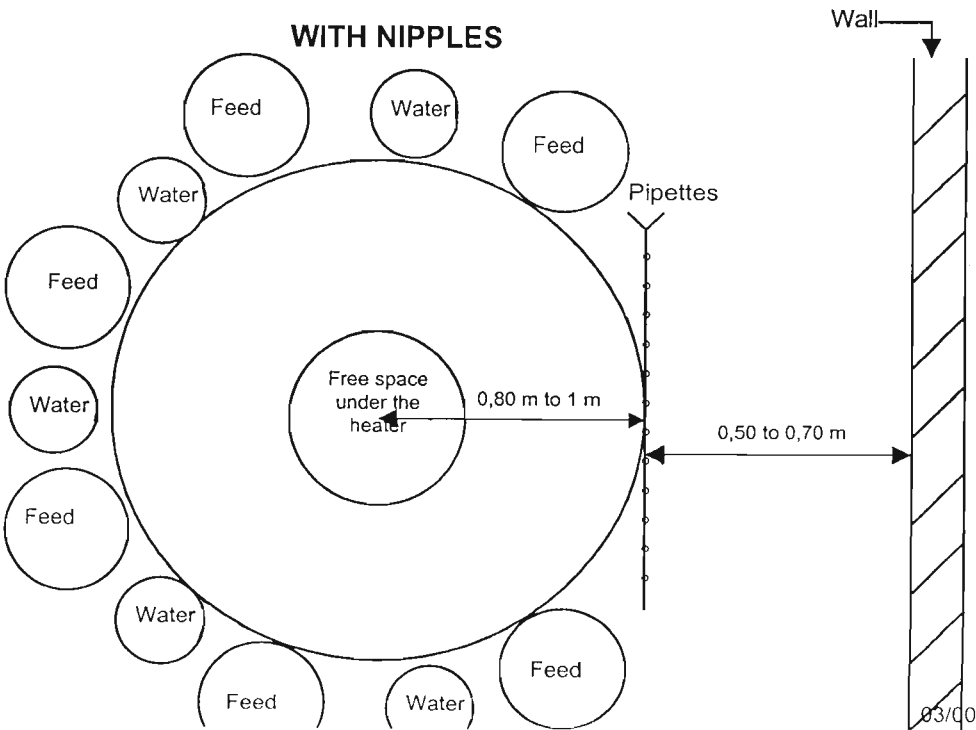
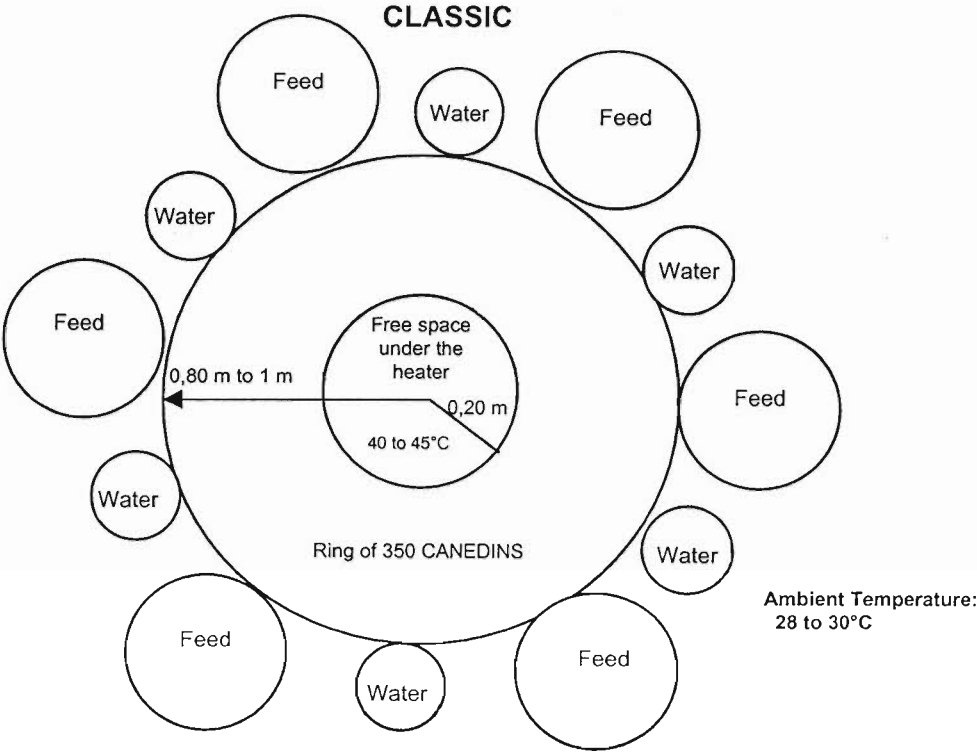
### Before starting a new batch :

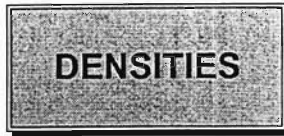
- Re-install clean and disinfect equipment and litter if necessary.
- Disinfect using fumigation.

### Important points :

- Remember to include ventilation shafts, enclosed vestibules, warehouses and doorways, all of which are highly contaminated areas.
- The disinfectants used must have received prior official approval and be used in accurate conditions of dosage, temperature and quantity of solution (1 litre/4 m<sup>2</sup>).
- Washing must be carried out using water that is bacteriologically drinkable.

**DRAWING OF AN INSTALLATION FOR STARTING UP**





**Densities to be adhered to :**

We advise you not to exceed the following densities :

**HEAVY STRAINS :**

- 10 males per m<sup>2</sup>
- 15 females per m<sup>2</sup>

i.e. 12 birds per m<sup>2</sup> made up of 50 % males, 50 % females.

**MEDIUM STRAINS :**

- 11 males per m<sup>2</sup>
- 17 females per m<sup>2</sup>

i.e. 13.5 birds per m<sup>2</sup> made up of 50 % males, 50 % females.

In order to keep to a balance in kg of live weight per m<sup>2</sup>, for a batch of 50 % ♂ and 50 % ♀, approximately 60 % of the building area should be allocated to the ♂ and 40 % to the ♀.

These standards assume that the level of equipment is flawless and that the building is perfectly run.

When the females are processed, the available space should be given to the males.

The objective being to produce approximately 46 kg live weight per m<sup>2</sup> (males + females).

**TEMPERATURE - VENTILATION**

1 heater for 300 to 400 ducklings

AGE IN DAYS	TEMPERATURES <sup>(1)</sup>	
	UNDER HEATERS	AMBIENT TEMPERATURE
1 to 3	40 - 45° C	30° C
4 to 7	38 - 42° C	29° C
7 to 14	36 - 38° C	27° C
14 to 21	35 - 37° C	25° C
21 to 28	30 - 32° C	22° C
28 and +	according to the season <sup>(2)</sup>	18 - 22° C

<sup>(1)</sup> Adjust temperature according to the behaviour of the birds.

<sup>(2)</sup> It is possible to raise the heaters and/or remove some of them gradually.

- Ventilation should be either static or dynamic and enable a healthy atmosphere to be maintained (ammonia level < 10 ppm).
- Avoid draughts until adult plumage is achieved.
- Where dynamic ventilation is used, provide an extraction rate of 1 to 6 m<sup>3</sup>/hour/kg of live weight.

## LIGHTING SCHEDULES FOR BROILER CANEDINS

AGE	INTENSITY	CONTINUOUS SCHEDULE <sup>(1)</sup>	SECTIONED SCHEDULE <sup>(1)</sup>
1 <sup>st</sup> week	60 to 80 lux	24 hours a day	24 hours a day
2 <sup>nd</sup> and 3 <sup>rd</sup> week	30 lux	Progressive decrease from 24 hrs to 16 hours a day	Begin by turning off for 2 hrs then add further periods of
4 <sup>th</sup> week to processing	10 lux	10 hrs of darkness 14 hrs of light	2 hr cuts to reach 6 sequences of 2 hrs of light and 2 hrs of darkness per day.

<sup>(1)</sup> In order to the lighting schedule to be effective, the intensity difference between the periods of light and darkness must be significant.



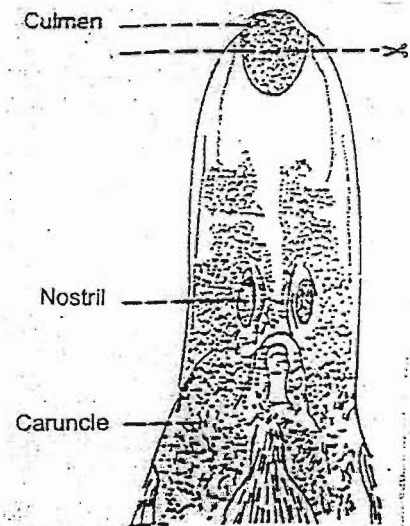
## DE-BEAKING

An operation consisting in shortening the upper mandible of the beak to limit pecking or cannibalism.

De-beaking must be carried out using highly sharpened secateurs or scissors with straight blades to obtain a clean straight cut without deforming the beak.

### Standard example of de-beaking

It is advisable to carry out de-beaking between 16 and 18 days



## DE-CLAWING

This intervention aims to avoid being clawed by birds while handling them, especially when they are being removed.

- It can be carried out as early as 10 days but it may equally be done at the same time as de-beaking at 16-18 days.
- Cut the claws one after the other for greater accuracy and greater evenness in de-clawing. It is advisable to cut from underneath the web to follow the implantation of the claw.



**Feed :**

When starting up : 1 feeder for 50 to 60 ducklings.

From the 2<sup>nd</sup> week onward : • Access to feeding systems.

- 3 cm per bird with circular feeders.

**Water :**

When starting up : 1 siphoning water trough for 50 to 60 ducklings.

Install adult drinking equipment from the very 1<sup>st</sup> day :

- Nipples : 1 for 5 ducklings.
- or
- Water troughs (plasson type) : 1 for 150 to 200 ducklings.

Remove the siphoning drinking troughs during the 2<sup>nd</sup> week.

## FEED CHARACTERISTICS FOR BROILER MUSCOVY DUCKS

	STARTER FEED 0 – 3 weeks		GROWER FEED 4 – 7 weeks		FATTENING FEED 8 – 12 weeks	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Granulation (Ø mm)	-	1.5	3.5	4	3.5	4
Metabolisable energy (Kcal/kg)	2900	-	3000	-	3100	-
Crude protein %	-	22.00	17.00	19.00	15.00	18.00
Methionine %	0.50	-	0.40	-	0.30	-
Methionine + cystine %	0.85	-	0.65	-	0.60	-
Lysine %	1.00	-	0.85	-	0.75	-
Threonine %	0.75	-	0.60	-	0.50	-
Tryptophane %	0.23	-	0.16	-	0.16	-
Cellulose matter %	-	4.00	-	5.00	-	6.00
Fats %	-	4.00	-	5.00	-	5.00
Calcium %	1.00	1.20	0.90	1.00	0.85	1.00
Digestible Phosphorus %	0.45	-	0.40	-	0.35	-
Vitamins : A (UI/kg)	15000	-	15000	-	15000	-
D (UI/kg)	3000	-	3000	-	3000	-
E (mg/kg)	20	-	20	-	20	-

The values for metabolisable energy and amino acids are based on the table for "CHICKS" issued by the French National Institute for Agricultural Research on the subject of start up and growth feeds, and for "ADULT COCKS" with regard to feed for the rearing, laying and moulting stages.

Na = 0.15 – 0.18

Cl = 0.15 – 0.20

**R51**  
**GROWTH - CONSUMPTION**

FEMALES								
PER WEEK					CUMULATIVE TOTAL			
WEEK	GMQ (g)	FEED g./d./♀	Instant I.C.	WATER ml/d./♀	AGE in Days	LIVE WT (g)	Cumul. CONS. g./♀	Cumul. I.C.
1 <sup>st</sup>	15	18	1.20	100	7	150	126	0.84
2 <sup>nd</sup>	27	42	1.56	200	14	340	420	1.24
3 <sup>rd</sup>	37	67	1.81	280	21	600	889	1.48
4 <sup>th</sup>	43	117	2.72	340	28	900	1708	1.90
5 <sup>th</sup>	54	148	2.74	380	35	1280	2744	2.14
6 <sup>th</sup>	59	157	2.66	400	42	1690	3843	2.27
7 <sup>th</sup>	53	147	2.77	400	49	2060	4872	2.37
8 <sup>th</sup>	39	137	3.51	400	56	2330	5831	2.50
9 <sup>th</sup>	31	128	4.13	400	63	2550	6727	2.64
10 <sup>th</sup>	21	120	5.71	400	70	2700	7567	2.80
11 <sup>th</sup>	13	108	8.31	400	77	2790	8323	2.98

## CONSTRAINTS IN THE USE OF FEED INGREDIENTS FOR BROILER MUSCOVY DUCKS

FEED RAW MATERIALS	STARTER FEED 0 - 3 weeks		GROWER FEED 4 - 7 weeks		FATTENING FEED 8 - 12 weeks	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
CORN	15 %	40 %	10 %	40 %	15 %	30 %
WHEAT	15 %	45 %	20 %	45 %	30 %	45 %
OATS	-	0 %	-	0 %	-	0 %
BARLEY	-	0 %	-	0 %	-	0 %
MANIOC	-	0 %	-	0 %	-	0 %
White Spring SORGHUM	-	5 %	-	5 %	-	5 %
BRAN	-	0 %	-	5 %	-	5 %
DISTILLERY SOLUBLES (corn based)	-	0 %	-	0 %	-	0 %
ADDED FATS	-	3 %	-	3 %	-	3 %
Including						
Animal fats	-	1 %	-	2 %	-	2 %
Vegetable oils	-	2 %	-	2 %	-	2 %
MOLASSES	-	0 %	-	0 %	-	0 %
SOYBEAN MEAL	-	-	-	-	-	-
00 RAPE SEED OIL MEAL	-	0 %	-	5 %	-	7 %
SUNFLOWER MEAL	-	0 %	-	5 %	-	7 %
SPRING PEAS	-	5 %	-	10 %	-	10 %
FIELD BEANS	-	0 %	-	0 %	-	0 %
LUCERNE MEALS	-	0 %	-	5 %	-	7 %
ANIMAL MEALS	-	5 %	-	5 %	-	5 %
Including						
Whole fish meal	-	3 %	-	2 %	-	0 %
Meat meal	-	4 %	-	5 %	-	7 %

## PROPHYLACTIC PROGRAMME

- 1 day : Vaccination against parvovirosis

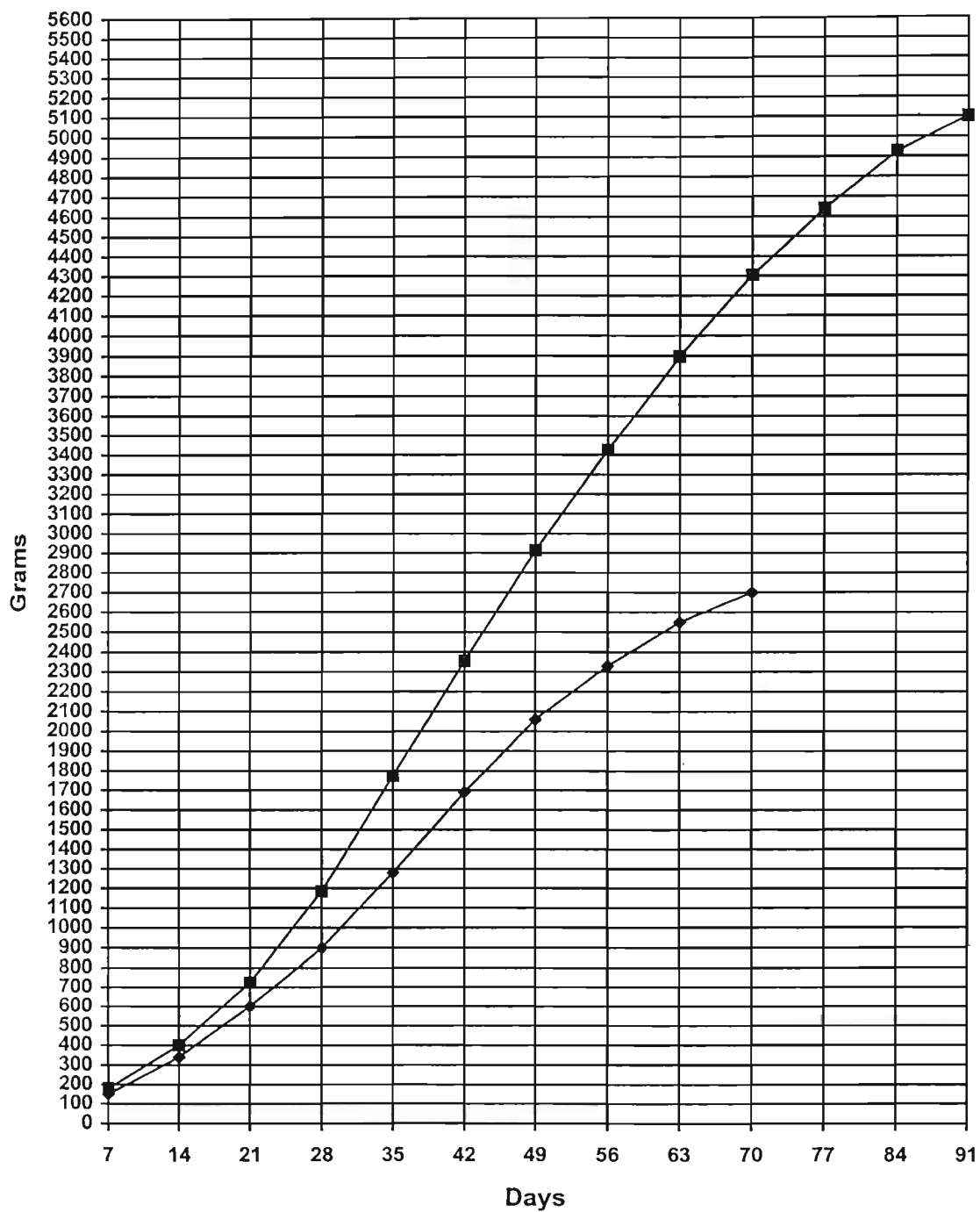
- 16-18 days : De-beaking – De-clawing  
Vaccination against parvovirosis

**R51**  
**GROWTH - CONSUMPTION**

MALES								
PER WEEK					CUMULATIVE TOTAL			
WEEK	GMQ (g)	FEED g./d./♂	Instant I.C.	WATER ml/d./♂	AGE in Days	LIVE WT (g)	Cumul. CONS. g./♂	Cumul. I.C.
1 <sup>st</sup>	19	21	1.11	100	7	180	147	0.82
2 <sup>nd</sup>	31	47	1.52	200	14	400	476	1.19
3 <sup>rd</sup>	46	83	1.80	320	21	725	1057	1.46
4 <sup>th</sup>	66	135	2.05	440	28	1185	2002	1.69
5 <sup>th</sup>	84	185	2.20	480	35	1775	3297	1.86
6 <sup>th</sup>	83	190	2.29	540	42	2355	4627	1.96
7 <sup>th</sup>	80	219	2.74	570	49	2915	6160	2.11
8 <sup>th</sup>	73	232	3.18	600	56	3425	7784	2.27
9 <sup>th</sup>	67	217	3.24	600	63	3895	9303	2.39
10 <sup>th</sup>	59	203	3.44	600	70	4305	10724	2.49
11 <sup>th</sup>	48	191	3.98	600	77	4640	12061	2.60
12 <sup>th</sup>	41	182	4.44	600	84	4925	13335	2.71
13 <sup>th</sup>	25	167	6.68	600	91	5100	14504	2.84

### GROWTH CHART FOR BROILERS CANEDINS

HEAVY STRAIN R 51



MALES	150	340	600	900	1280	1690	2060	2330	2550	2700			
FEMALES	180	400	725	1185	1775	2355	2915	3425	3895	4305	4640	4925	5100





**canedins®**  
CANETONS "DE BARBARIE"

S O U C H E L O U R D E



**PARENTAUX**

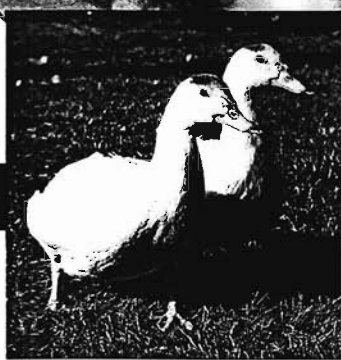
**CR**

Phénotype : plumage blanc  
Maturité sexuelle 28 semaines  
Fertilité 92 - 93 %

**CA**

Phénotype : plumage blanc  
Maturité sexuelle 28 semaines  
210 œufs en 2 pontes  
Eclorabilité 90 %

**CANEDINS R 51**



	♂	♀
Phénotype : plumage.....	blanc	blanc
Age d'abattage recommandé.....	88 jours	70 jours
Poids vif à l'abattage.....	5 kg	2.700 kg
Indice de consommation.....	2.8	2.8
Rendement filets.....	16 %	16 %

Performance moyenne  
du potentiel génétique à  $\pm 5\%$

Certification  
ISO 9001

ATAO N° 43096/1995

**GRIMAUD FRÈRES**  
**SELECTIONNEUR**  
**LA MAISON DU VIEUX-PÂTE**



**canedins®**  
CANETONS "DE BARBARIE"

**HYTOP**  
CANETONS "MULARD"

CANETONS "PEKIN"

UNION-PROG

**plus**

GRIMAUD FRERES S.A. - La Corbière - 49450 ROUSSAY - FRANCE - Tél. 33 (0) 2 41 70 36 90 - Télex 720532 F - Télécopie 33 (0) 2 41 70 31 67



**GRIMAUD FRÈRES SÉLECTION**  
**La Corbière**  
**49450 ROUSSAY**

**REARING GUIDE**  
**MUSCOVY DUCKS**  
**BREEDERS**  
**R51**

### **- Cleaning - Disinfection – Clean out :**

- The aim of this group of operations is to bring the building up to a level of hygiene which is essential to the reception of a new batch.
- All these operations must be carried out efficiently in a logical order, otherwise they will not be effective.
- Particular care should be taken with washing. No disinfectant is effective where organic matter is present.

#### **Order of the operations :**

- Spray insecticide as soon as the droppings are removed.
- Take down all movable equipment then clean it and disinfect it.
- Remove all organic matter from the building.
- Clean the building and its equipment, in particular the water distribution system.
- Disinfect walls and floor by spraying.
  - ⇒ Following this, install sanitary barriers (the enclosed vestibule, clothing, etc.).
- The sanitary interval then begins : its duration should be long enough to ensure that the building is completely dry.
- This period should be used to maintain the surrounds, clean and disinfect the feed storage areas and put down raticides.

#### **Before starting a new batch :**

- Re-install clean and disinfect equipment and litter if necessary.
- Disinfect using fumigation.

#### **Important points :**

- Remember to include ventilation shafts, enclosed vestibules, warehouses and doorways, all of which are highly contaminated areas.
- The disinfectants used must have received prior official approval and be used in accurate conditions of dosage, temperature and quantity of solution (1 litre/4 m<sup>2</sup>).
- Washing must be carried out using water that is bacteriologically drinkable.

## CONTENTS

### **1<sup>st</sup> PART: DESIGN - LAYOUT OF THE BUILDING**

#### **I. HEALTH CONSIDERATIONS**

- Sanitary precautions
- Cleaning - Disinfection – Clean out

#### **II. SET UP OF THE BUILDING**

### **2<sup>nd</sup> PART: CARRYING OUT THE REARING PROCESS**

#### **I. PRE-LAYING AND THE 1<sup>ST</sup> LAYING PHASES**

##### **11. INSTALLATION OF BREEDERS**

##### **12. HEATING - VENTILATION**

##### **13. WATER**

##### **14. FEED**

- 14.1. Nutritional characteristics
- 14.2. Constraints in the use of raw materials
- 14.3. Rationing Plan

##### **15. LIGHTING**

##### **16. PROPHYLAXIS - INTERVENTIONS**

##### **17. EGG COLLECTION**

- 17.1. Collecting organization
- 17.2. Eggs weight

##### **18. GROWTH CHARTS**

## **II. MOULTING**

**21. THE SET UP MOULTING**

**22. THE MOULTING PROGRESS**

**23. FEED**

**24. LIGHTING**

## **III. THE 2<sup>nd</sup> LAYING PHASE**

**31. HEATING - VENTILATION**

**32. FEED**

**33. LIGHTING**

**34. PROPHYLAXIS - INTERVENTIONS**

**35. EGGS WEIGHT CURVE**

**ANNEXES** :

- Affectation of the muscovy duck breeders
- Affectation of laying curve per female
- Rationing plan 1<sup>st</sup> laying, moulting and 2<sup>nd</sup> laying
- Growth charts 1<sup>st</sup> laying and moulting
- Laying graphs 1<sup>st</sup> and 2<sup>nd</sup> phases
- Eggs weight curves 1<sup>st</sup> and 2<sup>nd</sup> laying phases

## I. HEALTH CONSIDERATIONS

### - Health precautions:

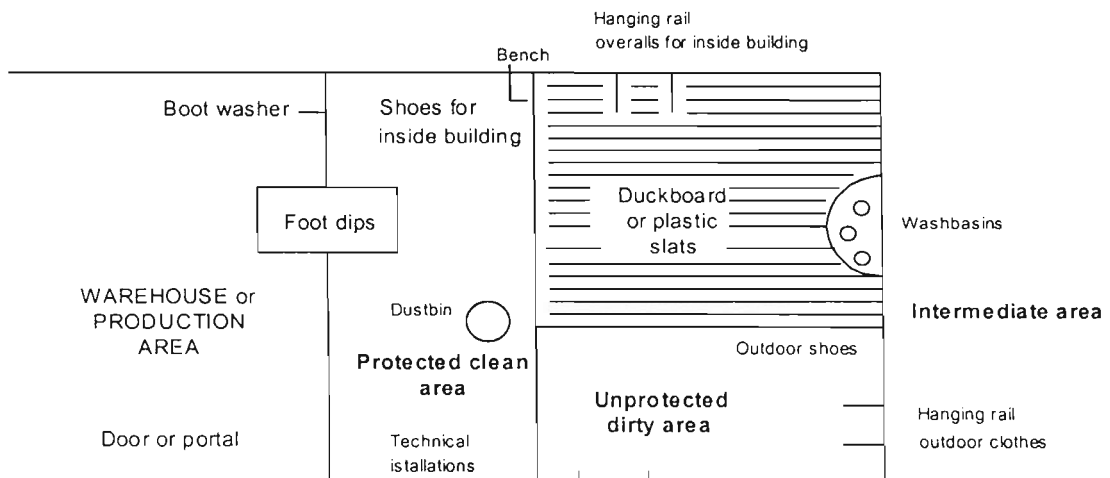
- The aim of these is to prevent external contamination by preventing potential vectors from entering the building.

#### Exterior protection :

- Fenced site.
- A clean ground surface surrounding the building, that can be disinfected.
- A building that is bird and rodent proof.
- No poultry on the premises.
- No feed or abattoir trucks should enter the protected area.
- Concrete area for washing.

#### Personnel :

- Man is the principal vector of contaminating agents. A well-designed enclosed vestibule that is always properly used should conform to the following characteristics :



- Its use should enable those entering to take off their outer clothing and shoes, which are potentially contaminated, in the dirty zone and to put on clean overalls after washing their hands. It should be kept clean and regularly disinfected.

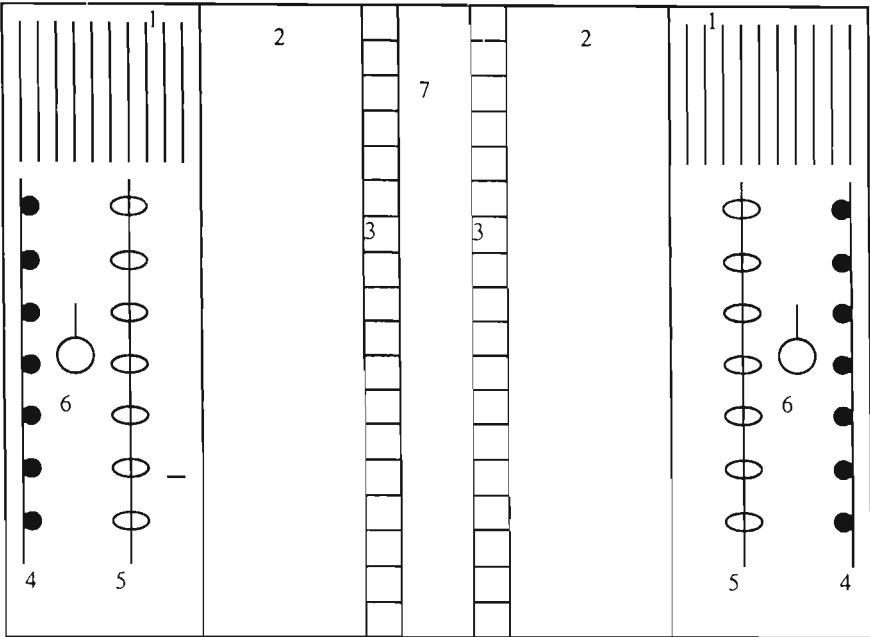
#### Active protection :

- Treatment should be administered to the youngest birds first and to others in rising order of age. In instances of disease, those who are ill should be treated last.
- Active controls should be organised against rodents and insects.
- Dead birds should be removed without entering clean zones and they should be stored in an air-tight and refrigerated area.
- The egg room, feed storage, feeders, drinking troughs and the water distribution system should be regularly decontaminated.

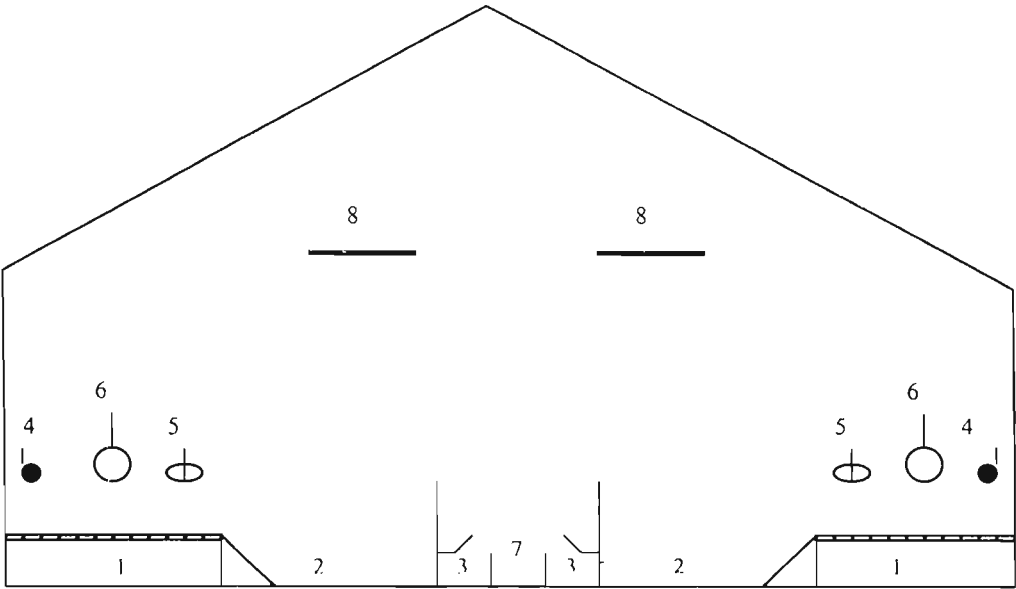
## II. SET UP OF THE BUILDING

- The building should preferably be dark inside, with dynamic ventilation. However, semi-dark buildings with static ventilation may be acceptable, in spite of a few difficulties in managing lighting schedules.
- You are advised to have a building with an adequate volume: 0.25 m<sup>3</sup>/kg of live weight, i.e. about 0.8 m<sup>3</sup>/duck.
- Interior arrangement :
  - A central walkway.
  - 50 % duckboards; 50 % litter.  
(see attached plan)
- The equipment for supplying water and feed should be placed on the duckboards. It is preferable to have a system that can be raised.
- In temperate climates, a heating system should be provided in order to maintain an ambient temperature of a minimum of 16°C.
- Nesting boxes should be installed on either side of the central walkway. 1 box should be provided for 6 ♀.
- Density (♂ in addition) :
  - Medium stock: 3.2 ♀/m<sup>2</sup>
  - Heavy stock: 3 ♀/m<sup>2</sup>
  - Extra heavy stock: 2.8 ♀/m<sup>2</sup>
- Ratio between the sexes : • 1 ♂ for 3.5 ♀
- The birds should be divided into pens containing 400 ♀

OVERALL PLAN OF THE BUILDING



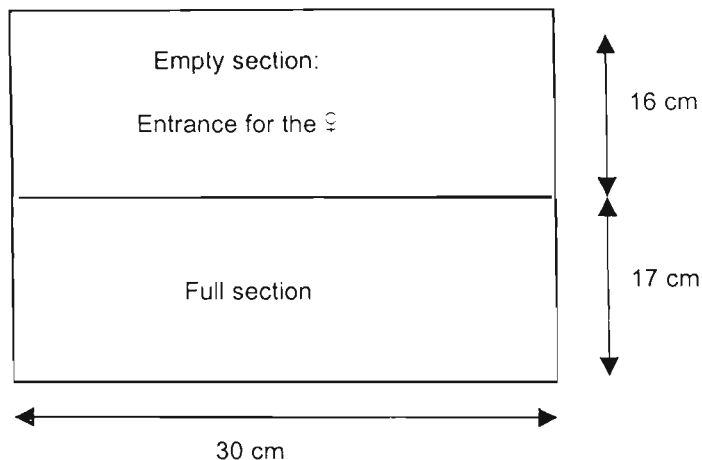
- 1. Duckboards
- 2. Litter
- 3. Nesting boxes
- 4. Nipples
- 5. Feeding line
- 6. "Plassons" drinkers
- 7. Central walkway
- 8. Lighting



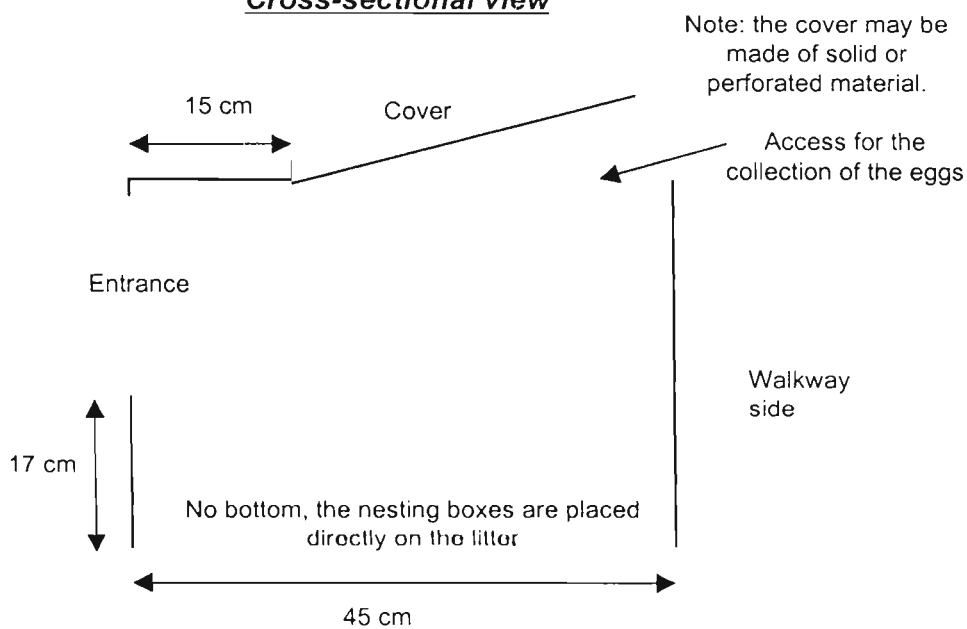


## PLAN OF A NESTING BOX

### Front view



### Cross-sectional view



## **2<sup>nd</sup> PART : CARRYING OUT THE REARING PROCESS**

### **I. PRE-LAYING AND THE 1<sup>st</sup> LAYING PHASES**

#### **11. INSTALLATION OF BREEDERS:**

- The transfer to the laying building should be made at 24 weeks. It is important to respect this age as it has a preponderant effect on the entry into the laying phase.
- For the first few days, the birds should be carefully watched to see that they reach the drinkers and feeders normally. It may be necessary to make them climb on the duckboards.
- The nesting boxes should be available to them at 27 weeks.
- The first eggs are laid at 28 weeks and the laying level should reach 8% at 29 weeks of age.

#### **12. HEATING - VENTILATION :**

- Air should be renewed at the following rate:  
minimum : 1 m<sup>3</sup>/hour / kg of live weight  
maximum : 6 m<sup>3</sup>/hour / kg of live weight
- The level of ammonia should be less than 10 ppm.
- The minimum temperature should be 16°C. In temperate climates, a heating system should be provided.

#### **13. WATER :**

- 2 types of drinkers should be available:  
Circular water trough : 1 for 150 ducks  
Nipples : 1 for 6 to 7 ducks
- The drinkers should be installed on the duckboards and evenly distributed.

**14. FEED :****14.1. Nutritional characteristics :**

- "Rearing" feed or young breeders feed should be distributed up to 26 weeks of age.
- "Laying" feed should be distributed from the 27<sup>th</sup> week onwards

			"Rearing" feed		"Layer" feed	
			MIN.	MAX.	MIN.	MAX.
Granulation (Ø mm)			3.5	4	3.5	4.0
Metabolisable energy	(Kcal/kg)		2700	2800	2800	2900
Crude protein	%		14.00	16.00	16.50	18.00
Methionine	%		0.30	-	0.40	-
Methionine + cystine	%		0.60	-	0.70	-
Lysine	%		0.70	-	0.80	-
Threonine	%		0.45	-	0.60	-
Tryptophane	%		0.16	-	0.17	-
Crude fiber	%		-	6.00	-	6.00
Fats	%		-	4.00	-	5.00
Minerals	%		-	7.00	-	11.00
Calcium	%		1.00	1.20	3.00	3.20
Available phosphorus	%		0.35	0.45	0.30	0.40
Vitamins :	A	(UI/kg)	15000	-	15000	-
	D	(UI/kg)	3000	-	4000	-
	E	(mg/kg)	20	-	20	-

**14.2. Constraints in the use of raw materials :**

RAW MATERIALS in %	"Rearing" feed		"Layer" feed	
	MIN.	MAX.	MIN.	MAX.
CORN	15	45	20	45
WHEAT	30	45	30	45
OATS	-	5	-	5
White Spring SORGHUM	-	0	-	10
BRAN	-	10	-	5
DISTILLERY SOLUBLES (corn based)	-	5	-	5
ADDED FATS	-	-	-	3
including: - Animal fats	-	-	-	2
- Vegetable oils	-	-	-	2
SUNFLOWER MEAL	-	-	-	10
SPRING PEAS	-	10	-	10
LUCERNE MEALS	-	7	-	5
ANIMAL MEALS	-	5	1.5	5
including: - Whole fish meal	-	4	1.5	4
- Meat meal	-	4	-	4

### 14.3. Rationing plan :

- From the quantity indicated above calculate a daily quantity per female covered according to the correct sex-ratio and the size of breeders.
- As for the rearing phase, quantities are given as an indication ; they should be adjusted according to the growth rate graph for ♀ and the start of the laying phase.
- The objective is to achieve 8 % laying rate in the 29<sup>th</sup> week.
- From the 26<sup>th</sup> week onwards, 2 meals a day should be given (in the morning and afternoon). Make sure that the feeders are empty before feed is distributed again.
- Access to feeders should be adequate : 5 cm per bird (♂ or ♀) for circular feeders.

(Rationing plan in annexes).

**15. LIGHTING :**

- The lighting should be fluorescent and the average intensity should be 70 lux.
- The building should be evenly lit over its whole length.

**- Lighting schedule :**

WEEKS	DURATION	WEEKS	DURATION
24 <sup>th</sup> wk 162-168 d.	10 hours	38 <sup>th</sup> wk 260-266 d.	14 hours 45 min
25 <sup>th</sup> wk 169-175 d.	11 hours	39 <sup>th</sup> wk 267-273 d.	15 hours
26 <sup>th</sup> wk 176-182 d.	12 hours	40 <sup>th</sup> wk 274-280 d.	15 hours
27 <sup>th</sup> wk 183-189 d.	13 hours	41 <sup>st</sup> wk 281-287 d.	15 hours 15 min
28 <sup>th</sup> wk 190-196 d.	13 hours 30 min	42 <sup>nd</sup> wk 288-294 d.	15 hours 15 min
29 <sup>th</sup> wk 197-203 d.	13 hours 45 min	43 <sup>rd</sup> wk 295-301 d.	15 hours 30 min
30 <sup>th</sup> wk 204-210 d.	13 hours 45 min	44 <sup>th</sup> wk 302-308 d.	15 hours 30 min
31 <sup>st</sup> wk 211-217 d.	14 hours	45 <sup>th</sup> wk 309-315 d.	15 hours 45 min
32 <sup>nd</sup> wk 218-224 d.	14 hours	46 <sup>th</sup> wk 316-322 d.	15 hours 45 min
33 <sup>rd</sup> wk 225-231 d.	14 hours 15 min	47 <sup>th</sup> wk 323-329 d.	16 hours
34 <sup>th</sup> wk 232-238 d.	14 hours 15 min	48 <sup>th</sup> wk 330-336 d.	16 hours
35 <sup>th</sup> wk 239-245 d.	14 hours 30 min	49 <sup>th</sup> wk 337-343 d.	16 hours
36 <sup>th</sup> wk 246-252 d.	14 hours 30 min	50 <sup>th</sup> wk 344-350 d. onward	16 hours 15 min
37 <sup>th</sup> wk 253-259 d.	14 hours 45		

- The start of the lighting schedule will be established according to the time the eggs are collected, on the basis that laying is at its maximum 3 hours after lights are switched on.
- In the case of semi-dark buildings, the following rules should be obeyed :
  - Never reduce the duration of lighting during laying.
  - If necessary, natural light should be complemented by a lighting schedule which enables the above standards to be reached, with regard to both duration and intensity.

## 16. PROPHYLAXIS - INTERVENTIONS :

Removing from the nest : - The phenomenon of broodiness may on occasion be important, especially in periods of hot weather.

- From the first symptoms one or the other of the following techniques should be used to take the bird off its nest :

### 1) Removing an individual bird from the nest :

- Transfer the broody ♀ for 3 or 4 days to a pen on full duckboards then return it to the original pen after checking the widening of the pelvic bones.
- Carry out this operation twice a week.

### 2) Removal from nest by changing pens :

- 1<sup>st</sup> phase: Individual switching of ♀ in opposite pens on either side of the walkway.
- 2<sup>nd</sup> phase: When broodiness persists for too long, switch all the pens, using the same procedure.

## 17. EGG COLLECTION :

### 17.1. Organisation of collection :

- To obtain as many clean eggs as possible, the first collection should take place 1 hour after the lighting is switched on.
- First gather the eggs laid outside the nests, then those laid in the nests.
- Gather eggs a second time at the end of the morning and again at the end of the afternoon.
- Separate the eggs that cannot be incubated.
- Store the eggs in plastic or cardboard cellular trays in a temperate room at about 17°C.

## 18. GROWTH CHARTS :

The control of growth and the lighting schedule are the 2 key elements leading to the start up of the laying phase.

In light or semi-dark buildings, the lighting schedule is difficult to adhere to, and this is why rationing is a major factor in triggering the laying phase at a suitable age.

The object of the following graphs is to achieve an 8% rate of laying at 29 weeks, in order to attain a satisfactory weight of egg and regular laying. (Follow closely the live weight indicated for each strain of breeder).

(Curves in annexes).



## II. MOULTING

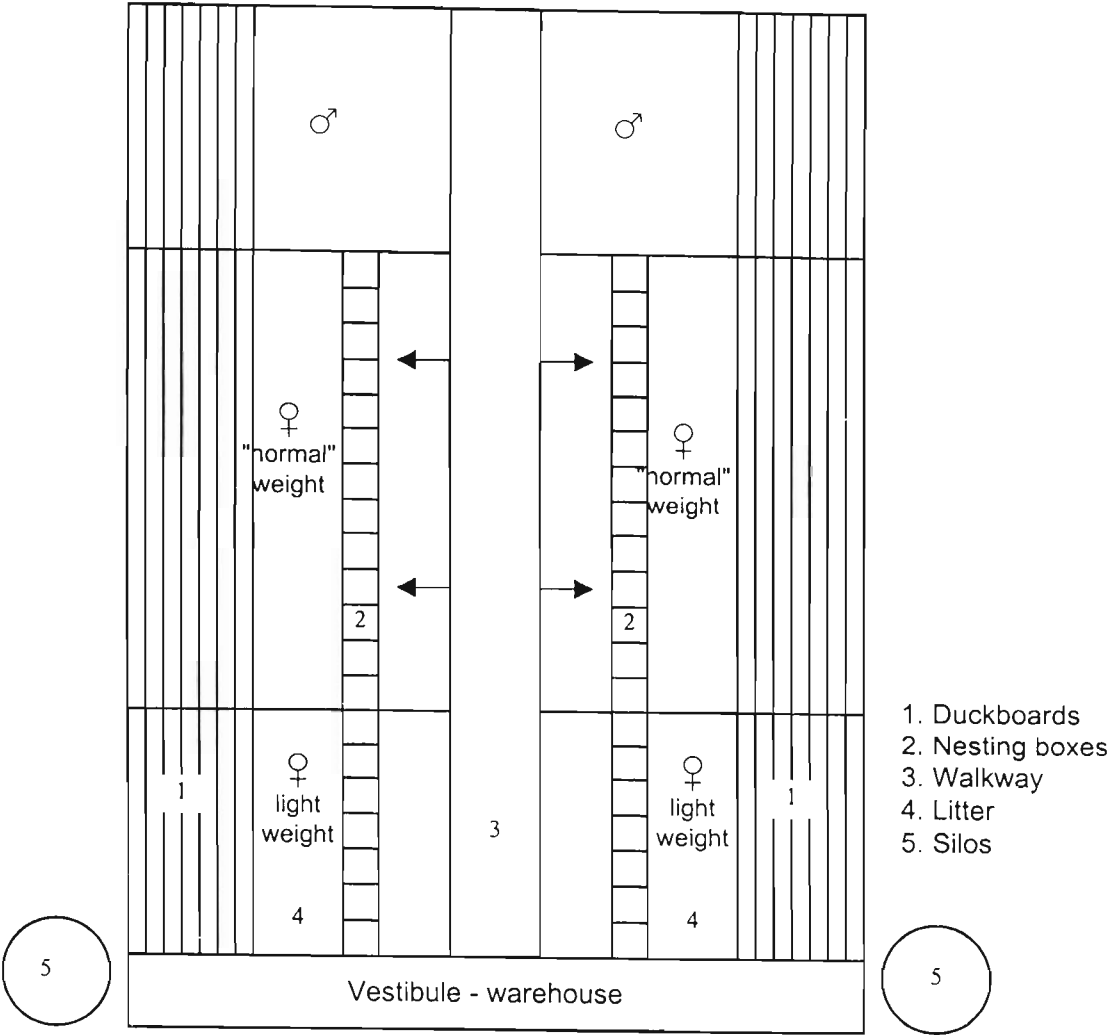
### 21. THE SET UP OF MOULTING:

- The start of moulting normally comes at the end of the 22<sup>nd</sup> week of the 1<sup>st</sup> laying phase. However, depending on the reproduction performance and/or the sales context, the 1<sup>st</sup> lay may be reduced or prolonged by a few weeks.
- The objective is to reduce the laying rate rapidly and significantly; the laying rate should be down to 3 to 4 % after 8 to 10 days of moulting.
- During the moulting ♂ and ♀ are separate. Also, you are advised to begin to separate the thinnest ♀ 1 to 2 weeks before moulting starts.

#### - Methodology :

Day/Age	Feeding	Lighting	Interventions
D - 3	Distribute rearing feed	14 hours	/
D - 2	/	12 hours	/
D - 1	/	10 hours	Empty feeders
D 0 = Day moulting start	Set up skip a day programme ⇒ 1 <sup>st</sup> day without feed.	8 hours Reduce intensity to 20 lux	/
D + 1	1 <sup>er</sup> feeding day ⇒ follow the rationing plan.	8 hours 20 lux	/
D + 2	2 <sup>nd</sup> day without feed.	8 hours 20 lux	<ul style="list-style-type: none"> <li>- Separation of ♂ from ♀.</li> <li>- Separation of lightest ♀</li> <li>- Check weight and homogeneity.</li> <li>- Reduce the area of litter for ♀ by 1/3 by moving nests away from the walkway.</li> </ul>

LAYOUT OF THE BUILDING FOR MOULTING



- Density:  $\sigma = 2,7 \sigma/m^2$   
 $\varphi = 4,7 \varphi/m^2$
- Place the light  $\varphi$  at the head of the feeding line and the  $\sigma$  at the end.
- For the  $\varphi$  with a correct weight, remove the barriers on litter in order to remove the brooding zones.
- The laying rate should be less than 3 % after 8 days of moulting.

## 22. THE PROGRESS OF MOULTING:

- Carry out a visual sort of light  $\varphi$  each week.
- Check weight and homogeneity each week (see growth charts for moulting).

AGE	EVENT	INTERVENTION
3	Start of the 1 <sup>st</sup> shedding of feathers	Carry out another individual check on weight of $\varphi$ to improve homogeneity and readjust rationing.
4		Re-install nests at the edge of the walkway.
10	Start of the 2 <sup>nd</sup> shedding of feathers	- Remove litter – Cleaning. - Put $\sigma$ and $\varphi$ together.
12	First eggs	- Vaccination and pens set up again. - Nesting boxes opened.
14	8 % laying = 1 <sup>st</sup> week of 2 <sup>nd</sup> lay	

- Temperature : maintain 15°C throughout moulting.

### 23. FEED :

- Type of feed :
  - Rearing feed from the end of the laying phase until the 10<sup>th</sup> week of moulting.
  - Laying feed from the 11<sup>th</sup> week of moulting.

(Rationing plan in annexes).

**24. LIGHTING :**

<b>Week of moulting</b>	<b>Duration</b>	<b>Intensity</b>
<b>0</b>	7 hours	15 to 20 lux
<b>1</b>	7 hours	15 to 20 lux
<b>2</b>	7 hours	15 to 20 lux
<b>3</b>	7 hours	15 to 20 lux
<b>4</b>	7 hours	15 to 20 lux
<b>5</b>	7 hours	15 to 20 lux
<b>6</b>	7 hours	15 to 20 lux
<b>7</b>	7 hours	15 to 20 lux
<b>8</b>	7 hours	15 to 20 lux
<b>9</b>	10 hours	70 lux
<b>10</b>	11 hours	70 lux
<b>11</b>	12 hours	70 lux
<b>12</b>	12 hours 15 min	70 lux
<b>13</b>	12 hours 45 min	70 lux

## II. THE 2<sup>nd</sup> LAYING PHASE

### 31. HEATING - VENTILATION :

- Maintain 16°C with a maximum level of 10 ppm of ammonia.

### 32. FEED :

- Same feed as in 1<sup>st</sup> laying phase.

(Rationing plan in annexes).

### 33. LIGHTING :

- Maximum intensity : 60 to 70 lux.

<b>Week of 2<sup>nd</sup> laying phase</b>	<b>Age (in weeks) (if cycle is normal)</b>	<b>Duration</b>
<b>1<sup>st</sup></b>	<b>64</b>	13 hours 45 min
<b>2<sup>nd</sup></b>	<b>65</b>	13 hours 45 min
<b>3<sup>rd</sup></b>	<b>66</b>	14 hours
<b>4<sup>th</sup></b>	<b>67</b>	14 hours
<b>5<sup>th</sup></b>	<b>68</b>	14 hours 15 min
<b>6<sup>th</sup></b>	<b>69</b>	14 hours 15 min
<b>7<sup>th</sup></b>	<b>70</b>	14 hours 30 min
<b>8<sup>th</sup></b>	<b>71</b>	14 hours 30 min
<b>9<sup>th</sup></b>	<b>72</b>	14 hours 45 min
<b>10<sup>th</sup></b>	<b>73</b>	14 hours 45 min
<b>11<sup>th</sup></b>	<b>74</b>	15 hours
<b>12<sup>th</sup></b>	<b>75</b>	15 hours
<b>13<sup>th</sup></b>	<b>76</b>	15 hours 15 min
<b>14<sup>th</sup></b>	<b>77</b>	15 hours 15 min
<b>15<sup>th</sup></b>	<b>78</b>	15 hours 30 min
<b>16<sup>th</sup></b>	<b>79</b>	15 hours 30 min
<b>17<sup>th</sup></b>	<b>80</b>	15 hours 45 min
<b>18<sup>th</sup></b>	<b>81</b>	15 hours 45 min
<b>19<sup>th</sup></b>	<b>82</b>	16 hours
<b>20<sup>th</sup></b>	<b>83</b>	16 hours
<b>21<sup>st</sup> and following</b>	<b>84</b>	16 hours 15 min

**34. PROPHYLAXIS – INTERVENTIONS :**

- Follow the procedure for brooding like in the 1<sup>st</sup> laying phase and watch out carefully for this as it is likely to happen earlier.

**35. EGGS WEIGHT CURVE :**

- The interpretation of the egg weight depend of the following factors :
  - Type of the croos-breeding
  - Age at the first egg
  - Feeding
  - Season
  - Sanitary conditions
- The variation coefficient of the individual egg weight is about 7 %.
- The variation coefficient of the average egg weight between differents flocks is about 2,5 %.

(Curve in annexes).



**ANNEXES**  
**AT REARING GUIDE**  
**MUSCOVY DUCKS**  
**BREEDERS**  
**R51**

- Affectation of the muscovy duck breeders
- Affectation of laying curve per female
- Rationing plans 1<sup>st</sup> laying, moulting and 2<sup>nd</sup> laying
- Growth charts 1<sup>st</sup> laying and moulting
- Laying graphs 1<sup>st</sup> and 2<sup>nd</sup> phases
- Eggs weight curves 1<sup>st</sup> and 2<sup>nd</sup> laying phases

**AFFECTATION OF THE MUSCOVY DUCK BREEDERS  
ACCORDING TO THEIR GROWTH POTENTIAL  
FOR YEAR 2001**

This affectation establishes the growth curve type (future breeders and moulting) as well as the rationing plan (future breeders and pre-laying) to apply for each type of breeder beginning a new phase in 2001

	MALE	FEMALE
MEDIUM STRAIN	CN	CK CO
HEAVY STRAIN	DT CR CF	DC CA

**AFFECTATION OF LAYING GRAPH OF  
FEMALE MUSCOVY BREEDER  
BEGINNING THEIR LAYING IN 2001**

<b>FEMALE</b>	<b>1<sup>st</sup> LAYING in 22 weeks</b>	<b>2<sup>nd</sup> LAYING in 21 weeks</b>
CO	112 eggs	98 eggs
CK	112 eggs	98 eggs
CA	112 eggs	98 eggs
DC	110 eggs	94 eggs

## RATIONING PLAN 1<sup>ST</sup> LAYING

Age	Quantity of feed per individual ♂			Quantity of feed per individual ♀		
	Medium	Heavy	Super Heavy	Medium	Heavy	Super Heavy
24 <sup>th</sup> wk 162-168 d.	212	220	230	121	125	130
25 <sup>th</sup> wk 169-175 d.	226	231	242	130	137	141
26 <sup>th</sup> wk 176-182 d.	240	248	259	141	147	159
27 <sup>th</sup> wk 183-189 d.	240	248	259	147	153	159
28 <sup>th</sup> wk 190-196 d.	230	238	249	153	159	165
29 <sup>th</sup> wk 197-203 d.	220	228	239	159	165	171
30 <sup>th</sup> wk 204-210 d.	210	218	229	165	171	177
31 <sup>st</sup> wk 211-217 d.	200	208	219	171	177	183
32 <sup>nd</sup> wk 218-224 d.	190	198	209	177	183	189
33 <sup>rd</sup> wk 225-231 d.	180	188	199	183	189	195
34 <sup>th</sup> wk 232-238 d.	170	178	189	189	195	201
35 <sup>th</sup> wk 239-245 d.	170	175	189	195	201	207
36 <sup>th</sup> week onward	on demand	on demand	on demand	on demand	on demand	on demand

## RATIONING PLAN MOULTING

ALL STRAINS							
Wk of moulting.	Calendar Week	♂		♀		Total quantity Building	
		Qty / day / ♂	Qty planned	Qty / day / ♀	Qty planned	Planned quantity	Real quantity
1		0.140		0.105			
2		0.150		0.105			
3		0.160		0.105			
4		0.170		0.110			
5		0.170		0.110			
6		0.170		0.110			
7		0.180		0.110			
8		0.180		0.115			
9		0.180		0.115			
10		0.180		0.115			
11		0.200		0.120			
12		0.200		0.120			
13		0.200		0.130			

These quantities should enable the growth chart specific to each strain of breeder (light, medium, heavy and super heavy), to be followed. However, the real the growth of breeders should be followed in order to adjust the quantities of feed.

## RATIONING PLAN 2<sup>nd</sup> LAYING

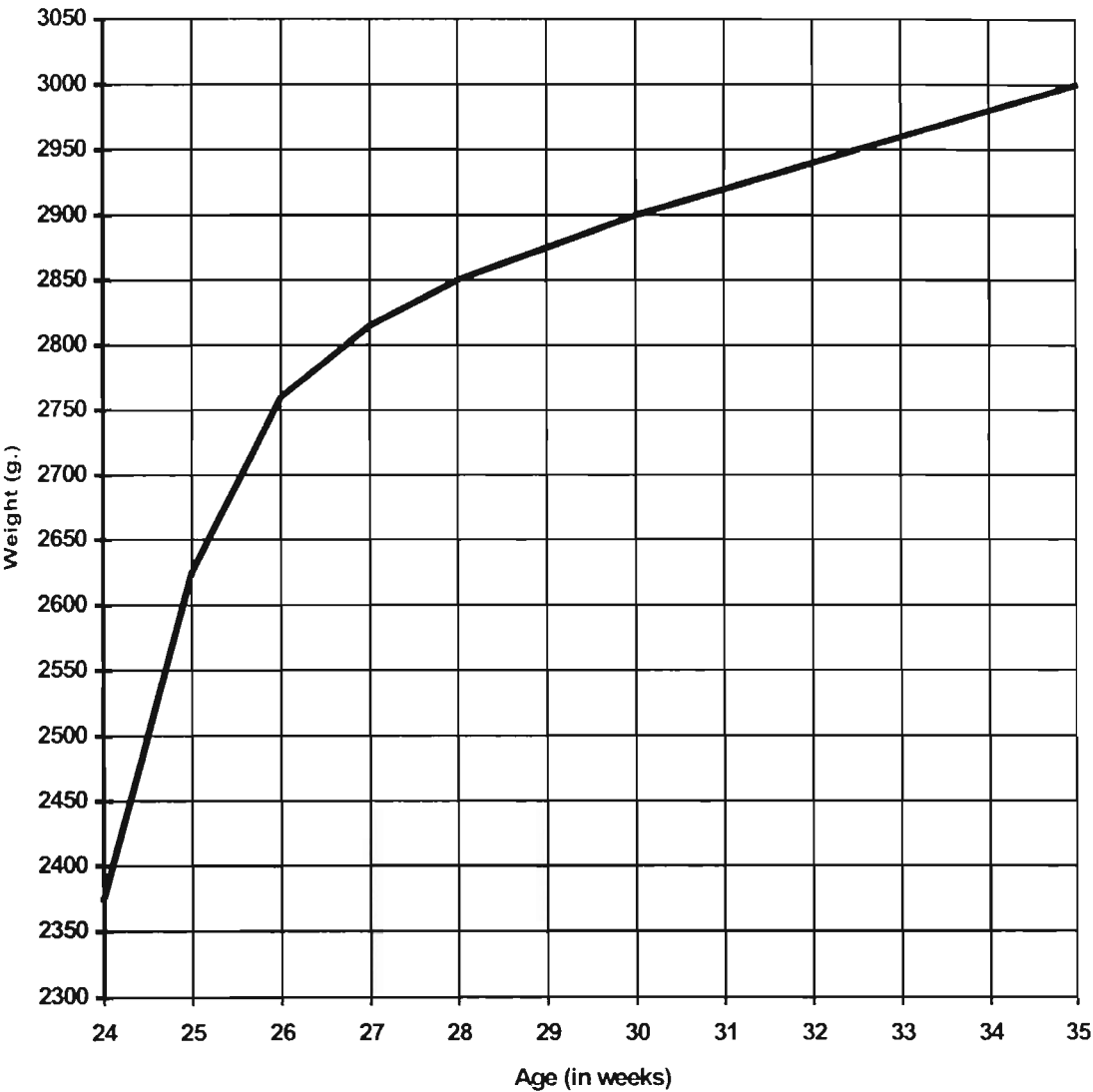
- Rationing plan for all strains :

<b>Weeks of 2<sup>nd</sup> laying phase</b>	<b>Quantity of feed per indiv. ♂ (in g)</b>	<b>Quantity of feed per indiv. ♀ (in g)</b>
<b>1<sup>st</sup></b>	194	142
<b>2<sup>nd</sup></b>	190	148
<b>3<sup>rd</sup></b>	184	155
<b>4<sup>th</sup></b>	178	162
<b>5<sup>th</sup></b>	172	168
<b>6<sup>th</sup></b>	168	175
<b>7<sup>th</sup></b>	161	182
<b>8<sup>th</sup> and following</b>	on demand	on demand

These quantities may be slightly modified depending on the growth rate at the end of moulting and the level of laying.

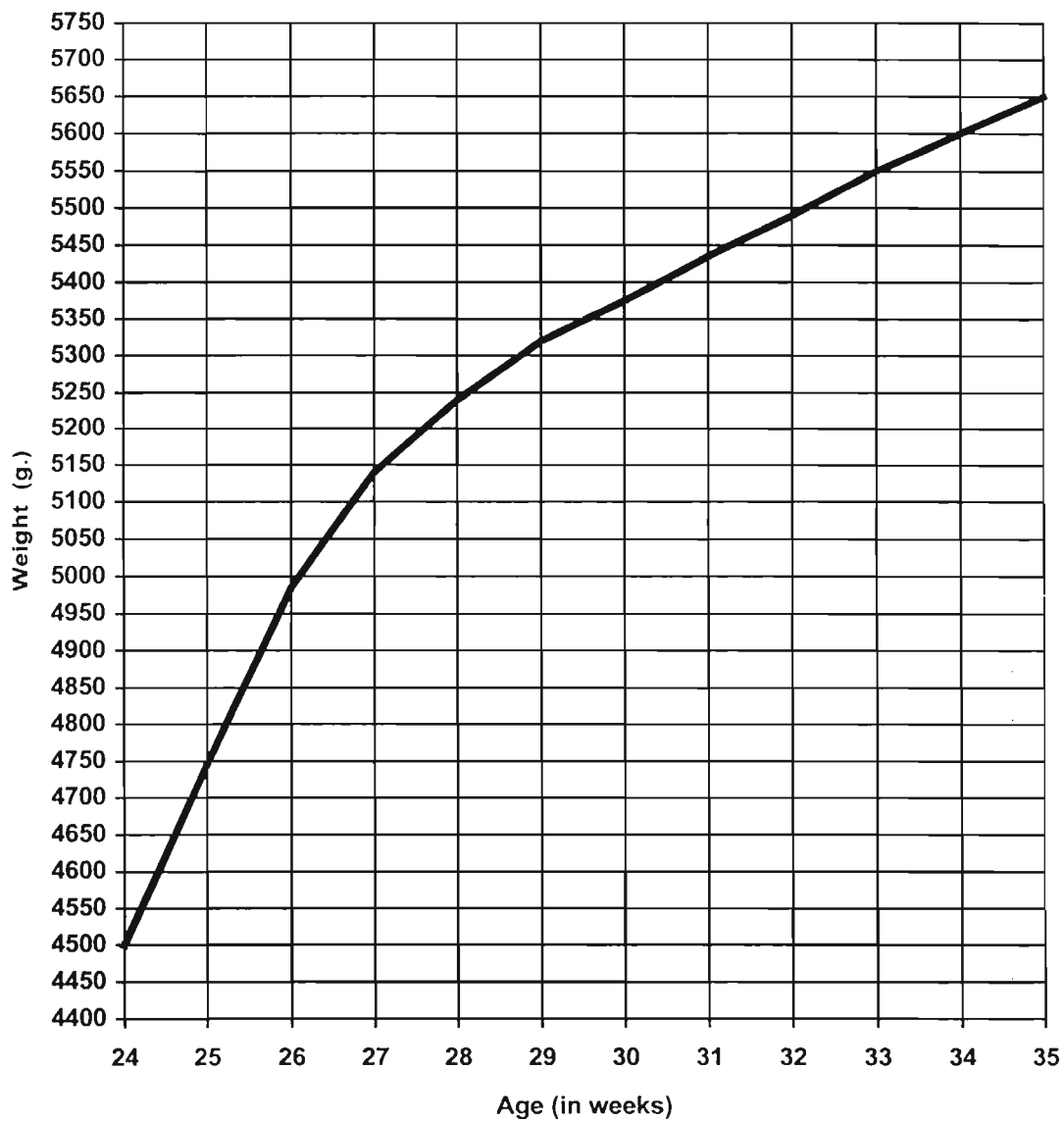
GROWTH CHART  
FEMALE MUSCOVY - HEAVY

Week	24	25	26	27	28	29	30	31	32	33	34	35
Calend.week												
Theoret.L.W.	2375	2625	2760	2815	2850	2875	2900	2920	2940	2960	2980	3000
Nb dead												
% Mortality												
% Homoge.												



# GROWT CHART MALE MUSCOVY - HEAVY

Week	24	25	26	27	28	29	30	31	32	33	34	35
Calend.week												
Theoret.L.W.	4500	4745	4985	5140	5240	5320	5375	5435	5490	5550	5600	5650
Nb dead												
% Mortality												
% Homoge.												

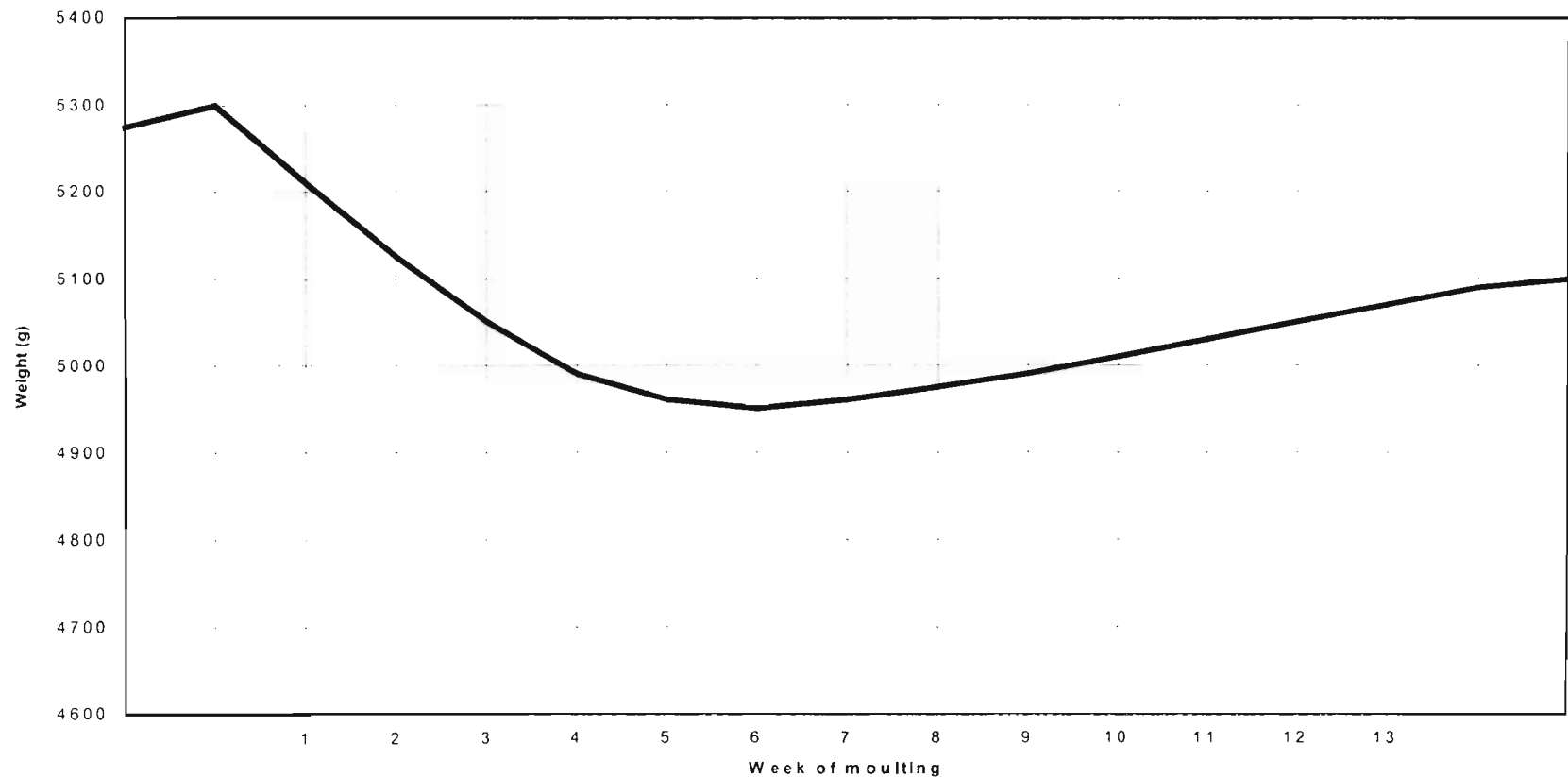




## GROWTH CHART DURING MOULTING MALE MUSCOVY - HEAVY

FLOCK N°: \_\_\_\_\_ NUMBERS ♂: \_\_\_\_\_ STRAIN: CR

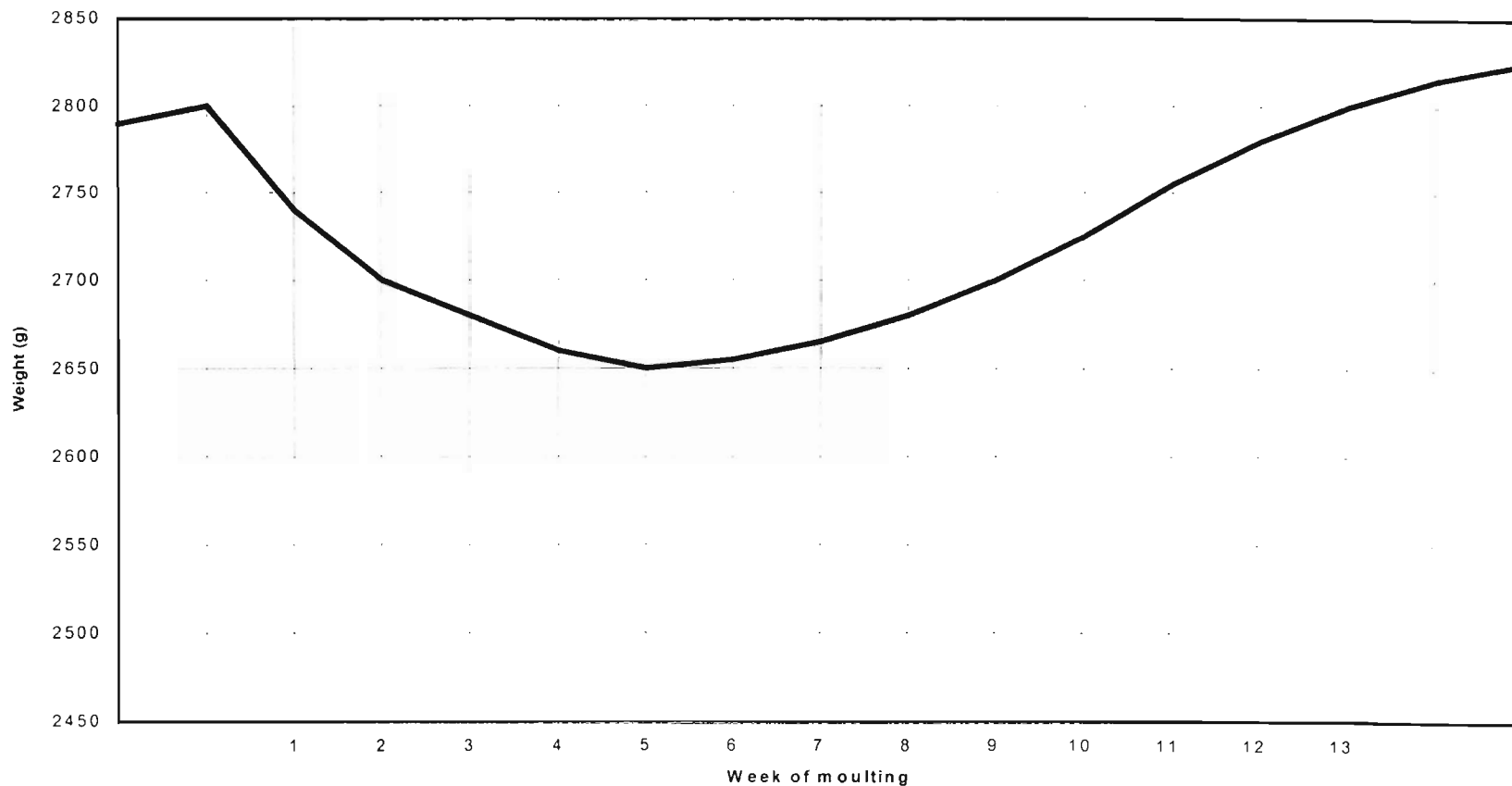
Week of moult			1	2	3	4	5	6	7	8	9	10	11	12	13		
Calend. Week																	
Theoretical LW	5275	5300	5210	5125	5050	4990	4960	4950	4960	4975	4990	5010	5030	5050	5070	5090	5100
Nb Dead																	
% Mortality																	
% Homogeneity																	



## GROWTH CHART DURING MOULTING FEMALE MUSCOVY - HEAVY

FLOCK N°: \_\_\_\_\_ NUMBERS ♀: \_\_\_\_\_ STRAIN: CA

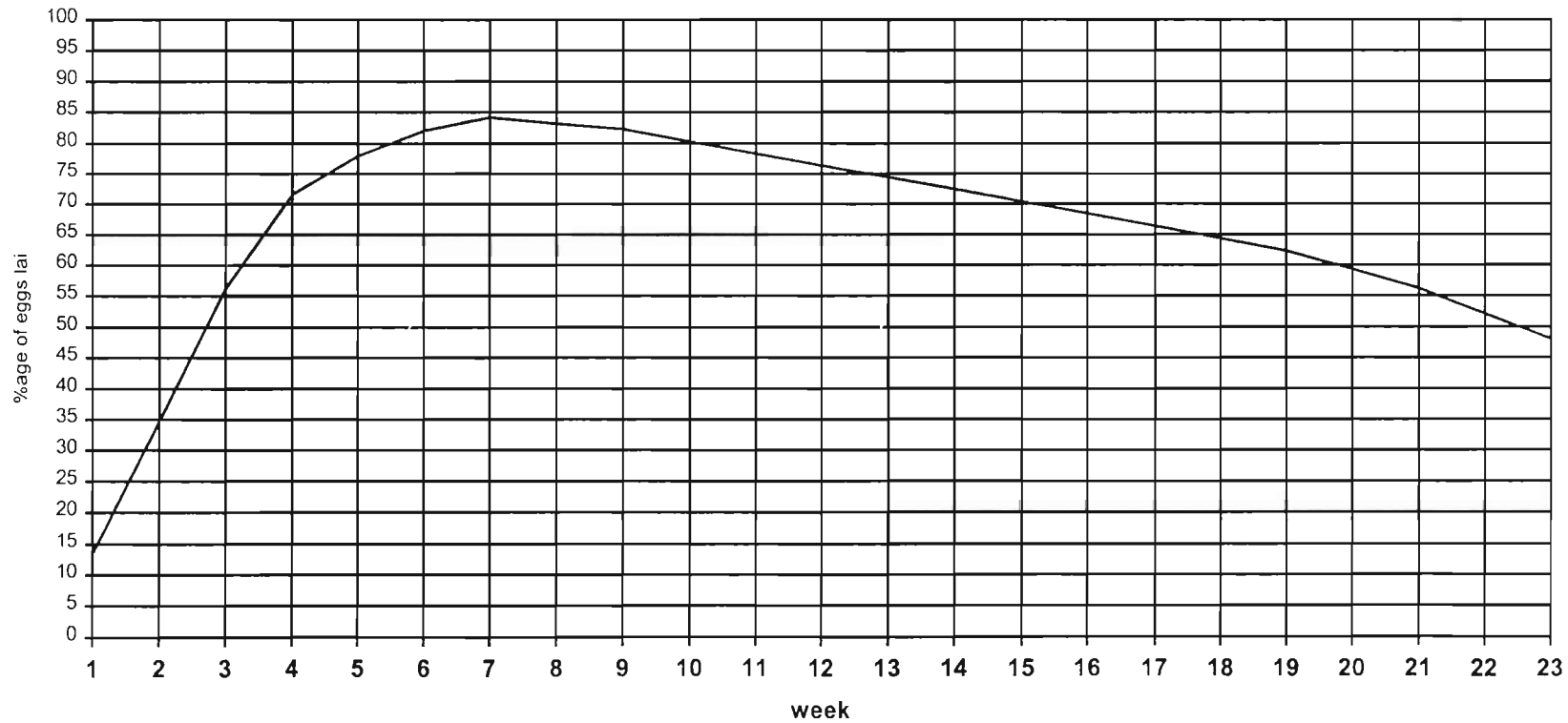
Week of moult			1	2	3	4	5	6	7	8	9	10	11	12	13		
Calend. Week																	
Theoretical LW	2790	2800	2740	2700	2680	2660	2650	2655	2665	2680	2700	2725	2755	2780	2800	2815	2825
Nb Dead																	
% Mortality																	
% Homogeneity																	



2nd LAYING GRAPH - MUSCOVY - Objective in 21 wks : 98 eggs / ♀ MEP

FLOCK N°: NUMBERS ♂ : ♀ : STRAIN :

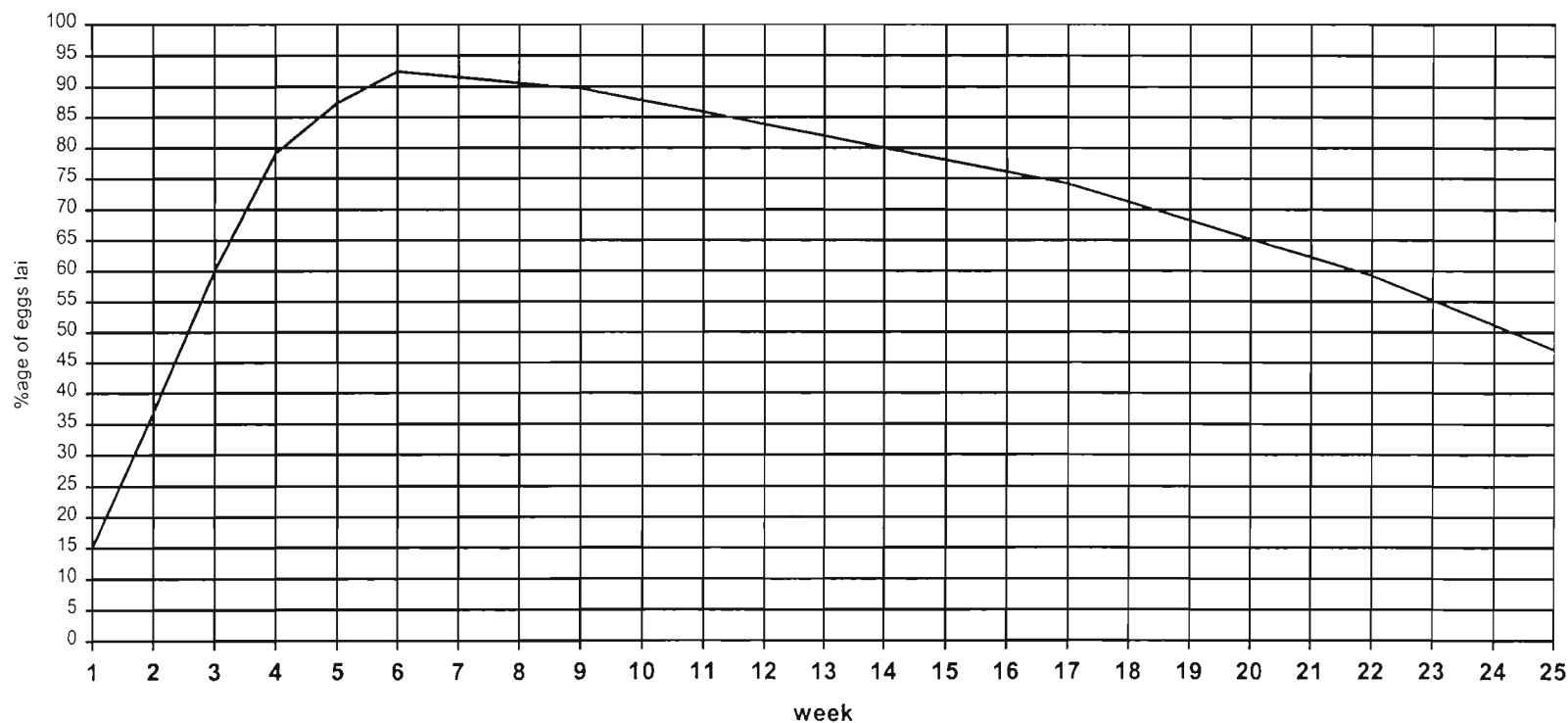
Week of laying	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Calendar week																							
% Laying ♀ present	13.3	34.7	56.2	71.6	77.9	82.0	84.2	83.2	82.3	80.3	78.3	76.3	74.4	72.4	70.4	68.4	66.4	64.3	62.3	59.3	56.2	52.1	48.0
Cumul eggs/♀ MEP	0.93	3.36	7.29	12.3	17.7	23.4	29.3	35.1	40.8	46.3	51.8	57.1	62.2	67.2	72.1	76.8	81.4	85.8	90.1	94.1	98.0	101.6	104.8
Cumul actual eggs																							
Nb ♂ Dead																							
Nb ♀ Dead																							



# 1st LAYING GRAPH - MUSCOVY - Objective in 22 wks : 112 eggs / ♀ MEP

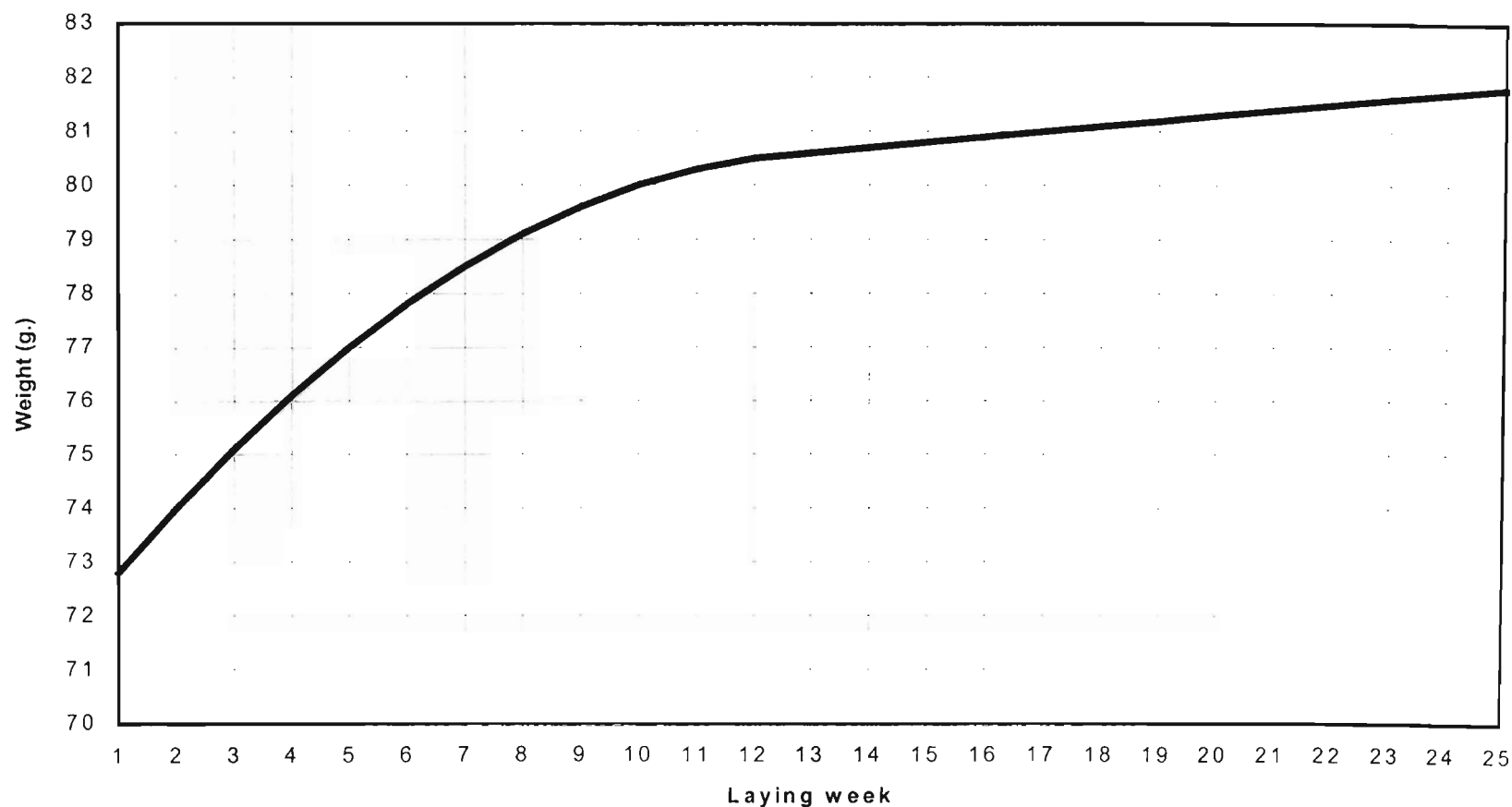
FLOCK N°: NUMBERS ♂: ♀: STRAIN :

Week of laying	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Calendar week																									
% Laying/♀ present	15.0	37.0	60.1	79.2	87.4	92.5	91.6	90.6	89.7	87.8	85.9	83.9	82.0	80.0	78.1	76.1	74.2	71.2	68.2	65.2	62.2	59.2	55.2	51.2	47.1
Cumul eggs/♀ MEP	1.05	3.64	7.84	13.4	19.5	25.9	32.3	38.6	44.8	50.9	56.8	62.7	68.3	73.9	79.2	84.5	89.6	94.5	99.2	103.7	107.9	112.0	115.8	119.3	122.3
Cumul actual eggs																									
Nb Dead ♂																									
Nb Dead ♀																									



## EGG WEIGHT CURVE - MUSCOVY DUCK – 1<sup>st</sup> LAYING

Laying week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Calendar week																									
Egg weight (g.)	72,8	74,0	75,1	76,1	77,0	77,8	78,5	79,1	79,6	80,0	80,3	80,5	80,6	80,7	80,8	80,9	81,0	81,1	81,2	81,3	81,4	81,5	81,6	81,7	81,8
Real weight (g)																									



EGG WEIGHT CURVE - MUSCOVY DUCK – 2<sup>nd</sup> LAYING

Laying week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Calendar week																							
Egg weight (g.)	75,0	76,2	77,3	78,4	79,2	80,0	80,7	81,3	81,8	82,2	82,5	82,7	82,8	82,9	83,0	83,1	83,2	83,3	83,4	83,5	83,6	83,7	83,8
Real weight (g)																							

