



CONTENIDO DEL INFORME TÉCNICO

Fecha de entrega del Informe

11 de enero 2005

Nombre del coordinador de la ejecución

Victor Valencia Baier

Firma del Coordinador de la Ejecución

1. ANTECEDENTES GENERALES DE LA PROPUESTA

Nombre de la propuesta

Sistemas de producción y cadena de exportación de carne ovina en Australia.

Código

FIA-CD-V-2005-1-P-121

Entidad responsable

INIA

Coordinador(a)

Victor Valencia Baier

Tipo de Iniciativa(s)

☒ Gira
 ☐ Beca
 ☐ Evento
 ☐ Consultores
 ☐ Documentos

Fecha de realización (inicio y término)

20 al 28 de octubre 2005



2. RESUMEN DE LA PROPUESTA

Resumir en no más de una página la justificación, actividades globales, resultados e impactos alcanzados con la propuesta completa. Cuando exista más de una iniciativa, cada una de ellas debe ser resumida en forma específica. Estos resúmenes deben sintetizar los aspectos principales de la propuesta y cada una de sus iniciativas en forma general.

GIRA TECNOLÓGICA

La justificación para la realización de esta gira se sustentó en la gran oportunidad que se abre para la exportación de carne ovina en la zona central producto de los importantes acuerdos comerciales que ha firmado el país. De esta forma se propone como sector, pasar de un esquema productivo informal, sin estructura y poco competitivo a una cadena agroalimentaria que permita consolidar esta nueva alternativa exportadora.

Sin embargo, para acceder al nivel de eficiencia productiva y lograr la calidad y volumen requeridos para que esta macrozona pueda participar en el contexto internacional debe acelerarse el proceso de tecnificación y asociatividad productiva, orientando los esfuerzos a satisfacer demandas claras y específicas de los mercados compradores de manera rentable.

Con esta finalidad se conocieron experiencias en manejo de praderas en zonas de clima mediterráneo templado, la utilización de cultivos suplementarios, el mejoramiento de especies forrajeras, estrategias de alimentación del rebaño y finalización de corderos, predios especializados para corderos pesados de exportación. Junto con lo anterior se visitaron criaderos de razas terminales empleadas en producción de carne, así como también se conoció el programa nacional de selección de animal para reproductores (LAMBPLAN). Debido a que a último momento los representantes de plantas faenadoras desistieron de participar en la gira, a solicitud del resto de los participantes, la visita programada a un frigorífico fue reemplazado por una actividad de campo, sin embargo se visitó una planta despostadora y carnicerías.

Con esta gira los productores adquirieron y reafirmaron conocimientos técnicos relevantes para mejorar sus indicadores productivos. Además, percibieron la importancia de generar un producto según los requerimientos de los mercados, así como la necesidad de asociarse y tratar de lograr una integración de la cadena productiva. Por su parte los profesionales asistentes además de mejorar sus conocimientos técnicos, apreciaron la importancia de la coordinación y definición de roles entre instituciones de la intervención tecnológica para apoyar a los productores que se realiza en Australia.



3. ALCANCES Y LOGROS DE LA PROPUESTA GLOBAL

Problema a resolver, justificación y objetivos planteado inicialmente en la propuesta

La producción promedio de carne de cordero por hectárea en el secano central del país es menor a 20kg. cifra resultante de pobres índices de destete y baja carga animal (menos de 1 oveja/ha). A esto se asocia un producto con características no bien definidas, poco uniforme y con un alto grado de estacionalidad en su oferta.

Como se mencionó anteriormente, para dinamizar el rubro ovino en la zona central y pensar en transformarlo en una alternativa rentable y exportable es necesario incorporar la tecnología que permita aumentar significativamente la producción y estandarizar la calidad del producto generado.

En este contexto el principal objetivo planteado en la gira fue estimular el desarrollo exportador del rubro ovino de la zona central de Chile, mediante la inducción de la necesidad de conocer y adoptar nuevas tecnologías de producción ovina dentro de los conceptos de calidad y normativas internacionales, a través del conocimiento de los componentes tecnológicos y estructura de la cadena exportadora australiana.

Objetivos alcanzados tras la realización de la propuesta

Los objetivos alcanzados fueron los siguientes:

Se conoció el manejo de pastizales, las estrategias de mejoramiento y el uso de especies forrajeras mejoradas adecuadas a zonas de secano mediterráneo. En tal sentido, los productores comprobaron la necesidad de realizar un buen establecimiento de praderas en términos de elección de variedades, mezclas forrajeras y fertilización. Además, vieron en terreno la estrategia de pastoreo, la cual se basa en lograr un balance entre calidad y disponibilidad de forraje según las necesidades de las diferentes categorías de animales.

- Conocer experiencias de intensificación de sistemas productivos en zonas de secano mediterráneo en base a cultivos forrajeros, conservación de forrajes y uso de suplementos.
- Conocer experiencias de producción de corderos livianos, medianos y pesados bajo las condiciones mencionadas.
- Conocer el sistema nacional de selección animal aplicado en Australia y los beneficios que representa el uso de genética de calidad.
- Conocer una planta de faena y procesamiento de exportación con clasificación de canales, desposte y presentación de cortes.



Resultados e impactos esperados inicialmente en la propuesta

Se espera que con la realización de esta gira los participantes mejoren su nivel tecnológico en el manejo de sistemas de producción, básicamente en praderas, alimentación y selección animal, razas y cruzamientos. Además se contempla que se familiaricen con sistemas de aseguramiento de calidad y conozcan la dinámica y experiencia de la cadena exportadora desde un punto de vista técnico.

Resultados obtenidos

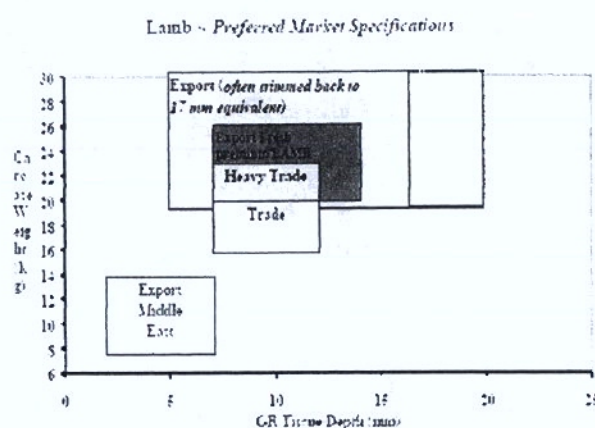
Descripción detallada de los conocimientos y/o tecnologías adquiridos y/o entregados. Explicar el grado de cumplimiento de los objetivos propuestos, de acuerdo a los resultados obtenidos. Para consultorías es necesario anexar el informe final del consultor.

Los aspectos más relevantes de los sistemas de producción vistos en Australia se pueden detallar en los siguientes puntos:

- Los sistemas de producción tienen como objetivo fundamental obtener la mayor cantidad de producto (carne) por unidad de superficie. Para esto se podría resumir en orden de importancia, el manejo y producción de praderas, la gestión predial y productivo y finalmente la genética animal.
- La mano de obra es el insumo más caro, por lo cual el núcleo familiar asume la gran mayoría de las labores habituales del predio. Las tareas más puntuales, como esquilas, construcción de cercos, conservación de forrajes, etc. Se realiza por medio de contratistas.
- Los sistemas de producción se caracterizan además por presentar un alto grado de especialización e integración vertical. Es decir, los productores saben cual es el tipo de canal que deben producir según las exigencias de los diferentes mercados, y además tienen cierta claridad con respecto a los precios que recibirían lo que les permite planificar su estrategia de producción.
- Se observa que el concepto que prima es la generación de un producto con características bien definidas, las cuales son conocidas y aceptadas por los productores e industria. En este caso, como se observa en la figura 1 se diferencian cinco tipos de productos (canales de cordero), en los cuales el peso y grado de engrasamiento son las variables que determinan el posible mercado objetivo.



Figura 1. Especificaciones de las canales según mercados de destino



Lo anterior es un elemento clave para poder tomar decisiones con respecto a que y como producir, ya que para cada tipo de canal hay un precio diferenciado y el productor puede optar por un sistema de producción u otro según su conveniencia técnica y económica.

Otro interesante aspecto de la integración lo constituye el hecho que no sólo existen productores de corderos que hacen todo el ciclo, sino también productores de vientres, que abastecen a los que producen corderos para que estos no tengan que generar sus reemplazos y otros productores que sólo se dedican a la engorda de corderos y no poseen vientres.

Desde el punto de vista técnico la mayoría de los predios que producen corderos se basan en sistemas pastoriles semi extensivos, en los cuales, en general se asocia el cultivo de cereales. El tamaño de los rebaños fluctúa entre 1500 a 4000 ovejas, con una carga animal de entre 4 a 8 ovejas por hectárea. Este es un aspecto clave a tener en consideración ya que con cargas menores el negocio no es rentable, situación que es absolutamente válida en Chile, sin embargo las cargas promedio del secano central del país no alcanzan a 1 oveja por hectárea.

Praderas: para alcanzar las cargas descritas alrededor de un 40% de la superficie de pastoreo corresponde a praderas establecidas y el 60% restante a praderas naturales y rastros. Adecuada y oportuna preparación de suelo y siembra, elección de especies y variedades adaptadas a las condiciones agroecológicas.

Las principales especies utilizadas en pastoreo son el trébol subterráneo y la ballica Wimmera, con producciones medias de 5-6 ton. ms/año. Además es generalizado el uso de alfalfa (con latencia estival) en condiciones de secano, a la cual se asocia avena o triticale como cultivo forrajero para aumentar la producción y balancear el aporte de nutrientes. Este tipo de praderas son empleadas para la engorda de corderos post destete y/o para corte, con producciones de 7 ton.ms/año. Otras especies empleadas en menor cantidad son el Trébol Balansa, Festuca, Falaris y Bromo. Serradela y Biserrula se encuentran menos distribuidas y restringidas a zonas con severos problemas de suelos. Un completo informe de especies y variedades se detalla en el anexo 1.



Foto 1 alfalfa asociada con avena



Foto 2. uso de regla para regular pastoreo



Como norma general se comprobó que la filosofía del manejo y uso de las praderas pasa por tratar de maximizar el consumo de materia seca, tratando de lograr un balance entre calidad y cantidad en función de la categoría de animal que se tenga. Este es uno de los principales tópicos en los cuales se está haciendo transferencia de tecnología a los productores (se anexa documento entregado en día de campo) bajo un programa denominado PROGRAZE (anexo 2).

Alimentación ovejas: el principal objetivo es mantener una condición corporal de 3 pareja durante el año, con el propósito de procurar una condición nutricional que permita porcentajes de destete de entre 120 a 150% (este indicador para condiciones del secano central de Chile no supera el 85%). Para esto se utilizan las praderas y el manejo de pastoreo descrito, a lo cual se asocia una suplementación antes y durante el encaste, usualmente denominada flushing. Este manejo se realiza comúnmente en todos los predios y consiste en 400 gr. de un suplemento proteico, por oveja al día (generalmente lupino), tres semanas antes del encaste, hasta una semana después de entrados los carneros.

Terminado el encaste y en un lapso de 80 a 90 días de entrados los carneros se realiza un examen de preñez mediante ultrasonido (scanning) con el fin de detectar ovejas secas y el tipo de gestación de las preñadas. Así, las secas se eliminan y aquellas ovejas que están gestando mellizos son separadas para proveerles mejores condiciones alimenticias, las que incluyen en general pastoreo de praderas de buena calidad o en su defecto suplementación 45 días antes del parto.

Alimentación de corderos: como se mencionó existen diferentes tipos de corderos, los cuales son sometidos a distintos tipos de manejos alimenticios. Las canales livianas que van al mercado de medio oriente (6 a 9 kg de canal) no requieren alimentación especial sólo destete más temprano de lo usual de forma tal que no superen los 18 a 20 kg. de peso vivo. Similar manejo tienen aquellos que van al mercado interno de canales livianas (16 a 18 kg. de canal), es decir no hay suplementación especial y generalmente estos pesos se obtienen al destete. Aquellos corderos destinados al mercado interno pero más pesados (20 a 22 kg de canal) se manejan por 2 a 3 semanas en praderas de alta calidad (generalmente alfalfa) post destete. Los corderos pesados de canales sobre 22 kg y hasta

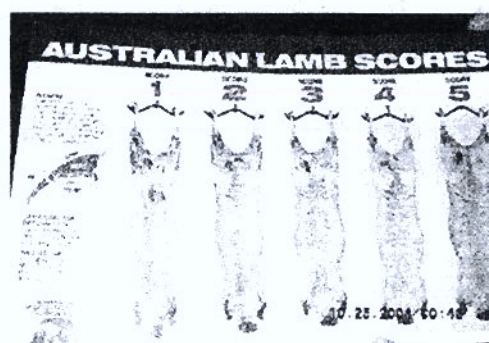
30 kg. son terminados en base a pastoreo y en la mayoría de los casos de suplementan con concentrado a razón de 600 gr/día por periodos variables de 30 a 45 días, siendo terminados a edades de entre 8 a 10 meses.

Fotografías 3 y 4 pastoreo de corderos en alfalfa



En las ilustraciones 1 y 2 se observa la clasificación oficial de canales según conformación y grado de engrasamiento. Las canales para mercado interno tendrían scores de 2 a 3, en tanto para exportación sería 3 a 4, con canales 5 también exportables, pero requieren ser desgrasadas

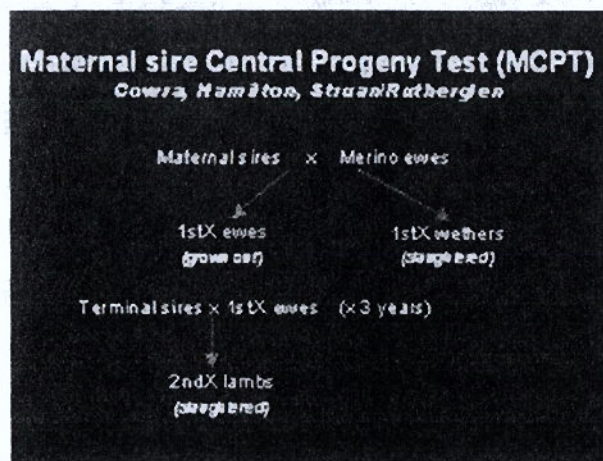
Ilustraciones 1 y 2 clasificación oficial de canales



Genética: a modo de antecedente es conveniente mencionar que la base genética común en casi todos los rebaños de Australia esta constituida por el Merino Australiano, raza especializada en producción de lana, con baja prolificidad, poca producción de leche y pobre conformación carnicera y engrasamiento temprano. Teniendo como base esta raza se tuvo que diseñar una estrategia de evaluación de cruzamientos que permitiera tres aspectos fundamentales; elevar la prolificidad, generar canales más grandes y con menos grasa o engrasamiento tardío y aumentar los rendimientos de canal. Para conseguir estos objetivos se mantiene a nivel nacional un programa de evaluación que involucra el uso de razas como Border Leicester, Finnish, Frisón oriental y Coopworth sobre ovejas merino para la obtención de un vientre que permita generar corderos con

las características mencionadas (ver figura 2). Una vez que esta hembra F1 es generada, se realiza cruzamientos terminales con Poll Dorset, White Suffolk o Texel. En rebaños comerciales los vientres tienen distintos porcentajes de sangre de las diversas razas mencionadas, siendo todos estos rebaños híbridos, no se observan rebaños de una raza específica, salvo en los predios que producen lana o los criaderos para vender reproductores.

Figura 2. Esquema de evolución de razas para la producción de hembras



Otro aspecto fundamental en el mejoramiento de las canales producidas se ha basado en la aplicación de un programa nacional de selección animal denominado LAMBPLAN, similar al empleado en bovinos (BREEDPLAN). Este programa administrado por la Universidad de New England tiene por finalidad generar valores de EBV (estimated breeding value) los cuales reflejan el mérito o valor genético de un reproductor para las principales características de importancia económica. Básicamente es un sistema nacional de registros y evaluación de ovinos, el cual genera un ranking de reproductores de acuerdo a las características de importancia económica. La información generada asiste la toma de decisiones de los productores a la hora de comprar cañeros que producirán corderos de buen rendimiento carnicero, o hembras F1 con buenas características reproductivas. Esta información es remitida a todos los productores registrados mediante informes oficiales que se envían a los criaderos de las diferentes razas. Los antecedentes generados corresponden a los animales que los criaderos tienen disponibles para ser comercializados como reproductores. La información incluye

- Aspectos reproductivos: prolificidad, diámetro escrotal.
- Aspectos productivos: peso destete, GPV post destete
- Calidad de canal: Área de ojo de lomo, cobertura grasa, peso de canal, rendimiento de canal.

Contar con estos datos es muy importante ya que esto permite la correcta compra de reproductores según las necesidades particulares de cada predio. Los antecedentes consideran la información productiva propia del animal, la que se tenga de sus parientes, la heredabilidad de cada característica y la relación entre estas, es decir un modelo de

evaluación genética en el cual se combinan todas las características de interés económico en un sólo valor final expresado en AD\$. Un aspecto interesante de destacar es que en la mayoría de los animales evaluados los valores de las características indicados corresponden a los valores del propio animal, no de su progenie. Esto permite acelerar el proceso de mejoramiento genético. Debido a lo anterior una herramienta importante para la evaluación de características relacionadas con la calidad de la canal lo constituye el uso de imágenes obtenidas por ultrasonido (ecografías), las que se practican a los animales para conocer área de ojo de lomo y cobertura de grasa dorsal.

Como se observa en el cuadro 1 los reportes incluyen información de variables técnicas, en este caso la información corresponde a cameros destinados a cruzamientos terminales. Esta información incluye la identificación del camero, los valores estimados para cada característica de interés económico (peso al destete, peso de finalización, engrasamiento y área de ojo de lomo).

Además se entregan los valores económicos estimados que reportaría cada camero. Por ejemplo, el camero 99-0012 proveería en su progenie corderos 2.75 kg. (la mitad del valor ya que el otro 50% correspondería a la oveja sobre la cual se usaría el camero) mas pesados al destete, 3,95 kg más pesados a término, con 0.15 cm más de grasa dorsal y 0.25 cm² más de ojo de lomo que el promedio de los cameros de la misma raza evaluados en la temporada. Desde el punto de vista económico este animal produciría un adicional de AD\$1,92 por canal si se emplea para corderos para el mercado interno o AD\$2,045 si se emplea para generar corderos más pesados para el mercado de exportación.

Cuadro 1. información generada por LAMBPLAN para cameros para cruzamientos terminales

Ram	EBV				Index	
	Pwt	wgt	rfat	Yeml	Trade\$	Elite\$
99-0012	5.5	7.2	0.5	0.5	103.34	104.39
99-0013	5.5	6.6	0.2	0.1	103.36	104.50
99-0014	4.2	6.0	0.5	0.1	103.21	104.82
99-0015	5.0	6.6	0.1	0.1	103.30	103.62

Manejo reproductivo: este se enfoca lograr el mayor porcentaje de destete posible (120% a 150%). Para esto se debe asegurar al encaste una condición corporal de 3.0 – 4.0. Como datos interesantes al respecto se puede señalar que 1 grado de condición corporal equivale a 7 kilos de peso vivo y que se estima que por cada unidad de incremento en la condición corporal del rebaño se destetan un 12% más de corderos.

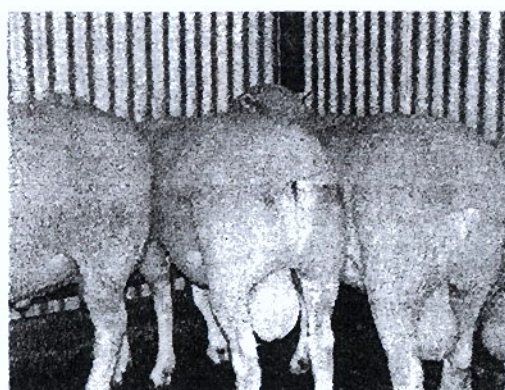
Los machos previos al encaste son revisados de pene y patas y deben presentar un condición corporal de 4,0 y una circunferencia escrotal sobre 28 cm. Además se suplementan durante 8 semanas previo al encaste con una dieta alta en proteína (500 gr. Lupino), lo cual aumenta la producción espermática y mejora la fertilidad. El encaste se prolonga por 6 semanas, y la lactancia dura 18 semanas. Es bastante usual que los productores usen corderos (8 a 10 meses) para encaste de su masa, y que los cameros no se empleen por más de dos temporadas. Con esto se acelera el progreso genético.



Como se mencionó las ovejas se someten a un programa de flushing y sólo en encastes tempranos se emplean machos vasectomizados o retajos para estimular el inicio de los celos. El porcentaje de machos empleado es de 1% + 1. Esta relación puede variar en función de la experiencia de los carneros, la edad de las hembras, tamaño de potreros y facilidad de acceso a aguadas.

Post encaste se debe cuidar mantener la condición corporal. Se realiza Scanning a los 80 días de retirados los carneros. Con esto se pueden separar únicas de melliceras. Durante el último tercio de preñez, animales se destinan a las mejores praderas. Para evitar pérdida de condición corporal se realiza manejo alimenticio diferenciado en caso de únicas o melliceras. Vacunación contra enterotoxemia y desparasitación de acuerdo a resultados análisis coproparasitario.

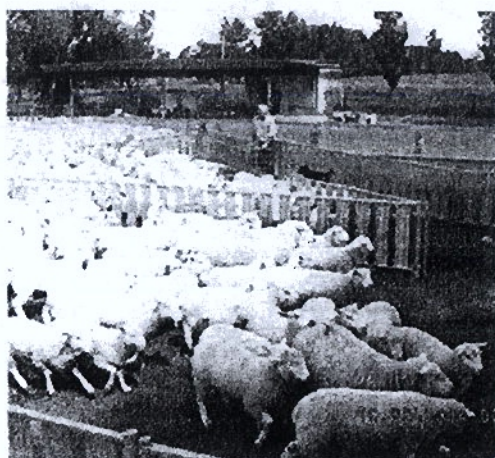
Fotos 5 y 6 . Carneros Poll Dorset



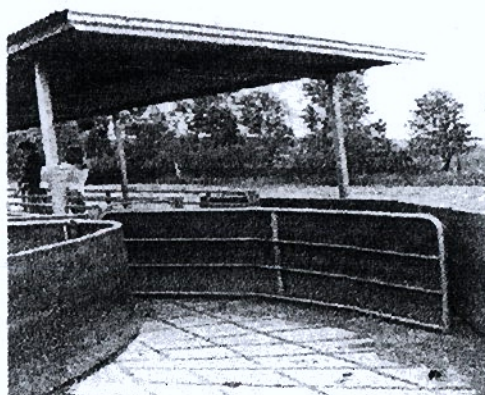
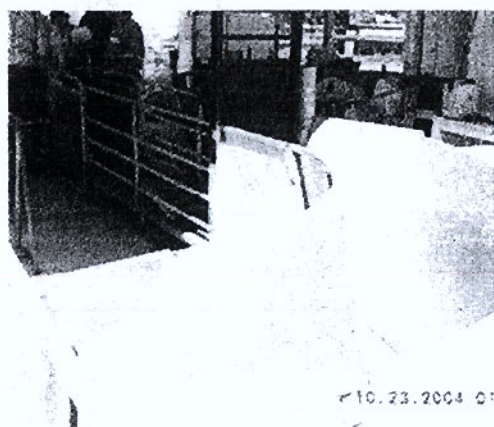
Instalaciones e infraestructura: para el adecuado manejo de los animales se observó que las instalaciones son sumamente funcionales. Los corrales son curvos, adaptados según comportamiento animal, evitando superficies que dañen a los animales así como sectores donde se produzcan apiñamientos. La mayoría son de estructura móvil, siempre metálicos dimensionados considerando 1 oveja por m² en corral y 3 ovejas por m² en embudo.

Como se observa además las mangas y embudos son cerrados y curvos para evitar que los animales tengan visión hacia afuera facilitándose el manejo ya que los animales avanzan sin tener que arrearlos, buscando solos la salida. En todos los predios además se cuenta con balanza para el pesaje de animales. Finalmente, destaca en el manejo animal el uso de los perros de raza Kelpy, sin los cuales la cantidad de mano de obra y tiempo que se requeriría para esto sería muy alta.

Fotos 7 y 8



Fotos 9 y 10 mangas y embudos para el manejo ovino



Manejo sanitario: dos son los principales problemas sanitarios que afectan los rebaños. El primero tiene relación con el control de parásitos, especialmente internos. Producto de años de uso de antiparasitarios, sin tener claridad con respecto al agente causal se ha ido creando un alto grado de resistencia a muchos productos. Así en la actualidad el tratamiento que se hace es dirigido a eliminar el agente causal con productos específicos y teniendo además claridad respecto al grado de infestación. Para esto es común el muestreo coproparasitario, asociado al uso de kits para la detección de resistencia a antiparasitarios. (ver anexo 6)

El segundo problema de importancia esta representado por el foot rot, enfermedad de alta prevalencia en los rebaños, la cual es controlada mediante tratamientos de baños podales con sulfato de zinc y enejo. Las vacunas y otros tratamientos no han resultado efectivos.



Asociatividad: Uno de los aspectos más relevantes que se pueden mencionar en este punto es la existencia de una organización nacional que agrupa a los productores e industriales de carne bovina y ovina denominada Meat and Livestock Australia (MLA). Esta organización tiene entre sus objetivos mantener y mejorar el acceso a mercados de las carnes rojas australianas, construyendo demanda en diversos países y creando vínculos entre la industria local y mercados externos. Junto a esto participa en la generación de investigación y desarrollo para proveer ventajas comparativas permanentes a la industria.

También esta organización constituye una fuente de información para el sector para lo cual compila y analiza estadísticas de producción, precios, tendencias de mercado, etc con lo cual los actores pueden tomar mejores decisiones. De igual forma juega un rol importante en la educación y actualización de productores, procesadores y consumidores acerca del desarrollo y tendencias de la industria.

El financiamiento de MLA proviene de aportes directos pagados por los productores sobre las transacciones de sus animales. Por su parte los industriales aportan a través de contratos definidos.

Resultados adicionales

Describir los resultados obtenidos que no estaban contemplados inicialmente como por ejemplo: formación de una organización, incorporación de alguna tecnología, desarrollo de un proyecto, firma de un convenio, entre otros posibles.

No existen resultados adicionales por el momento.

Aplicabilidad

Explicar la situación actual del sector y/o temática en Chile (región), compararla con las tendencias y perspectivas presentadas en las actividades de la propuesta y explicar la posible incorporación de los conocimientos y/o tecnologías, en el corto, mediano o largo plazo, los procesos de adaptación necesarios, las zonas potenciales y los apoyos tanto técnicos como financieros necesarios para hacer posible su incorporación en nuestro país (región).

Desde el punto de vista técnico la factibilidad de exportar carne ovina desde la zona central es una posibilidad real, sin embargo bajo el actual escenario es difícil que esto constituya una actividad sostenible. La razón es simple, oferta escasa y estacional lo que genera precios altos, que el mercado interno está dispuesto a pagar ya que el consumo de cordero está asociado a festividades, lo cual hace este destino como mucho más probable que la exportación. Si a esto se suman los mayores requisitos en términos de normativas (PABCO), el tipo de cambio y eventualmente se hagan exigibles algunos atributos de producto la tarea es aún más compleja.

Sin embargo, a pesar de los buenos precios recibidos, el actual esquema de producción imperante en la mayoría de los predios hacen que la producción ovina no sea rentable. La razón de lo anterior es la baja producción, lo cual si bien indirectamente mantiene una



situación de buenos precios, hace que las utilidades generadas sean muy bajas y en algunos casos negativas. Esta situación es más crítica aún entre productores pequeños y medianos ya que en predios mayores si bien la rentabilidad por hectárea no es superior, el tamaño de los rebaños es mayor con lo cual las utilidades prediales son mayores y hace que el rubro subsista ya que no hay muchas otras alternativas productivas rentables. Bajo esta realidad pensar en haber desarrollado un programa para impulsar el rubro sin tener la posibilidad de sacar la producción fuera del mercado nacional habría sido, al menos riesgoso en términos de precios.

Así entonces el desarrollo del rubro cobra sentido sólo en un escenario de exportación, como el de hoy. Un escenario en que difícilmente se puedan generar precios más altos que los que actualmente paga el mercado interno, pero que tendría una enorme capacidad de absorción de producto, lo cual impediría la baja de precios que ocurriría si no se exportara y aumentase la oferta. Esto permitiría en teoría aumentar significativamente la producción predial, con el consecuente incremento de las utilidades totales.

En esta ecuación ya está la capacidad exportadora de la industria, falta ahora el aumento de la oferta. Para lograr esto es indispensable aplicar tecnología. Tecnología que está desarrollada y validada en el país hace muchos años, pero que en general no se ha aplicado por distintas razones, siendo quizá la fundamental la baja proyección económica que se percibía del rubro, sin mencionar la baja capacidad de inversión de la mayoría de los productores ovinos del secano central.

La propuesta buscó así estimular la adopción e innovación tecnológica entre los productores, así como clarificar los énfasis y estrategias entre los profesionales ligados al sector en el diseño de propuestas de desarrollo.

Puede llamar la atención que se haya tenido que realizar una gira a Australia para concluir que las propuestas tecnológicas más prioritarias sean muy similares a las que se han tratado de difundir durante años por especialistas nacionales, sin embargo fue fundamental que se viera en otro lado...ver para creer...esto es fundamental no sólo para productores, sino también para quienes formulan y para quienes evalúan la pertinencia de proyectos de innovación, el diseño de programas de desarrollo y otros relacionados con la necesidad de tecnología y la pertinencia o impacto de la misma.

A continuación se señalan las tecnologías más relevantes y su posible mecanismo de adopción. Antes de proceder advierto sin embargo que si los revisores o lectores de este informe buscan encontrar en los siguientes párrafos estrategias ligadas a tecnologías de marcadores moleculares, transgenia, u otra de estas fascinantes aplicaciones, se van a decepcionar enormemente. Lo que se describirá no es otra cosa que lo que está haciendo el sector productivo en Australia y que es exactamente lo que se necesita para lograr el desarrollo del sector ovino de la zona central. Esto es, en los siguientes diez años aplicar lo que sabemos hace más de veinte y aún no lo hacemos... ¿O quizá no lo sabemos todos?

Se fortaleció la necesidad básica de aumentar la capacidad talajera. Para esto se requieren más recursos para inversión y más capacitación entre los agentes de extensión. Ambas cosas pueden fortalecerse a través del SIRSD. Uno de los grandes problemas para un adecuado establecimiento de praderas es la falta de maquinaria en estos

sectores. Así muchas veces el productor accede al crédito o apoyo estatal, sin embargo en la práctica la labor se realiza en forma deficiente, con mala preparación de suelos, fuera de época, con especies y/o variedades poco adecuadas, etc. El resultado es pobre y los recursos mal empleados. Las praderas son la base, hay que hacerlas! Pero bien..

En este punto es fundamental hacer hincapié que con menos de 6 ovejas por hectárea y con porcentajes de destete menores a 110% es imposible lograr márgenes brutos por hectárea superiores a los \$50.000 al año. Se estima que el margen bruto por hectárea con una carga de 1 oveja/ha, y porcentajes de destete de 80% no alcanza a \$1000.

Desde el punto de vista de manejo genético, se observó que el uso de vientres híbridos que combinen características de dos o más razas que tengan como objetivo aumentar la prolificidad, aumentar el tamaño y rendimiento de canal son el punto básico. Sobre estos el uso de machos terminales es la estrategia generalizada. En nuestra realidad esta técnica se ha evaluado y difundido, sin embargo ha tenido poca adopción, prefiriéndose las razas puras e idealmente los "cara negra", Suffolk o Hampshire. Un aporte importante en este sentido podría ser la introducción de semen de carneros de alta calidad y/o la incorporación de animales vivos o embriones que aumenten la dotación de razas ovinas carniceras presentes en el país. La evaluación mediante un programa nacional de cruzamientos podría ser un proyecto interesante a desarrollar. Este debe ser nacional con objetivos únicos, siguiendo un protocolo y criterios de evaluación comunes. Algo que convenza a todos..y no un cruzamiento por aquí otro por allá, con diseños experimentales distintos (si es que los tienen), con razas similares, pero individuos distintos, etc..en síntesis hacer las cosas bien. "Casi como los gringos". Como un ejemplo de este punto vale mencionar el programa de evaluación de razas de carne o doble propósito sobre merino para la generación de hembras con el objeto de determinar cual sería la mejor cruce para generar una hembra de buenas características de prolificidad, instinto materno, producción de leche y conformación carnicera. Lo más interesante para los productores en este sentido fue constatar que aún cuando existían diferencias entre las razas utilizadas, el efecto "carnero" o individuo era el más importante. En otras palabras, existían diferencias que podían llegar al doble en los resultados al comparar cameros de la misma raza, en comparación con la diferencia existente entre cameros de las distintas razas. Este punto es de vital importancia cuando se realizan proyectos y ensayos de cruzamientos comparando razas, con pocos individuos, y luego se infieren resultados señalando el efecto raza, sin considerar el efecto individuo (ver anexo 3)

Lo anterior está muy ligado a las estrategias de alimentación empleadas. Mantener una condición corporal entre 3 y 4, es decir ovejas en buen estado durante todo el año es fundamental para alcanzar los objetivos productivos. No se saca nada con tener animales de alto potencial genético si no se tiene la alimentación adecuada. El uso de flushing nuevamente es una técnica bastante conocida, pero poco usada en Chile, en Australia es parte del manejo habitual. Esto se puede aplicar demostrando la importancia de mantener ovejas en buena condición y usando flushing en predios demostrativos, a través de proyectos de validación y transferencia tecnológica.

Desde el punto de vista del apoyo a la gestión productiva sería interesante lograr una caracterización de los diferentes tipos canales que requeriría la industria. Esto se podría ilustrar en folletos y junto con esto describir la estrategia de producción para lograrlas.

El apoyo a la formación de instancias de asociatividad parece un factor fundamental a abordar. En este momento en la zona central existen muy pocas agrupaciones de



productores en general muy locales y con poca influencia. El fomento a la creación de una Asociación de productores ovinos a de la zona central y sur del país podría ser un hito relevante en el desarrollo del rubro.

La transferencia de tecnología es fundamental. En este sentido se pudo ver la importancia de uniformar las temáticas y formas de hacer transferencia. Los agentes de extensión siguen todos un programa similar el cual es proporcionado por los entes técnicos que el Departamento de agricultura define en conjunto con los productores. Al igual que en Chile existen grupos de transferencia, tipo GTT, en los cuales las temáticas son comunes y se sigue el mismo programa técnico por todos los grupos. La diferencia radica en que lo que se transfiere no es lo que se le ocurra a cada coordinador de GTT, a cada productor o empresa de transferencia. De igual forma existe una capacitación permanente y dirigida de estos extensionistas, los cuales además son evaluados técnicamente. En otras palabras tienen claros los problemas, las soluciones y la forma de cómo resolverlos, para lo cual se diseña una estrategia de intervención común.

Detección de nuevas oportunidades y aspectos que quedan por abordar

Señalar aquellas iniciativas que surgen como vías para realizar un aporte futuro para el rubro y/o temática en el marco de los objetivos iniciales de la propuesta, como por ejemplo la posibilidad de realizar nuevas actividades.

Indicar además, en función de los resultados obtenidos, los aspectos y vacíos tecnológicos que aún quedan por abordar para ampliar el desarrollo del rubro y/o temática.

Actividades o iniciativas posibles de realizar:

1. Importación de semen y reproductores de razas especializadas (Poll Dorset, Texel y white suffolk serían un aporte interesante para mejorar la calidad de las canales.
2. Introducción de la raza Dohne para las condiciones de aysén y Magallanes donde la lana es importante. Esta mejoraría el tamaño de las canales sin disminuir la calidad de la lana.
3. Ver la posibilidad de evaluar nuevas variedades y especies forrajeras australianas. Especial interés cobran en este punto nuevas variedades de trébol subterráneo y balansa no presentes en el país. También sería muy importante evaluar variedades de alfalfa con latencia estival no empleadas hasta ahora en Chile.
4. Un proyecto de transferencia de tecnología a productores y profesionales para actualizar los conocimientos en el rubro con aplicaciones a nivel predial es de gran importancia, aún cuando pueda parecer ser "poco innovativo".
5. Un proyecto de investigación destinado a ver la posibilidad de establecer sistemas intensivos de producción de corderos bajo condiciones de riego en suelos marginales. Esto puede abrir nuevos horizontes al producción ovina de la zona centro sur haciendo de este rubro una alternativa competitiva con otras rubros tradicionales. Potenciales de producción, calidad de canales y comportamiento sanitario serían aspectos necesarios a evaluar.

Los vacíos tecnológicos posibles de abordar fueron desarrollados en el punto anterior.

4. ASPECTOS RELACIONADOS CON LA EJECUCIÓN DE LA PROPUESTA

Programa Actividades Realizadas

Nº	Fecha	Actividad	Iniciativa
1	21/10/05	Llegada a Melbourne (PM) se recibe programa y detalles de la gira, con el guía y se da tarde libre para descansar del vuelo de 26 horas.	
2	22/10/05	Visita al National Wool Museum	Gira
3	22/10/05	Visit David & Wendy Dennis, Polwarth (Ideal) Stud.	Gira
4	23/10/05	Visit Queen Victoria Markets	Gira
5	23/10/05	Visit James Ramage. 5000 ac sheep farmer. National president of Coopworth breed society. Specializes in composite female production and producing lambs to sell to lamb finishers	Gira
6	24/10/05	Visit Rutherglen Research Station. Research into pasture species particularly legumes and supplements and Sire/breed comparison/evaluation.	Gira
7	24/10/05	Visit to Don & Karen Mills "Kardinia" Property size 1600ac runs 3000 merino/Dohne sheep for lambs and wool. Stud Breeder of "Dohne" sheep.	Gira
8	24/10/05	Visit to Paul and Joan Trevethan "Dunoon" Two properties 2,800 ac main enterprises wool and lambs with weather production for export and domestic market. Terminal sires over merino ewes.	Gira



9	24/10/05	Visit to Noel Wilson "Kismet West" Innovative approach to developing "Composite" terminal sires using Texel, Poll Dorset, White Suffolk, East Friesian and White Dorper. Experienced in feeding to finish prime lambs. Has developed expertise in buying in store lambs and finishing on irrigated pastures and feed mixes.	.
10	25/10/05	Visit to Joe & Fiona Corrigan "Fairview" 2,100 ac 900 ewes joined to self replacing merinos, 480 merinos to PD 65% under crop. Pasture made up of 85% improved perennial pastures. Lambing rates in excess of 100%	.
11	25/10/05	Visit to Mark & Jane Yates "Barwon" Stud. Property of 4,000ac. Poll Dorset Stud of 900 ewes, 400 White Suffolk's. Flock of 1,200 1st Cross ewes for commercial lambs. 2,200ac under crop of wheat, lupins, peas, canola. For the stock grows lucerne and chicory. Sells 600 rams/year. Makes silage and buys in sheep pellets and barley for supplementary feeding. Uses Lambplan for ram selection and marketing. Improved pastures of clovers and perennial rye.	.
12	25/10/05	Visit progressive Meat wholesaler Knights Wholesale Butchery.	.
13	26/10/05	Mary & David Booth Lunch provided <i>Trades under the name of Buronga Organics" from a 4000ac property. Produces organic Cattle, Dorper sheep, Boer goats and crops of wheat, rye, triticale and spelt. Associated with special products is special marketing alliances and strategy. Lunch will be a series of tastings of new and innovative organic foods.</i>	.
14	26/10/05	"Prograze" visit with farmer group	.



15	26/10/05	Visit Andy Roberts Leading marketing and breeding innovator. Alliances with market outlets. (Cootamundra Butchers - morning visit). Experienced in nutrition and health issues with sheep.	
16	27/10/05	Arrive Lark Hill property of Geoff & Pam Mitchell Beef, Cattle & Sheep	
17	27/10/05	PM llegada Sydney, tarde libre	
18	28/10/05	Vuelo de regreso a Chile	

Detallar las actividades realizadas en cada una de las iniciativas, señalar y discutir las diferencias con la propuesta original, y rescatar lo más importante de cada una de ellas. Por ejemplo, en el caso de Giras discutir las actividades de cada visita; Becas, analizar las exposiciones más interesantes; Consultores, detallar el itinerario y comentarios del consultor; Eventos, resumir y analizar cada una de las exposiciones; y Documentos, analizar brevemente los contenidos de cada sección.

GIRAS

Día 1: según itinerario se llega a Melbourne a las 15:30 hrs. después de un vuelo de 26 horas. Se analiza el programa de la gira con el Guía, se entrega material informativo a los integrantes del grupo y se da la tarde libre para descansar del viaje.

Día 2: Se visita en la mañana el museo nacional de la lana en la ciudad de Geelong distante 60 km, de Melbourne. Aquí se pudo apreciar la historia de la producción ovina Australiana, las labores efectuadas en predios ovejeros, los productos generados etc. Fue una visita introductoria de gran utilidad para entender la importancia de la producción ovina en el desarrollo social, económico y cultural de Australia.

Día 2: en la tarde se visita un predio comercial (Tarnwamcoort) en la localidad de Wamcoort, a 120 de Melbourne Empresa especializada en la raza Polwarth, raza especializada en producción de lana y que fue creada por la misma familia. Cruza Lincoln con Merino, se obtiene una F1 que se cruzó con Corriedale, y luego se realiza una retrocruza con Merino.

La empresa está dedicada a la producción de lana de fibra larga, de 24 μ . Se utiliza para la artesanía. Se exporta a Estados Unidos y Canadá, además de la venta directa como lana o prendas que se realiza en el predio (foto 12)

El manejo que se realiza con el ganado es intensivo, contempla la cobertura del vellón durante todo el año, entre una esquila y la siguiente, para evitar la presencia de impurezas y suciedad de la lana (foto 11).

El rebaño está compuesto por un 60% de ovejas y un 40% de capones, y dependiendo

de la variación en el precio de la lana, se orienta la producción en uno u otro sentido.

Se utiliza cruzamiento terminal con Poll Dorset, con el fin de obtener un "prime lamb", ya sea para el mercado interno o exportación.

Foto 11. Ovejas Pollwarth con capa protectora



Foto 12. tienda en el predio



Día 3 (AM): se realiza una visita a Queen Victoria Markets, lugar con más de cien años de existencia donde se comercializan diversos productos e insumos agropecuarios.

Día 3 (PM). Se visita el predio de James Ramaje (presidente de la asociación de criaderos de la raza Coopworth), una explotación de 2500 hectáreas especializada en la producción de hembras compuestas y la producción de corderos para exportación.

El rebaño tiene la raza Coopworth como base de los cruzamientos. Se cruza con diferentes razas de carneros, que incluyen Border Leicester, East Friesian, White Suffolk, y Texel, con el objetivo de producir corderos con canales sobre 28 kilos y hembras híbridas o compuestas. Para esto el propietario importa desde Nueva Zelanda animales en los cuales se ha identificado el gen Wishhart, asociado con prolificidad, los que utiliza sobre su rebaño. Estos animales pueden ser de cualquiera de las razas mencionadas. El productor además hizo mención a que en Nueva Zelanda se está trabajando en la identificación de marcadores moleculares que otorgan resistencia a bajas temperaturas al cordero recién nacido, para bajar los índices de mortalidad post natal.

El productor no busca una raza determinada, sino animales de alta eficiencia productiva. En tal sentido la selección de los carneros que utiliza en su rebaño se basa en el programa de selección genética LAMB PLAN. La información generada asiste la toma de decisiones a sus clientes a la hora de comprar carneros que producirán corderos de buen rendimiento carnicero, o hembras F1 con buenas características reproductivas.

Foto 13. Corderos Coopworth x Texel y Poll Dorset



Día 4 AM: Se Visita la estación experimental de Rutherglen, la cual en el área ovina tiene como líneas de trabajo la evaluación de especies forrajeras, estrategias para mejorar las características de las canales y la evaluación de genotipos y cruzamientos para generar madres con mejores aptitudes para producir corderos de alta calidad.

En los ensayos de praderas lo más llamativo fue la evaluación de cultivares de alfalfa asociado a cereales en condiciones de secano, en los cuales no sólo se evaluaba la siembra asociada al momento del establecimiento, sino después de tener la alfalfa establecida, se sembraba entre las hileras cereales (avena y triticale), para aumentar la cantidad total de materia seca y a la vez, mejorar el balance nutricional (se entrega información en el anexo 4).

Foto 14. Vista ensayos de praderas



Foto 15. Ensayos de praderas



Aún cuando no se pudo ver en terreno, se recibió además una charla técnica en la cual se describía la estrategia de evaluación de cruzamientos sobre ovejas merino con el objeto de determinar cual sería la mejor cruce para generar una hembra de buenas características de prolificidad, instinto materno, producción de leche y conformación canicera. Lo más interesante para los productores en este sentido fue constatar que

aún cuando existían diferencias entre las razas utilizadas, el efecto "carnero" o individuo era el más importante (información adicional en anexo 3).

Día 4 PM: Se visita una propiedad comercial dedicada a producir corderos y lana además de producir reproductores de la raza Dohne compuesta por 1500 hectáreas y 4500 ovejas. Lo interesante de esta visita fue conocer esta raza ovina doble propósito con características sobresalientes. Esta raza creada en Sud África e introducida hace pocos años en Australia tiene la propiedad de generar canales pesadas y poco engrasadas y además producir una lana de una finura adecuada (22 a 18 micras). Los productores australianos la están usando con particular éxito para cruzarla con sus ovejas merino y generar un cordero de una excelente canal (directamente el F1) y al mismo tiempo los capones y los reemplazos, ya que si bien esta cruce disminuye algo la producción de lana respecto al Merino, mantiene su finura, pero mejorando las canales, por lo cual cumple un efecto de doble propósito espectacular. Esta raza la utilizan los productores para los que la lana aún es importante. Los productores especializados de cordero prefieren los esquemas de cruzamientos y razas indicadas anteriormente en este informe ya que para ellos la lana no es importante y por otro lado ya sus vientres perdieron el potencial lanero al ser ya todos compuestos.

Conviene señalar que el uso de esta raza en nuestro país puede tener un impacto enorme en los rebaños de Aysén y Magallanes sobre los vientres Corriedale, donde mejoraría el tamaño de la canal y la finura de la lana en forma significativa. Dos aspectos en los cuales existen actualmente deficiencias. (se adjunta información en anexo 5).

Foto 16 Camero de raza Dohne.

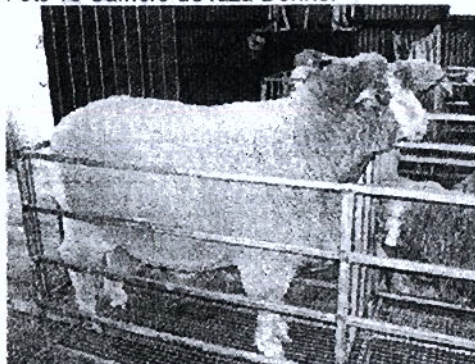


Foto 17. Animales raza White Dorper



Día 4 PM: Se visita un predio comercial dedicado exclusivamente "Kismet West" a la producción de corderos para exportación. Su estrategia productiva se basa en praderas con una carga de 7 ovejas por hectárea en las cuales se mantiene un rebaño compuesto de Hembras las cuales tienen diferentes proporciones de Texel, Poll Dorset, White Suffolk, East Friesian y White Dorper.

Además de terminar sus propios corderos este productor, compraba corderos recién destetados para engordarlos en praderas bajo riego con altas cargas animales (30 a 40 corderos/ha por tres a cuatro meses en el año). Esta experiencia fue muy interesante pensando en la posibilidad de intensificar la producción ovina bajo condiciones de praderas de riego en la zona centro-sur o en zonas de la X región.

Al contrario de lo descrito en la visita anterior, en este caso el productor trataba de eliminar lo más posible la lana de sus ovejas, para lo cual había introducido la raza White Dorper, la cual tiene más pelo que lana.

Foto 18. Corderos híbridos



Foto 19. Rebaño compuesto



Día 5 AM: Se visitan dos predios comerciales, destinados a la producción de corderos y cereales. Ambos tenían manejos similares a los anteriores descritos, sin embargo la diferencia radica en el mayor uso de los rastros de cultivos y por lo mismo por tener un porcentaje de praderas mejoradas más alto que le resto que cultivaba menos.

Día 5 PM: Se visita criadero "Barwon" Stud, propiedad de 2000 hectáreas de las cuales 1100 se cultivan y las restantes 900 constituyen el criadero. En estas se mantienen 900 ovejas Poll Dorset y 400 White Sufflok, en base a praderas de alfalfa y chicoria, trébol subterráneo y ballica. Suplementa además con concentrado proteico y cebada. Comercializa 600 cameros al año, esta bajo el programa LAMBPLAN para la selección de los cameros que vende. Además tiene un rebaño de 1200 ovejas híbridas las cuales se destinan a la producción de corderos.

Día 5 PM: se realiza visita una carnicería y sala de desposte con el objeto de apreciar las canales, cortes y presentación de estos. Se pudo comprobar la excelente conformación y tamaño de la canal, la cual generaba cortes de buen tamaño y grado de engrasamiento. Los participantes comprobaron la importancia que tiene para los consumidores el tipo de corte y atributos de la carne. También pudieron observar la importancia de la presentación y preparación que se le puede hacer a los diferentes cortes con lo que se agrega valor y se hace un producto más atractivo para el consumidor (Fotos 22 y 23).

Foto 20. Carneros White Suffolk

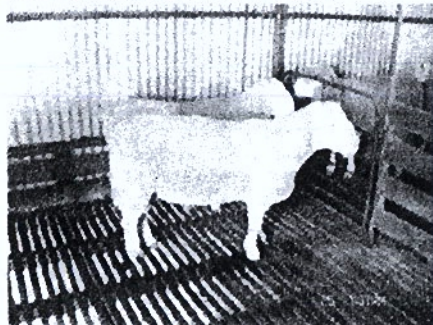


Foto 21. Camero Poll Dorset

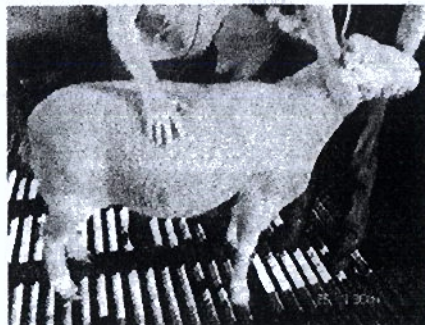


Foto 22. Cortes de cordero



Foto 23. Cortes de cordero

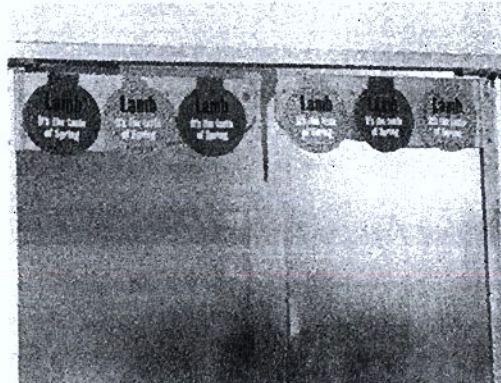


La promoción e identificación de la carne de cordero con cosas naturales e inocuas, para favorecer el consumo es algo que se puede observar en todas los supermercados y carnicerías (fotos 24 y 25)

Foto 24. Promoción del cordero



Foto 25. Promoción del cordero



Día 6 AM: Se visita un predio de producción orgánica de 2000 hectáreas, el cual produce ovinos, bovinos, caprinos y cultivos (trigo, centeno, triticale). Estos se venden al mercado interno de Sydney en locales de productos orgánicos con una demanda estable y al principio difícil de crear. De la experiencia recogida se desprende que es posible la producción orgánica, que la rentabilidad es similar a la producción convencional, que requiere esfuerzo y trabajo adicional, además de una convicción especial. Los productores deben estar convencidos, es como una opción de vida, más que productiva. Se notaban muy contentos con lo que hacían. El grupo pudo disfrutar de la calidez y hospitalidad de esta pareja, además de una comida basada en carne de cordero y cabrito, galletas y panes orgánicos y otros productos.

Día 6 PM: se asiste a una reunión de un grupo de transferencia tecnológica, tipo GTT. Este está bajo el esquema de transferencia mencionada anteriormente en este informe, denominado programa PROGRAZE. Los productores recorren el predio, comparten experiencias y reciben una charla técnica de un tópico determinado. Se adjunta tema de la charla (anexo 2).

Día 7 AM : en esta penúltima actividad de la gira se visita un predio el cual está especializado en producir corderos Texel para el mercado interno. Se observa una integración entre el productor y la carnicería y supermercados de la ciudad de Cootamundra. Este y otros productores abastecen los locales comerciales y la carne se vende con etiqueta indicando el nombre del predio y el sello de carne texel.

Foto 27. Corderos Texel en engorda



Foto 28. Corte de cordero con sello Texel



Día 7 AM: En camino a Sydney se visita predio dedicado a la producción bovina y ovina. En esta visita se pudo compartir información con comercializadores de ganado y se disfrutó de una típica barbacoa australiana.

Día 7PM : Se llega a las 18:00 hrs. a Sydney para tomar la día siguiente el vuelo de regreso a Chile.



Contactos Establecidos

Presentar los antecedentes de los contactos establecidos durante el desarrollo de la propuesta (profesionales, investigadores, empresas, etc.), de acuerdo al siguiente cuadro:

Institución Empresa Organización	Persona de Contacto	Cargo	Fono/Fax	Dirección	E-mail
ANF Agritours	Peter Lloyd	Chief executive	02 6772 9899		plloyd@anf.com.au
Barwon Stud	Mark Yates	Dueño	02 6920 3525		
Cashmore Park Prime lamb seedstock	John Keiller	Manager	03 55265248		johnok@hotmail.net.au
Ramage Rural	Jaime Ramage	Dueño	03 57981443		ramage@odo.com.au

Material elaborado y/o recopilado

Entregar un listado del material elaborado, recibido y/o entregado en el marco de la propuesta. Se debe entregar adjunto al informe un set de todo el material escrito y audiovisual, ordenado de acuerdo al cuadro que se presenta a continuación.

También se deben adjuntar fotografías correspondientes a la actividad desarrollada. El material se debe adjuntar en forma impresa y en un medio electrónico (disquet o disco compacto).

Elaborado

Tipo de material	Nombre o identificación	Preparado por	Cantidad
------------------	-------------------------	---------------	----------

Recopilado

Tipo de Material	Nº Correlativo (si es necesario)	Caracterización (título)
Artículo	1	Calculating cost of production
Artículo	2	An introduction to LAMBPLAN
Artículo	3	Using LAMBPLAN to select the right terminal sire ram
Artículo	4	The National Flock Identification Scheme



Artículo	5	Sheepmeat eating quality. A guide for Australian producers
Programa de difusión de la actividad		
En esta sección se deben describir las actividades de difusión de la actividad, adjuntando el material preparado y/o distribuido para tal efecto.		
En la realización de estas actividades, se deberán seguir los lineamientos que establece el "Instructivo de Difusión y Publicaciones" de FIA, que le será entregado junto con el instructivo y formato para la elaboración del informe técnico.		
Según lo establecido en la propuesta se realizaron tres charlas de difusión. Una en la VI otra en la VII y la última en la VIII región. La versión digital de la charla se entrega en CD adjunto.		

1.- PARTICIPANTES DE LA PROPUESTA

GIRAS, BECAS: Ficha de Participantes

CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	Ramón
Apellido Paterno	Leyton
Apellido Materno	Farias
RUT Personal	5.033.630-1
Dirección, Comuna y Región	Avda. O'Higgins 1052, Curicó
Fono y Fax	75-621568
E-mail	No tiene
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	Predio Porvenir
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	5.033.630-1
Cargo o actividad que desarrolla	Dueño
Rubro, área o sector a la cual se vincula o en la que trabaja	Ovinos de carne



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EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	Alberto Hellmut
Apellido Paterno	Seeger
Apellido Materno	Stein
RUT Personal	2.606.754-5
Dirección, Comuna y Región	Camino Cauquenes a Parral, Cruce Capellanía, 8 km. al N. Comuna de Cauquenes, Séptima Región
Fono y Fax	09-8402456
E-mail	No tiene
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	San Juan de Capellanía
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	2.606.754-5
Cargo o actividad que desarrolla	Administrador y dueño
Rubro, área o sector a la cual se vincula o en la que trabaja	Ovinos de carne



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CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	Victor
Apellido Paterno	Valencia
Apellido Materno	Baier
RUT Personal	10.432.571-8
Dirección, Comuna y Región	Avda. Esperanza S/N Villa Alegre
Fono y Fax	73-381768
E-mail	vvalencia@inia.cl
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	INIA
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	61.312.000-9
Cargo o actividad que desarrolla	Sub Director I+D
Rubro, área o sector a la cual se vincula o en la que trabaja	Sistemas de producción bovinos y ovinos



GOBIERNO DE CHILE
FUNDACIÓN PARA LA
INNOVACIÓN AGRARIA

1. PARTICIPANTES DE LA PROPUESTA

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CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	Marcela
Apellido Paterno	Gómez
Apellido Materno	Ceruti
RUT Personal	7.106.695-9
Dirección, Comuna y Región	Parcela11, San Luis de Pedehue, San Fernando, Sexta Región
Fono y Fax	072-715468
E-mail	mgomez@fundacionchile.cl
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	Fundación Chile
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	70.300.000-2
Cargo o actividad que desarrolla	Médico Veterinario, Coordinador Proyecto Cordero del Secano Costero Central
Rubro, área o sector a la cual se vincula o en la que trabaja	Ovinos de carne



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CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	Francisca
Apellido Paterno	Cea
Apellido Materno	Mora
RUT Personal	9.224.473-3
Dirección, Comuna y Región	Mallulermo, Comuna San Ignacio, VIII región
Fono y Fax	No tiene
E-mail	No tiene
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	9.224.473-3
Cargo o actividad que desarrolla	Propietaria
Rubro, área o sector a la cual se vincula o en la que trabaja	Agricultora, producción ovina



1. PARTICIPANTES DE LA PROPUESTA

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CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	Juan Nicolás
Apellido Paterno	Fuentes
Apellido Materno	Lizana
RUT Personal	12.315.695-1
Dirección, Comuna y Región	Mallermo s/Nº, Comuna de La Estrella , Sexta Región
Fono y Fax	09-4451536
E-mail	infuentesl@yahoo.com
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	Predio San Carlos de Mallermo, de propiedad de Juan Fuentes Pérez
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	3.719.407-7
Cargo o actividad que desarrolla	Administrador, e hijo del dueño
Rubro, área o sector a la cual se vincula o en la que trabaja	Ovinos de carne

1. PARTICIPANTES DE LA PROPUESTA

GIRAS, BECAS: Ficha de Participantes

CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	Victor Eduardo
Apellido Paterno	Parraguez
Apellido Materno	Galarce
RUT Personal	3.769.688-9
Dirección, Comuna y Región	Panilonco s/N°, Comuna de Pichilemu, Sexta Región
Fono y Fax	09-8313260 - 072 - 841029
E-mail	panilonco@mixmail.com
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	Fundo centinela
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	3.769.688-9
Cargo o actividad que desarrolla	Administrador y dueño
Rubro, área o sector a la cual se vincula o en la que trabaja	Ovinos de carne

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GIRAS, BECAS: Ficha de Participantes

CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	Héctor
Apellido Paterno	Doberti
Apellido Materno	Negro
RUT Personal	4.504.046-1
Dirección, Comuna y Región	Fundo Alcones s/Nº, Comuna de Marchigüe, Sexta Región
Fono y Fax	09-7423515
E-mail	dobertih@terra.cl
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	Agrícola Alcones Ltda
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	84.442.100-1
Cargo o actividad que desarrolla	Administrador
Rubro, área o sector a la cual se vincula o en la que trabaja	Ovinos de carne

1. PARTICIPANTES DE LA PROPUESTA

GIRAS, BECAS: Ficha de Participantes

CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	ORIANA PATRICIA
Apellido Paterno	BURGOS
Apellido Materno	GONZALEZ
RUT Personal	10.208.203-3
Dirección, Comuna y Región	PJE BADALONA 1349, PARQUE BARCELONA CHILLÁN, REGIÓN DEL BÍO BÍO
Fono y Fax	42-320655
E-mail	ovinosur@yahoo.es
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	PROFO OVINO REGION DEL BIO BIO
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	NO REGISTRA
Cargo o actividad que desarrolla	GERENTE
Rubro, área o sector a la cual se vincula o en la que trabaja	PRODUCCIÓN Y COMERCIALIZACION DE CARNE OVINA



1. PARTICIPANTES DE LA PROPUESTA

GIRAS, BECAS: Ficha de Participantes

CONSULTORES: Ficha de(l) Consultor(es)

EVENTOS: Ficha de Expositores y Organizadores

DOCUMENTOS: Ficha de Autores y Editores

Nombre	MICHEL
Apellido Paterno	LEPORATI
Apellido Materno	NERON
RUT Personal	7.627.065-1
Dirección, Comuna y Región	AGUSTINAS 1465, 5° PISO, SANTIAGO, R.M.
Fono y Fax	FONO: 690 81 65 FAX: 690 81 19
E-mail	mleporati@indap.cl
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	INDAP
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	61.307.000-1
Cargo o actividad que desarrolla	Encargado Plan Ganadero
Rubro, área o sector a la cual se vincula o en la que trabaja	Agricultura Familiar Campesina, producción pecuaria



Participantes en actividades de difusión

Es necesario registrar los antecedentes de todos los asistentes que participaron en las actividades de difusión. El listado de asistentes a cualquier actividad deberá al menos contener la siguiente información:

Nombre	
Apellido Paterno	
Apellido Materno	
RUT Personal	
Dirección, Comuna y Región	
Fono y Fax	
E-mail	
Nombre de la organización, empresa o institución donde trabaja / Nombre del predio o de la sociedad en caso de ser productor	
RUT de la organización, empresa o institución donde trabaja / RUT de la sociedad agrícola o predio en caso de ser agricultor	
Cargo o actividad que desarrolla	
Rubro, área o sector a la cual se vincula o en la que trabaja	

Se anexa listado de asistencia a actividades.

1. EVALUACIÓN DE LA PROPUESTA

Evaluación de la actividad para cada INICIATIVA

En esta sección se debe evaluar la actividad en cuanto a los siguientes ítems:

a) Efectividad de la convocatoria (cuando corresponda)

La convocatoria se podría calificar de regular a buena. La asistencia en promedio a las tres charlas fue de 20 personas.

b) Grado de participación de los asistentes (interés, nivel de consultas, dudas, etc)

Los asistentes mostraron bastante interés con un nivel de consultas alto.

c) Nivel de conocimientos adquiridos por los participantes, en función de lo esperado (se debe indicar si la actividad contaba con algún mecanismo para medir este punto y entregar una copia de los instrumentos de evaluación aplicados)

No se determinó

d) Problemas presentados y sugerencias para mejorarlos en el futuro (incumplimiento de horarios, deserción de participantes, incumplimiento del programa, otros)

Deserción de algunos participantes. Esto se tradujo en aumento de los costos e inconvenientes para la presentación de la propuesta, los cuales fueron subsanados con mucha paciencia por parte del coordinador y comprensión por parte del FIA, aunque no sin burocracia.

Aspectos relacionados con la postulación al programa de Captura y Difusión

a) Información recibida por parte de FIA para realizar la postulación

☐ amplia y detallada ☐ aceptable ☐ deficiente

Justificar:

b) Sistema de postulación al Programa de Formación o Promoción (según corresponda)

☐ adecuado ☐ aceptable ☐ deficiente

Justificar:

c) Apoyo de FIA en la realización de los trámites de viaje internacionales (pasajes, seguros, otros) (sólo cuando corresponda)

☐ bueno ☒ regular ☐ malo

Justificar:

d) Recomendaciones (señalar aquellas recomendaciones que puedan aportar a mejorar los aspectos administrativos antes indicados)

2. Conclusiones Finales de la Propuesta Completa

En el caso de Giras Tecnológicas, en lo posible presentar conclusiones individuales por participante.

Como conclusiones del coordinador se señalan a continuación:

- Los sistemas de producción están enfocados a la obtención de un producto claramente definido por los diferentes mercados objetivos.
- Existe una integración vertical de toda la cadena productiva en la cual todos los eslabones se ven favorecidos.
- La selección genética ha jugado un rol preponderante en el mejoramiento de la eficiencia productiva y la competitividad del sector.
- La alimentación (praderas), gestión y manejo animal constituyen la clave del éxito productivo.....toda esta tecnología esta disponible en Chile!
- La investigación es desarrollada y financiada en común acuerdo entre productores, industriales, universidades y gobierno. Forraje, Genética, eficiencia productiva y calidad de producto son las grandes áreas temáticas.
- La asociatividad y organización forma de los productores e industriales ha sido una de las claves en el éxito exportador y la mantención de mercados de alto valor (MLA).
- La transferencia tecnológica hacia los productores presenta un alto grado de coordinación entre las diversas instituciones, con roles, temáticas y objetivos claramente definidos.

Se anexan documentos entregados por algunos participantes. El resto no enviaron nada a la fecha de entrega de este informe.

INFORME GIRA TECNOLÓGICA OVINOS DE CARNE A AUSTRALIA 2005

19 AL 28 DE OCTUBRE 2005.

1. INTRODUCCION : Frente a la posibilidad de exportar carne ovina chilena al Mercado Común Europeo y a E.E.U.U. de N. A. A raíz de los tratados de Libre Comercio con los respectivos Gobiernos, el Ministerio de Agricultura encabezado por el señor Subsecretario de Agriculturas y secundado por sus Servicio FIA, INIA INDAP, y SAG se la jugó por apoyar a los productores ovinos en el desafío que significa transformar las actuales ovejerías, en su mayoría tradicionales y rústicas, con razas poco definidas, escaso manejo y bajos índices de producción en empresas eficientes, tecnológicamente avanzadas y sobretodo, lo cual no es el caso en la mayoría actualmente, rentables.

Dentro de este marco de apoyo se insertó la gira tecnológica que el FIA ayudó a financiar a un grupo de productores ovinos de la VI a la VIII región y técnicos para recoger el máximo de experiencias posibles en la zona de producción de carne ovina de Australia entre Melbourne y Sydney.

Australia, situada en el mismo hemisferio de Chile, con condiciones de clima y suelo comparables y a diferencia de España, que es una fábrica de corderos caros, con un mismo esquema básico de explotación, solo más avanzado fue que para quien participamos en la gira, una verdadera revelación de cuan sencillo es aplicar tecnologías racionales simples si solo se tiene muy claro lo que se quiere lograr.

El suscrito posee una empresa ovina de la raza Suffolk down de 800 cabezas en el secano interior de Cauquenes, que no obstante tener buenos índices de producción y 1,6 ovejas por ha y vender una proporción de su producción como reproductores a mayor precio sin embargo tiene una rentabilidad bajísima por unidad de superficie.

Nuestro aporte, a raíz de nuestro viaje a Australia, sería demostrar que con la aplicación de las nuevas técnicas aprendidas el negocio ovino puede ser rentable aún en condiciones difíciles.

2. OBJETIVOS

La mayor fuente de ingresos de un predio productor de carne ovina es la venta de corderos, sea para reproductores o matanza.

Por lo tanto el objetivo es producir el máximo de carne de cordero por unidad de superficie, lo que se logra maximizando el porcentaje de parición al destete en relación a ovejas encastadas y logrando una máxima carga animal por ha.

3. ESTRATEGIA

Para lograr los objetivos enunciados dependemos de

- Recursos forrajeros
- Mejoramiento genético
- Manejo reproductivo, productivo y sanitario

También influyen la gestión y la comercialización, que escapan a este informe.

3.1 RECURSOS FORRAJEROS

Por lejos el mayor factor limitante para poder aumentar la carga animal, mejorar los porcentajes de parición, disminuir la mortandad y obtener una mayor ganancia diaria de peso de los corderos es la falta de suficientes recursos forrajeros para darle una adecuada nutrición sobre todo a los vientres.

Si bien la zona visitada, tanto por la latitud como por una mayor conciencia de los recursos naturales disponibles, está en condiciones más favorables que la nuestra, nos impactó la importancia primordial que tiene para el productor ovino la alimentación de su ganado.

Nos tocó visitar empastadas artificiales en base a falaris, ballica, trébol subterráneo, trébol balanza, trébol persa y otras especies, bien fertilizadas en que en secano había cargas animales sobre 10 ovejas / ha, en parte manejado con cerco eléctrico.

Se hace mucho uso de praderas suplementarios en base a avena, coles, alfalfa etc. obteniendo sobre 5000 kgs. de mat seca por ha.

Por último se acude a la suplementación con grano, tanto avena como lupino, que recién a nuestro regreso a Chile pudimos valorar como una solución estratégica para períodos críticos. Lamentablemente no profundizamos en este tema.

A pesar de lo importante que es la alimentación en nuestras condiciones, distintas a las más favorables de Australia, tenemos a nuestra disposición la tecnología para sembrar empastadas y praderas suplementarias y es solo el factor costo que nos ha frenado en hacer mayores inversiones.

3.2 MEJORAMIENTO GENETICO

Se visitaron tanto planteles de animales finos inscritos como también explotaciones comerciales, siendo los enfoques totalmente diferentes.

Visitamos criaderos de la raza Dohne (Merino Australiano con Merino Fleischschaf) Polled Dorset, White Suffolk, Coopwovlh, Polwarth, Texel y Dorper con animales de gran calidad y peso, pero salvo fines de hibridación no recomendables para las condiciones ovejeras actuales del país.

Los criaderos son muy estrictos en cumplir sus reglamentos y tienen su ganado inscrito en los respectivos Flockbook con sus características y ancestros.

Hay gran preocupación por introducir genes por ej. de la prolificidad, la precocidad (ganancia de peso diaria) e incluso resistencia a los parásitos y al foot rot. Incluso la raza Dorper bota su lana una vez al año, ahorrándose así los gastos de esquila (US\$ 3 x ovino superior al valor de la lana).

Lamentablemente en la zona visitada no existía el Suffolk down, habiendo sido superada por otras razas más eficientes. Sin embargo en Chile es la raza más común en la zona central, donde se impuso por su rusticidad y buena adaptación a las condiciones de nuestro ambiente, pero le queda por desarrollar su potencial de prolificidad (sobre 120% parición), su precocidad con ganancias diarias de hasta 400 grs. y sus cualidades maternas.

Habiendo inseminado nuestro plantel con el semen del mejor carnero S.D. de Nueva Zelandia, estamos realizando nuestro propio programa de mejoramiento en que poco influye lo observado en Australia.

Muy distintos son los criaderos comerciales donde predomina el pragmatismo comercial de producir exactamente lo que el mercado les exige en el momento, exigencias que varían constantemente.

Ellos ya casi no hablan de razas, sino que cruzan animales de distintos tipos para lograr con "razas" maternas mejorar características para las hembras y con carneros de carne crías terminales.

No les preocupa mayormente la consanguinidad, la edad de las ovejas mientras produzcan ni eventuales manchas, cachos u otras fallas.

De hecho existen productores de vientres, otros que las cubren y hacen parir y por último los que compran lechones de 15 kgr. y los engordan llegando hasta 60 kgr., si el mercado lo pide, todo ello aprovechando integrar zonas más pobres y más productivas.

MANEJO REPRODUCTIVO, PRODUCTIVO Y SANITARIO

La clave del manejo reproductivo es ajustar las necesidades variables de nutrición de la oveja a través del año a las disponibilidades de cantidad y calidad de forraje de las praderas, también variables a través del año.

Ello se logra haciendo el encaste de tal manera que la oveja tenga suficiente pasto en el último tercio de preñez y sobretodo durante la lactancia, ajustando el crecimiento del cordero al despegue del crecimiento del pasto en primavera.

A diferencia de nuestra práctica habitual de iniciar el manejo reproductivo con el encaste los australianos lo inician con el destete de los corderos, pues es a partir de la recuperación de la oveja desde ese instante como se desempeñará como madre el próximo período.

Donde realmente el aporte de nuestra gira a Australia fue espectacular fue en el aprendizaje de nuevas técnicas del manejo reproductivo de nuestro ganado a través del año. A ello nos referimos en los párrafos siguientes, en el que ellas fueron adaptadas a un predio ovino como el nuestro ubicado en el secano interior de la VII región.

MANEJO REPRODUCTIVO, PRODUCTIVO Y SANITARIO DEL GANADO OVINO A TRAVÉS DEL AÑO.

Fecha	Práctica
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1. DESTETE AL ENCASTE

Nov 10

Destete corderos

- Corderos a potrero rezagado para engorda
— Ovejas a potrero de descanso y recuperación

Nov 18

Encierra corderos

- Selección 20% borregas de reemplazo
- Colocación autocrotal
- Señal del fundo
- 2º vacunación Clostrivac

Selección carnerillos reproducción para venta

- Colocación autocrotal
2ª vacunación Clostrivac

Nov 20

Esquila ovejás

- Esquila y marca ovejas secas especialmente borregas 2 dientes.
- Eliminación ovejas viejas en dos grupos
 - Aptas para venta reproducción sin fallas
 - Para matadero c/ fallas dientes, ubres, patas, etc.

Dic 1 – 30

Venta de reproductores y ganado de matanza

- _ Carneros dos dientes
- _ Carnerillos diente leche
- _ Borregas diente leche
- _ Ovejas para reproducción
- Ovejas rechazo y corderos para matanza

Enero 15

Rodeo ovinos destinados reproducción: carneros, vientres, borregas 2 dientes

- Revisión Condición Corporal (CC) Separación 2 piños para encaste CC3
CC2
- Alimentación suplementaria carneros CC 2
- Alimentación suplementaria (avena-lupino) vientres y borregas CC 2

2. ENCASTE

Febrero 28

Preparación encaste

- _ Eliminación ovejas con fallas ubres, dientes, patas
- _ Eliminación borregas 2 dientes vírgenes x fallas y bajo standard raza
- _ Chequeo carneros testículos, pene, patas y dientes
- _ Desparasitación ovejas y carneros
- _ Cambio potrero

Marzo 1 a Abril 20

Junta carneros con ovejas

3. ENCASTE A PARICION

Junio 10

Preparación parición

- _ Análisis coprológico (10 muestras por piño)
- _ Scanning
- _ Separación ovejas secas y uníparas, de mellicera
- _ Eliminación ovejas secas repetidas
- _ Medición CC

Junio 20

Ultimo tercio de preñez

- _ Vacunación Clostrivac vientres
- _ Desparasitación seg. análisis coprológico
- _ Suplementación c/avena y lupino

4. PARICION

Julio 24

Preparación parición

- _ Revisión potreros: cierros, aguadas, lugares alojamientos drenados, protección viento

Parición

Agosto 1

- _ Cambios de potrero
- _ Recorrido y supervisión permanente del ganado
 - Pesaje y recuento corderos muertos
 - Borogluconato de calcio, yodo
 - Control jotes y perros
- _ Máxima tranquilidad ganado

5. PARICION AL DESTETE

Sept. 30

Rodeo vientres y corderos

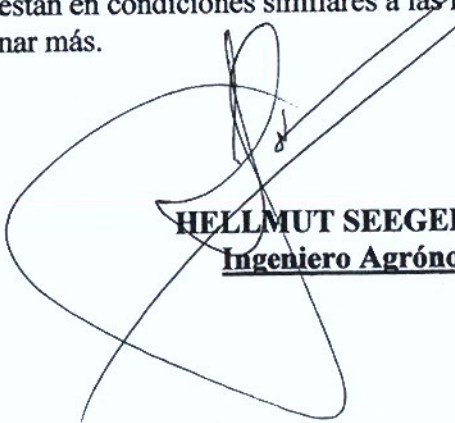
- _ Descole en grupos pequeños
- _ Desparasitación corderos

- Vacunación Clostrivac 1ª dosis
- Cambio de potrero

MODIFICACIONES AL MANEJO REPRODUCTIVO INTRODUCIDAS DE AUSTRALIA.

<u>ANTES</u>	<u>DESPUES</u>
Inicio del ciclo reproductivo con encaste	Inicio del ciclo reproductivo con destete
Ovejas al destete al peor potrero,	Ovejas del destete a recuperación antes del encaste.
Encaste al 20 de Febrero	Encaste al 1 de marzo: días más cortos
% de carneros: 3%	% carneros: 2%
Duración encaste: 60 días	Duración encaste: 51 días
Condición corporal no se tomaba en cuenta	Estricto seguimiento C.C.
Alimentación suplementaria: solo excepcional	Avena y lupino épocas críticas parte de Rutina.
Desparasitación: 2 veces al año	2ª desparasitación antes de parto según Análisis coprológico.
Vacunación Clostrivac: sólo corderos	Vacunación Clostrivac: ovejas y corderos.
	Uso del scanning: alimentación separada ovejas uníparas y múltiparas.

Es nuestra esperanza que los conocimientos adquiridos en la gira tecnológica a Australia nos permitan realizar un manejo tecnológicamente más racional y rentable de nuestra explotación ovina de secano, para así poder hacer participar al mayor número de productores ovinos posible que están en condiciones similares a las nuestras de las ventajas que significa trabajar bien y ganar más.


HELLMUT SEEGER STEIN
Ingeniero Agrónomo

2.2.-Resultados experiencia con el proyecto de predios piloto:

El trabajo con los predios piloto a tres años de su implementación ha obtenido resultados muy interesantes en términos de un cambio importante a nivel de los predios, que les han llevado a mejorar productividad, principalmente ordenando todos los factores relacionados con la producción e incorporando tecnologías disponibles, tales como, mejoramiento de su base forrajera, uso eficiente del recurso suelo, programas de bioseguridad, entre otros. El mejoramiento en la productividad se ha visto reflejado en los indicadores productivos y reproductivos que han sido evaluados desde el inicio del proyecto, y que se manifiestan principalmente en el aumento de kilos de carne por hectárea relacionado con un aumento de la tasa de destete (sobre un 20% promedio) y por ende de la producción de kilos de carne por há.

2.3.-Requerimientos para complementar el trabajo que se está realizando

La zona Centro – Sur de Chile, secano costero e interior, tiene un gran potencial para desarrollar la producción ovina y revalorizar un rubro que ha perdido importancia frente a otras alternativas como la forestación y la vitivinicultura

En este escenario, y dadas las claras oportunidades que tiene este producto en el escenario actual, y el atraso que tiene Chile en términos de incorporación de tecnologías en el rubro que permitan crecer y ser competitivos, se planteó la idea de ir a conocer la experiencia Australiana de desarrollo técnico-productivo y comercial de la cadena de producción ovina.

Nos planteamos como objetivos:

- Conocer los sistemas de producción ovina en Australia, la incorporación y uso de las tecnologías.
- Conocer nuevas tecnologías productivas y reproductivas, factibles de ser aplicadas.
- Conocer los resultados productivos y reproductivos de las explotaciones ovinas, de acuerdo a los objetivos locales, y la forma de afianzar esos resultados con los productores de modo de establecer un modelo de desarrollo sustentable.
- Conocer las formas de vinculación entre los productores y los profesionales asesores, los sistemas de transferencia de tecnologías y formas de acceso a la información
- Conocer las líneas de investigación en praderas y genética animal, de modo de incorporar nuevas ideas a los trabajos de desarrollo que se están realizando en la zona central.
- Conocer las formas de vinculación de los productores con el mercado
- Conocer el comportamiento y las formas de adaptación, a un mercado dinámico, cambiante y exigente.

3.- Resultados de acuerdo a lo expuesto:

- El programa de la Gira fue muy bien desarrollado y cumplió con las expectativas de la intervención, tanto de los productores que participan como pilotos en el programa de Fundación Chile, como de los profesionales que los asesoran.
- Fue interesante comprobar que las tecnologías productivas y reproductivas que están siendo aplicadas en Australia, se encuentran disponibles en nuestro país, y de hecho están siendo aplicadas en Chile con productores proactivos, informados y exigentes, en los cuales además se han obtenido resultados exitosos.

Gira Tecnológica "Sistemas de producción y cadena de exportación de carne ovina en Australia".

Comentarios Frente a la experiencia. Marcela Gómez Ceruti, Médico Veterinario de Fundación Chile.

1.-Contexto General

Fundación Chile a contar del año 1998 y hasta el año 2002, comenzó a trabajar en Magallanes, en acuerdo con el Ministerio de Agricultura y la Corporación de Fomento de la Producción (CORFO), en un proyecto cuya finalidad era impulsar el desarrollo integral del sector ovino en la XII Región.

Dado el éxito que ese programa tuvo, a contar del año 2001, nuevamente en convenio con el Ministerio de Agricultura, Fundación implementó con carácter de Proyecto Piloto, un Programa de comercialización de Corderos del Secano Costero de la Sexta Región. Fundación Chile gestionó la incorporación de Carnes Nuble al programa a partir del año 2001 y logró entusiasmarlos para ingresar al negocio formal.

Este programa tuvo gran éxito e impacto en la zona, llegando a comercializar cerca de 10.000 cabezas anuales, bajo el concepto de "Cordero de Primavera". Esto determinó que a contar del año 2003 y dadas las posibilidades reales de reposicionamiento de la carne de cordero en el país y sobre todo las ventajas que ofrece la apertura de mercados internacionales, se implementara un programa de Desarrollo Tecnológico integral para el cordero del secano de la Sexta Región. Este programa comenzó a trabajar con 10 predios piloto en distintas comunas del secano de las Provincias de Cardenal Caro y Colchagua. El objetivo fue incorporar tecnologías precompetitivas en el Secano de la Sexta Región, para generar un sistema de producción sustentable económicamente, que permita desarrollar una cadena integrada de exportación de carne de cordero desde el secano costero.

2.-Antecedentes Técnico-productivos

2.1.-Diagnóstico inicial:

La producción ovina se desarrolla y se continuará desarrollando en sectores de secano costero e interior, marginales, cuya característica actual es el progresivo deterioro del suelo, y el ineficiente uso de los recursos disponibles. Se ha constituido en una regla frecuente para los productores, no incorporar tecnologías en sus explotaciones ovinas, aduciendo el bajo retorno por hectárea que tiene esta actividad. Esto ha determinado el bajo nivel productivo de los rebaños ovinos, y el consecuente escaso retorno económico para los productores. Se sigue produciendo bajo un esquema extensivo propio de predios con grandes superficies, como los que se encontraban en la zona central hace más de cincuenta años atrás, donde era frecuente encontrar una baja carga animal.

En este contexto se puede afirmar que la principal causa de la baja rentabilidad de los predios esta representada por el casi nulo uso de tecnología, atribuible no sólo a una escasa capacidad de inversión, si no también a la falta de información, dado que desconocen las características de sus suelos; potenciales de rendimientos de sus praderas, no conocen su situación sanitaria, no manejan conceptos de bioseguridad y buenas prácticas ganaderas, desconocen el potencial genético de sus rebaños y no saben interrelacionar variables técnicas y productivas con los resultados económicos de sus explotaciones.

4.- Aplicabilidad de los resultados de la Gira. Estrategias a nivel nacional para lograr la innovación en producción ovina.

4.1.- A nivel de los profesionales vinculados a los procesos de desarrollo tecnológico:

- En primer lugar parece clave la capacitación de profesionales y técnicos vinculados al tema ovino, generar especialización.
- Generar procesos de investigación integrados al proceso productivo y en estrecha vinculación con los productores, orientados a una demanda real.

4.2.- A nivel de los productores:

- La apropiación de conocimientos por parte de los productores requiere de un esfuerzo adicional. Debe establecerse programas de asesoría técnica especializada y certificada.
- La orientación clara de las propuestas, con elementos tecnológicos aplicables y resultados concretos es clave
- La definición clara del producto que debe ser entregado al mercado, permitirá orientar los esfuerzos hacia ese objetivo, y si además esto se traduce en mejoramientos en la rentabilidad reales, los productores invertirán en nuevas tecnologías propuestas.
- A nivel de los productores pequeños, el incentivo de los programas de INDAP es muy importante en el momento de incorporación de nuevas tecnologías.

4.3.- A nivel de los programas estratégicos de desarrollo:

- El estructurar una propuesta de desarrollo estratégico en producción ovina, con elementos que crucen todos los estratos de productores, que unifique criterios técnicos, y que permita ordenar el trabajo que se está realizando en el rubro, parece clave.
- Promover la asociatividad de los productores, como elemento estratégico para la incorporación de tecnologías y su vinculación con el mercado

ANEXOS

Pasture Grasses, Legumes and Herbs used in NSW 2004–2005

ANEXO 1



NSW Agriculture



GRASSLAND SOCIETY OF NSW INC.

Annuals

ARROWLEAF CLOVER (*Trifolium vesiculosum*)

An annual mainly spring–summer growing legume, adapted to a wide range of soil types. Avoid soils with pH(Ca) greater than 7.5. Hard seeded. Good soil moisture is needed in spring for its potential to be reached. Sown in mixtures for short-medium-term pastures or as a component of high-density legume crops. Minimum average rainfall for

the species: 400 mm in Southern NSW, 500 mm in Northern NSW. Sowing rates 1–4 kg/ha in a mixture with species such as sub clover.

Select varieties on the basis of:

- **Maturity:** earlier maturing varieties suited to drier more marginal areas.

Seed available:

Variety/brand	Main Seed Source
Early maturing	
Cefalu [Ⓛ]	Seedmark/PlantTech
Late maturing	
Seelu	Public variety
Zulu II [Ⓛ]	Seedmark/PlantTech

BALANSA CLOVER (*Trifolium michelianum*)

A self-regenerating annual legume that grows mainly in autumn, winter and spring. Suited to soils of pH (Ca) 4.5–7.0. Tolerates waterlogging. Resists clover scorch and root rot.

Slow early growth but improves in late winter and spring. Produces good quality hay. It has a high proportion of hard seeds. Sow in autumn (dryland) with good moisture or early autumn (irrigated). Sowing rate: 2–5 kg/ha. 0.5–1.0 kg/ha when used in mixtures, 5 kg/ha when used as a 1-year forage crop

Minimum average rainfall for the species: 350 mm Southern NSW, 650 mm in Northern NSW.

Select varieties on the basis of:

- **Maturity:** Earlier maturing varieties are suited to drier more marginal areas.
- **Seasonal growth:** Select varieties to match feed requirements (seek local trial results if available).

Seed available:

Variety/brand	Main Seed Source
Early maturing	
Frontier [Ⓛ]	Seedmark/PlantTech
Mid season maturity	
Paradana	Public variety
Late season maturity	
Bolta [Ⓛ]	Seedmark/PlantTech

BERSEEM CLOVER (*Trifolium alexandrinum*)

Annual, growing in autumn, winter and spring. Used as an annual forage crop. Suited to fertile, neutral pH soils. Sow as a pure stand or in mixtures as a high density legume crop in late February to early April. Minimum average rainfall for the species: 600 mm in Southern NSW, 750 mm in Northern NSW.

Sowing rate: 15–25 kg/ha, mixtures, 2–6 kg/ha

Select varieties on the basis of:

- **Maturity:**
- **Disease resistance:** Resistance to diseases may be important in your situation i.e. clover scorch, *phytophthora* root rot, *pythium*

rot, leaf rust – check local requirements for the need for resistance.

Seed available:

Variety/brand	Main Seed Source
Mid season to late maturing	
Carmel ('Multicut')	Public variety
Elite II [Ⓛ]	Seedmark/PlantTech

BISERRULA (*Biserrula pelecinus*)

A hard seeded, autumn, winter and spring growing legume. It has performed well on lighter textured soils and will tolerate soil acidity. It has a deep root system. Usually sown

in mixtures with serradella and sub clover. Minimum average rainfall for biserrula – 400 mm in Southern NSW 525 mm in Northern NSW. Sow autumn.

Sowing rate 1–3 kg/ha.

Variety/brand name: Casbah (Seedmark/PlantTech, Ballard Seeds); Mauro [Ⓛ] (Ballard Seeds, Seedmark/PlantTech)

CRIMSON CLOVER (*Trifolium incarnatum*)

Annual, soft seeded self-regenerating autumn, winter, spring growing aerial legume. Used for grazing, silage and hay production. It is suited to low fertility soils and tolerant of low pH. Erect, good early season growth.

Susceptible to blue green aphid.

Minimum average rainfall for the species: 450 mm Southern NSW, 650 mm Northern NSW. Sow in autumn at 1–4 kg/ha in mixtures, 8–10 kg/ha when sown as a pure stand.

Varieties available:

Caprera (Seedmark/PlantTech)
Blaza [®] (Seedmark/PlantTech)

Both varieties are soft seeded, and mid-late season relative to sub clover mid to late season varieties.

GLAND CLOVER (*Trifolium glanduliferum*)

A self-regenerating, semi-erect annual legume, suitable to neutral to mildly acid soils. The major advantage of gland clover is its resistance to red legged earth mite and aphids. Resistant to scorch. Moderately tolerant of waterlogging.

Growth period similar to early maturing sub clovers (e.g. Dalkeith). Useful in mixtures with other temperate legumes or lucerne. Produces high seed yields. Sowing rate 2–4 kg/ha. Minimum average annual rainfall for this species 375

mm in Southern NSW to 550 mm in Northern NSW.

Variety: Prima (Ballard Seeds, Premier Seeds, Newseeds, Auswest Seeds, Seedmark/PlantTech)

BARREL MEDIC (*Medicago truncatula*)

Self regenerating annuals growing mainly in autumn, winter and spring. Best suited to neutral to alkaline soils in lower rainfall areas of wheat belt and further west.

Suited to long-term pastures. Sow on good moisture between mid-April and end of May. Minimum average rainfall for the species: 275 mm in Southern NSW and 400 mm in Northern NSW.

Sowing rate: 2–6 kg/ha

Select varieties on the basis of:

- **Maturity:** Use earlier maturing varieties in drier more marginal areas of medic zone.
- **Adaptation to soil type:** Jemalong, Jester are particularly suited to red clay loams, Mogul adapted to heavy alkaline soils.
- **Hard seed:** Use high hard seed levels where persistence is needed.
- **Aphid resistance:** Blue green aphid tolerance highly desirable.
- **Yield and persistence:** Seek local trial information where available.

Seed available:

Variety/brand	Main Seed Source
Mid – late season, moderately hard seeded, blue green aphid tolerant	
Paraggio	Public variety
Mid – late season, high hard seeded, blue green aphid tolerant	
Sephi	Public variety
Jester [®]	Seedmark/PlantTech
Mid – late season, high hard seeded, aphid susceptible	
Jemalong	Public variety
Mid season, high hard seeded, blue green aphid tolerant	
Mogul [®]	AWB Seeds
Short season, high hard seeded, blue green aphid tolerant	
Caliph [®]	Pacific Seeds, Seedmark/PlantTech, AWB Seeds

BURR MEDIC (*Medicago polymorpha* var *brevispina*)

A self regenerating annual legume growing mainly in the autumn, winter and spring. It differs from naturalised burr medic in having spineless pods. It has a high seed yield, however it is susceptible to blue green aphid, a pest that can cause considerable damage to susceptible medics in western NSW.

It has been grown in other states on a wide range of soil types from mildly acid red brown sandy loams to red clay loams. Its area of adaptation in NSW is likely to be similar to that for Caliph barrel medic. Sowing rates, 2–5 kg/ha.

Seed available:

Variety/brand	Main Seed Source
High hard seed levels	
Santiago	Public variety
Moderate hard seed levels	
Scimitar [®]	Seedmark/PlantTech

GAMA MEDIC (*Medicago rugosa*)

A self regenerating annual legume growing mainly in the autumn, winter and spring. It is suited to the western edge of the cropping zone (similar area to Cyprus barrel medic) and to calcareous clay and loam soils.

Gama medic has vigorous seedlings but is intolerant of heavy grazing pressure. It is very tolerant of blue green aphid, and tolerant of spotted alfalfa aphid pre flowering. Sowing rates, 2–4 kg/ha.

Seed available: Paraponto (Public variety)

HYBRID MEDIC

This is a hybrid between disc medic (*Medicago tornata*) and strand medic (*Medicago littoralis*). Similar to disc medic in performance. It has been selected for neutral to alkaline

sandy soils, especially deep sandy soil types. Early maturing. Usually used in mixtures. Resistant to blue green aphid. Sowing rate: 3–8 kg/ha. Minimum average annual rainfall for

the variety, 275 mm in Southern NSW.

Variety: Toreador [®]
(Seedmark/PlantTech)

MUREX MEDIC (*Medicago murex*)

Self-regenerating annuals. Grows mainly in winter and spring. Suited to long-term pastures. Sow on good moisture between mid-April and end of May. Suited to a soil pH (Ca) of 4.5 and above. Compared with

subterranean clovers (see below) of similar maturity, murex has a higher proportion of hard seeds, stays greener for longer (particularly during a dry spring), and the residue breaks down more slowly over

summer. Regeneration in subsequent years is variable. Minimum average rainfall for the species: 500 mm Southern NSW.

Sowing rate: 2–6 kg/ha.

Variety: Zodiac (Public variety)

SNAIL MEDIC (*Medicago scutellata*)

Self regenerating annuals. Grows mainly in autumn, winter and spring. Best suited to neutral to alkaline soils in lower rainfall areas of wheat belt and further west.

Suited to long-term pastures. Sow on good moisture between mid-April and end of May. Resists spotted alfalfa aphid; tolerates blue-green aphid. It has vigorous seedlings and good growth in the first year. Variable regeneration from seed reserves in the soil (best on self-mulching soils).

Moderately acceptable to stock. Minimum average rainfall for the species: 400 mm Southern NSW; 500 mm Northern NSW. Sowing rate: 3–7 kg/ha

Select varieties on the basis of:

- **Maturity:** Use earlier maturing varieties in drier more marginal areas of medic zone.
- **Yield and persistence:** Seek local trial information where available.

Seed available:

Variety/brand	Main Seed Source
Early flowering	
Sava	Public variety
Silver	AWB Seeds
Mid flowering	
Essex	AWB Seeds
Late flowering	
Kelson	Seedmark/PlantTech

SPHERE MEDIC (*Medicago sphaerocarpus*)

Self-regenerating annual. It is semi prostrate to erect and can remain green longer into the season than other annual legumes of similar flowering time. Moderate level of

hard seed suitable for crop rotations. It is tolerant of acid soils, although not quite as tolerant as murex medic. Tolerant of red legged earth-mite. Minimum average rainfall for the

species: 350 mm Southern NSW. Sow in autumn at 8 kg/ha.

Seed available: Orion
(Ballard Seeds, Seedmark/PlantTech)

STRAND MEDIC (*Medicago littoralis*)

Self regenerating annual. Grows mainly in winter and spring. Best suited to neutral to alkaline soils in lower rainfall areas of wheat belt and further west.

Suited to long-term pastures. Sow on good moisture between mid-April and end of May. Strand medic is only suited to well-drained soils of sandy texture in low rainfall country.

Minimum average rainfall for the species: 275 mm Southern NSW. Sowing rate: 2–6 kg/ha

Select varieties on the basis of:

- **Aphid resistance:** Blue /green

aphid tolerance desirable.

- **Hard seed levels:** High hard seed levels enhance long-term persistence; softer seeded types enhance regeneration especially in the year after establishment.

- **Maturity:** The earlier the maturity the better suited to lower rainfall areas of the adapted zone.

- **Yield and persistence:** Seek local trial information where available.

Seed available:

Variety	Aphid resistance	Main Seed Source
Mid season, hard seeded		
Harbinger	Susceptible to blue green aphid	Public variety
Mid season, moderately hard seeded		
Harbinger AR	Tolerant of blue green aphid	Public variety
Early maturing, moderately hard seeded		
Herald [®]	Tolerant of blue green aphid	AWB Seeds

PERSIAN CLOVER (*Trifolium resupinatum*)

An autumn and winter spring growing annual with excellent tolerance to waterlogging. Persian clover is moderately tolerant of salinity being superior to subterranean clover but inferior to lucerne in that respect.

Used as a fodder/forage crop; good feed value as hay, pasture or standing hay. Also used as a component in high-density legume crops in cropping rotations.

Good regrowth after grazing. It is suitable in mixtures with short-term ryegrasses. Sow in mid-late autumn (dryland) or early February (irrigated). Sowing rate: 4–10 kg/ha.

There are 2 types of Persian clover: *Trifolium resupinatum* var. *resupinatum* has a more prostrate habit, thinner stems and smaller leaflets. Used in dryland pastures. Hard seed and seed yields are higher than majus. Flowering and maturity are mostly earlier than majus types. Minimum average annual rainfall for this group of Persian clovers is 450 mm (Southern NSW).

Trifolium resupinatum var. *majus* has an erect habit, thick hollow stems and large leaflets. Hard seed level is very low at one to two per cent. Flowering and maturity is mostly late. Used in high density legume crops. Minimum average annual rainfall for this group of Persian clovers is 450 mm (Southern NSW).

Select varieties on the basis of:

- **Use pattern:** Short-term or medium to long-term pasture or high density annual forage as outlined above.
- **Maturity:** Later maturing varieties for irrigation and high rainfall.
- **Hard seed levels:** Higher hard seed levels confer better regeneration potential. Use soft seeded varieties with no or low hard seed levels for annual forage crop, those with high hard seed levels for self-regenerating pastures.
- **Seasonal production:** Select varieties to match feed requirements (check local trial information if available).
- **Disease resistance:** Varieties differ in their resistance to disease. Check local information on the need to have resistance in varieties. Of importance is leaf and stem rust, clover scorch and phytophthora root rot.

Seed available:

Variety/brand	Comment	Main Seed Source
1. <i>Trifolium resupinatum</i> var. <i>resupinatum</i> – self-regenerating, prostrate to semi prostrate types – suitable for short-term – long-term pastures		
Early to mid season, high hard seed levels		
Persian Prolific	Tolerant to clover scorch and Phytophthora root rot	Seedmark/PlantTech Ballard Seeds
Nitro Plus [Ⓢ]	Resistant to clover scorch and Phytophthora root rot	Seedmark/PlantTech
Mid season, high hard seed levels		
Kyambro [Ⓢ]	Tolerance to leaf rust, stem rust and clover scorch	Seedmark/PlantTech
2. <i>Trifolium resupinatum</i> var. <i>majus</i> – Annual semi erect to erect types, suitable for forage/fodder crops. Known in some areas as Shaftal clover.		
Mid season, no hard seed		
Lightning [Ⓢ]	Tolerance to clover scorch, susceptible to leaf rust	Seedmark/PlantTech
Late season, low hard seed levels		
Maral	Susceptible to leaf rust	Public variety
Morbuk	Resistant to clover scorch	Seedmark/PlantTech
Laser [Ⓢ]	Tolerance to leaf/stem rust, clover scorch and Phytophthora root rot	Seedmark/PlantTech

ROSE CLOVER (*Trifolium hirtum*)

An annual self-regenerating legume growing in autumn, winter and spring. Suited to a wide range of soils especially lighter textured soils. It is sensitive to heavy grazing or cutting.

Commonly used in mixtures with medics or subterranean clovers. Sow in autumn. Sowing rate: 0.5–4 kg/ha. Minimum average rainfall for the species: 400 mm in Southern NSW to

650 mm in Northern NSW.

Variety: Hykon – Public variety, (Ballard Seeds)

HYBRID SERRADELLA

This variety is a hybrid between yellow and pink serradella. Suited to light textured soils and tolerant of soil aluminium. It is late maturing.

Sowing rate: 5–10 kg/ha.

Minimum average rainfall for the species: 500 mm in Southern NSW to 600 mm in Northern NSW.

Variety: Grassland Spectra (Heritage Seeds)

SLENDER SERRADELLA (*Ornithopus pinnatus*)

As for yellow serradella but suited to less well-drained soils. Useful in mixtures with yellow serradella. Minimum average rainfall for the

species: 400 mm in Southern NSW to 450 mm Northern NSW. Sow in autumn at 0.5–2.0 kg pod/ha

Seed available:

Jabala (Public variety)
McFarlanes (DM & LA McFarlane)

PINK SERRADELLA (*Ornithopus sativus*)**= French serradella**

As for yellow serradella, especially suited for short-term production (1–2 years), or in pasture mixes to improve the production in the initial years of the pasture. New hard seeded varieties may improve persistence. Early to mid season maturity with improved winter growth. Soft seeded types are

sown as pod in mixtures at 2–4 kg/ha. Hard seeded varieties should be sown with dehulled bare seed at 2–4 kg/ha.

Minimum average annual rainfall for the species: 350 mm in Southern NSW to 400 mm Northern NSW.

Seed available:

Variety/brand	Main Seed Source
Soft seeded erect growth habit	
Cadiz (D)	Ballard Seeds Seedmark/PlantTech AWB Seeds
Hard seeded, prostrate growth habit	
Erica (D)	Ballard Seeds Seedmark/PlantTech
Hard seeded, erect growth habit	
Margurita (D)	Ballard Seeds Seedmark/PlantTech

YELLOW SERRADELLA (*Ornithopus compressus*)

A self-regenerating annual legume, growing in autumn, winter and spring. Suited to deep, sandy, acid soils with moderate to high levels of exchangeable aluminium (except cv. Madeira). Not suited to poorly drained or waterlogged soils.

Seed with hull removed is preferred, if available; podded seed must be treated with hot water before sowing. Mixtures of varieties of different maturities and hard seed levels are useful. Sow in autumn.

Minimum average rainfall for the species: 400 mm Southern NSW, 450 mm Northern NSW. Sowing rate: Seed in pod 2–10 kg/ha, hull removed 0.5–3.0 kg/ha. Enhanced pod is also available (this is partially

processed and consists of a mix of pod and clean seed).

Select varieties on the basis of:

- **Maturity:** Earlier maturing varieties suit drier more marginal areas, late varieties suit high rainfall areas.
- **Hard seed levels:** Medium hard seed levels tend to increase second year production.
- **Soil aluminium:** All varieties have high tolerance to exchangeable soil aluminium except Madeira (low tolerance) and Elgara (moderate to high tolerance).

Note: Elgara seed may be in short supply.

Seed available:

Variety/brand	Main Seed Source
Mid – late season, high hard seed levels	
Avila	Public variety
Early – mid season, high hard seed levels	
Elgara	Public variety
Madeira	Public variety
Early season, medium hard seed levels	
King	G N Lummis Ballard Seeds
Early season, high hard seed levels	
Santorini (D)	Seedmark/PlantTech Ballard Seeds
Charano (D)	Ballard Seeds Seedmark/PlantTech
Very early season, high hard seed level	
Yelbeni (D)	Ballard Seeds

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Quality PASTURE SEEDS

SPECIALISING IN SERRADELLAS



• Santorini, Avilla, Charano, King & Yelbeni Yellow Serradella

• Cadiz, Margurita & Erica French Serradella

• Casbah & Mauro Biserrula

• Prima Gland Clover • Sub Clovers • Persian Clover

• Orion Medic • Crimson Clover • Rose Clover



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SUBTERRANEAN CLOVER (*Trifolium subterraneum*)

A self-regenerating annual. Grows mainly in autumn, winter and spring. Suited to moderately acid to neutral soils. Best suited legume for large areas of southern New South Wales. Resists grazing as seeds are buried.

Ensure reliable seed set and improved persistence by using the most suitable variety for a particular district. Mixtures of varieties can be used to take advantage of extended seasons, for example, by including a slightly longer-season (later maturing) variety, and improve persistence by including a slightly shorter-season (early maturing) variety that has a higher proportion of hard seed. (The subterranean clover varieties are listed from late to early maturity). Sow in early to late autumn.

Minimum average rainfall for the species: 375 mm Southern NSW to 600 mm Northern NSW. Sowing rate: 4–10 kg/ha.

Select varieties on the basis of:

- **Type of sub clover:** Subterranean sub clovers are adapted to neutral to moderately acid soils; Brachycalycinum sub clovers are best suited to neutral to alkaline soils; Yanninicum types of sub clover are especially suited to poorly drained waterlogged soils.
- **Hard seed levels:** High hard seed levels are desirable where persistence is needed in drier parts of the sub clover zone. Low levels suit higher rainfall areas with late maturing varieties (see Appendix VI).
- **Maturity:** Use earlier maturing varieties in drier more marginal areas, and later maturing varieties where spring rainfall is reliable (see Appendix VI).
- **Phytophthora root rot:** Root rot tolerance is important in poorly drained soils in high rainfall areas and under irrigation. There are three known races of Phytophthora root rot. Varieties with resistance to less than all three races are designated as partially resistant in the table.

Seed available:

Variety/brand	Comments	Main Seed Source
Subterranean sub species – Varieties particularly suited to acid to neutral soils		
Very late maturing, very low hard seed levels		
Leura ^(D)	Partially resistant to root rot, susceptible to scorch	Wrightson Seeds
Mid – late maturing, low hard seed levels		
Denmark ^(D)	Partially resistant to root rot, resistant to scorch	Seedmark/PlantTech
Karridale	Partially resistant to root rot, moderately resistant to scorch	Public variety
Mid – late season, moderate hard seed levels		
Goulburn ^(D)	Partially resistant to root rot, resistant to scorch	Pacific Seeds
Limbara		Seedmark/PlantTech
Mid season, low hard seed levels		
Woogenellup	Susceptible to root rot and scorch	Public variety
Mid season, moderate hard seed levels		
June	Susceptible to root rot, resistant to scorch	Public variety
Coolamon		Premier Seeds
Mid season, high hard seed levels		
Campea ^(D)		Seedmark/PlantTech
Early – mid season, very high hard seed levels		
York ^(D)	Partially resistant to root rot, susceptible to scorch	Seedmark/PlantTech
Early – mid season, moderate hard seed levels		
Seaton Park LF	Resistant to root rot, susceptible to scorch	Public variety
Early season, high hard seed levels		
Urana ^(D)	Resistant clover scorch	Auswest Seeds
Losa		Seedmark/PlantTech
Dalkeith	Partially resistant to root rot, susceptible to scorch	Public variety
Very early season, high hard seed levels		
Nungarin	Susceptible to root rot and scorch	Public variety
Izmir		Premier Seeds
		Ballard Seeds
Brachycalycinum sub species – Varieties particularly suited to neutral to alkaline soils		
Mid season, low hard seed levels		
Clare	Susceptible to root rot and scorch	Public variety
Mid season, moderate hard seed levels		
Antas ^(D)		Seedmark/PlantTech
Early – mid season moderate hard seed levels		
Rosedale	Susceptible to root rot, moderately resistant to scorch	Seedmark/PlantTech
Yanninicum sub species – Varieties particularly suited to poorly drained waterlogged soils		
Late season, moderate hard seed levels		
Meteora	Partially resistant to root rot, resistant to scorch	Public variety
Napier ^(D)	Resistant to root rot	Seedmark/PlantTech
	Resistant to scorch	
Mid season, moderate hard seed levels		
Gosse ^(D)	Resistant to root rot and scorch	Seedmark/PlantTech
Riverina ^(D)	Resistant to root rot and scorch	Premier Seeds
Early – mid season, low hard seed levels		
Trikkala	Partially resistant root rot, moderately resistant to scorch	Public variety

- **Red legged earth mites:** Resistance highly desirable. Resistance to red legged earth mite does not necessarily confer resistance to blue oat mite. Urana and Clare have red legged earth mite resistance.
- **Production potential:** Especially

winter production (very dependent on plant density). Long season production is important where late spring conditions occur or where irrigation is available – seek local results where available

- **Oestrogen levels:** Do not grow older varieties as some varieties

(e.g. Dwalganup, Yarloop) can have high levels of plant oestrogens that may result in livestock infertility. All listed varieties have low levels and are unlikely to cause clover disease in sheep.

- **Other diseases:** e.g. clover scorch in particular may be a problem in higher rainfall districts.

WOOLLY POD VETCH (*Vicia villosa*)

Self regenerating annual type of vetch. Grows in autumn, winter and spring. Suited to a wide range of soil types, especially well-drained soils. Does not tolerate waterlogging. Tolerates soils with moderate levels of exchangeable soil aluminium. It can be a weed problem in winter crops. Forage crop vetches are also available. Note that some other species of vetch are marketed that are not self-regenerating and are used

primarily as forage crops rather than for self regenerating pastures.

Sow in autumn. Sowing rate: 4–10 kg/ha. Minimum average rainfall for the species: 550 mm Southern NSW, 650 mm Northern NSW.

Select varieties on the basis of:

- **Hard seed levels:** Soft varieties are useful for short crop rotations. Increasing hard seed levels increase regeneration potential.

- **Productivity:** Especially in winter (consult local trial results if available)

Seed available:

Variety	Main Seed Source
Low hard seeded	
Capello [Ⓢ]	Seedmark/PlantTech
High hard seeded	
Haymaker Plus [Ⓢ]	Seedmark/PlantTech
Namoi	Public variety

Perennials

BIRDSFOOT TREFOIL (*Lotus corniculatus*) (see also Lotus)

Summer active perennial legume especially suited to acidic and lower fertility soils. Low bloat risk. Plants generally short lived, reseeding

needed for long-term persistence. Sow in autumn at 2–3 kg/ha. Minimum average rainfall for the species: 700 mm

Variety: Grasslands Goldie [Ⓢ] (Pacific Seeds, Cropmark Seeds) – Seed may be in short supply.

CAUCASIAN CLOVER (*Trifolium ambiguum*)

Perennial. Spring, summer, autumn growing clover. Spreads by rhizomes. Suited to higher elevated country. Persistent once established. Establishment slow. Ensure weed free

establishment conditions. Sow early autumn or spring in elevated areas at 3 kg/ha. Minimum average rainfall for the species: 700 mm in Southern NSW, 800 mm in Northern NSW.

Variety: Endura [Ⓢ] (Wrightson Seeds)

LOTUS (*Lotus uliginosus* Syn *L. pedunculatus*) (see also Birdsfoot trefoil)

A summer active perennial with main growth in spring and summer. Suited to a wide range of soils, especially acid soils with low fertility. Tolerates moderate salinity. Responds to added phosphorus. In coastal regions it is useful in mixtures with tropical

grasses. Sow in late winter to early spring, or late summer to early autumn. Early growth slow. Low bloat risk. Minimum average rainfall for the species: 900 mm. Sowing rate: 1–2 kg/ha.

Seed available: Grasslands Maku (Heritage Seeds)

LUCERNE (*Medicago sativa*)

Widely grown perennial legume with its main growth in spring, summer and autumn. It is best suited to a wide range of well-drained, slightly acid to alkaline soils (pH (Ca) 5.2–7.5).

Drought resistant. For good persistence it must be grazed or cut on rotation. Can dry out soil profiles to depth.

Usually sown in autumn or in spring (irrigated) when the soil temperature is high enough and there is sufficient moisture for establishment.

Sowing rate: dryland 1–5 kg/ha; irrigated 10–15 kg/ha.

Minimum average rainfall for the species: 375 mm Southern NSW and 400 mm Northern NSW.

Select varieties on the basis of:

Late autumn/winter growth: Select winter activity where winter feed/production is important, where seedling vigour is essential and where persistence is of secondary importance over short-term production. Semi winter dormant and winter dormant types tend to be more persistent under grazing systems that do not allow for adequate rest.

Insects

- **Spotted alfalfa aphid:** Do not grow any variety that is not resistant to spotted alfalfa aphid. Not all varieties marketed are resistant (e.g. Hunter River).

- **Blue green aphid:** Resistance is highly desirable. Not all varieties marketed have resistance (e.g. Hunter River).

Diseases

Resistance to disease is of much greater importance when lucerne is grown under irrigation than when grown dryland.

- **Phytophthora root rot:** Resistance is essential under irrigation and desirable on poorly drained soil types dryland.
- **Anthrachnose:** Desirable to have at least moderate resistance under irrigation and in humid environments. (Note that Anthracnose is the stem symptom of the disease *Colletotrichum crown rot*).
- **Bacterial wilt:** Resistance is desirable on some river systems only (seek local advice).
- **Stem nematode:** Resistance desirable on some river systems only (seek local advice).

Potential hay quality: Highly winter active varieties may be more stalky especially as lucerne stands thin.

Local productivity and persistence: Consult local trial information if available.

See Appendix V for ratings on winter growth, insects and diseases.

Seed available:

Variety/brand	Main Seed Source
Winter dormant	
Pioneer brand L34 HQ Ⓢ	Pioneer Hi-bred
Pioneer brand 54Q53 Ⓢ	Pioneer Hi-bred
Prime Ⓢ	Heritage Seeds
Semi winter-dormant	
Grasslands Kaituna	Wrightson Seeds
Hunter River	Public variety
Pioneer brand L55 Ⓢ	Pioneer Hi-bred
Venus Ⓢ	Seedmark/PlantTech
Winter – active	
Aurora	Public variety
Flairdale Ⓢ	Alfagreen
Genesis Ⓢ	Seedmark/PlantTech
Hallmark Ⓢ	Keith Seeds
Hunterfield	Public variety
Pioneer Brand 57Q75 Ⓢ	Pioneer Hi-bred
Quadrella Ⓢ	Keith Seeds
SARDI SEVEN Ⓢ	Heritage Seeds
SuperAurora Ⓢ	Seed Genetics Australia, Auswest Seeds
Trifecta	Public variety
UQL-1 Ⓢ	Keith Seeds
WL 525HQ	Wrightson Seeds
WL 414	Wrightson Seeds
Highly winter-active	
Aquarius Ⓢ	Seedmark/PlantTech
Cropper Nine	Wrightson Seeds
CUF101	Public variety
Eureka Ⓢ	Heritage Seeds
Pioneer brand L69 Ⓢ	Pioneer Hi-bred
Pioneer brand L90 Ⓢ	Pioneer Hi-bred
Rippa	Pacific Seeds
Salado Ⓢ	Seedmark/PlantTech
SARDI TEN Ⓢ	Heritage Seeds
Sceptre Ⓢ	Heritage Seeds
Sequel	Public variety
Sequel HR Ⓢ	Keith Seeds
Sequence Ⓢ	Seed Genetics Australia, Auswest Seeds
Siriver	Public variety
SuperSiriver Ⓢ	Seed Genetics Australia, Auswest Seeds
WL 612	Wrightson Seeds

RED CLOVER (*Trifolium pratense*)

A short-term (2–3 years) perennial legume. Most growth occurs in summer and autumn. Best suited to well-drained, fertile, slightly acid to neutral soils. Suited to high rainfall with a good proportion of it during summer. Performs best in cool coastal and tablelands areas. Some varieties also used in irrigated pasture mixtures.

Susceptible to root rot. Sow in autumn or spring (irrigation/tablelands).

Minimum average rainfall for the species: 700 mm in the Southern NSW to 800 mm in Northern NSW. Sowing rate: 1–4 kg/ha.

Select varieties on the basis of:

- **Oestrogen level:** Oestrogen can adversely affect performance of breeding stock. (Red clover oestrogen is used in the pharmaceutical trade.)
- **Maturity:** Earlier types usually provide earlier feed in the spring.
- **Ploidy:** Tetraploid types tend to have larger leaves than diploid types
- **Seasonal growth:** Select high productivity to match livestock demand – especially winter growth. See local trial data if available.
- **Stoloniferous habit:** May assist spread and increase persistence.

Seed available:

Variety/brand	Comment*	Main Seed Source
Early maturing diploids		
Grasslands Hamua ('Cowgrass')	High oestrogen	Public variety
Grasslands Sensation [Ⓛ]	Medium oestrogen	Pacific Seeds
Grasslands Colenso [Ⓛ]	Medium oestrogen	PGG Seeds
Early maturing stoloniferous diploids		
Astred [Ⓛ]	Low oestrogen	Wrightson Seeds
Grasslands Broadway [Ⓛ]		PGG Seeds
Early maturing tetraploids		
PAC 19	High oestrogen	Pacific Seeds
Mid season maturing diploids		
Redquin	Low oestrogen	Public variety
Renegade	Medium oestrogen	Wrightson Seeds
Ceres Claret	Medium oestrogen	PGG Seeds
Late season diploids		
Grasslands Turoa	High oestrogen	Public variety
Late season tetraploids		
Grasslands Pawera	High oestrogen	Public variety

*After Charlton D and Stewart A, (2000) Pasture and forage Plants for New Zealand, NZ Grassland Assoc.

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STRAWBERRY CLOVER (*Trifolium fragiferum*)

A perennial similar in growth habit to white clover but not as productive overall. Most growth in spring, summer and autumn. In saline and waterlogged conditions it is useful in mixtures with white clover. It is useful in seepage areas in lower

rainfall areas. Sow in autumn (dryland) or autumn or spring (irrigated). Sowing rate: 0.5–4 kg/ha.

Minimum average rainfall for the species: 600 mm Southern NSW, 650 mm Northern NSW

Varieties available:

Palestine (Public variety)

Grasslands Onward [Ⓢ] (Pacific Seeds)

Grasslands Upward [Ⓢ] (Wrightson Seeds)

WHITE CLOVER (*Trifolium repens*)

A perennial legume with most growth in spring, summer and autumn. Suited to a wide range of soils, being relatively tolerant of acidic soils.

Useful species on infertile land (provided the soil is well fertilised with phosphorus and sulphur). Suited to short or medium-term pasture and irrigated areas. For survival, it needs good summer rainfall or irrigation.

It has a high nutritive value and some varieties tolerate heavy grazing. Sow on good moisture in mid autumn to early winter (dryland) and /or spring (irrigated and tablelands).

Minimum average rainfall for the species: 700 mm Southern NSW to 775 mm Northern NSW. Sowing rate: Normally 1–2 kg/ha, with a range of 0.5–4.0 kg/ha, as a minor component of seed mixtures through to use as dense irrigated stands.

Select varieties on the basis of:

- **Plant habit:** Larger leaved varieties tend to be higher yielding than smaller leaved types. Note that these categories are broad and the characteristics of leaf size and stolon density are continuous (i.e. a variety listed as 'medium' leaf size may be between a medium and a large leaf size. Low growing types tend to be more tolerant of sheep grazing, while more erect varieties tend to be more suited to dairy cattle. The greater the stolon density the greater the variety's ability to spread and survive, especially under close grazing (e.g. sheep vs cattle).
- **Seasonal production:** Overall productivity (especially winter) and persistence: Consult local trial information where available.

Seed available:

Variety/brand	Main Seed Source
Large – leaved	
Aran	Heritage Seeds
El Lucero	Heritage Seeds
Grasslands Kopu [Ⓢ]	Wrightson Seeds
Haifa	Public variety
Kopu II	Wrightson Seeds
Osceola	Wrightson Seeds
Quest	Seedmark/PlantTech
Super Haifa [Ⓢ]	Seed Genetics Australia Auswest Seeds
Super Ladino [Ⓢ]	Seed Genetics Australia Auswest Seeds
Waverley [Ⓢ]	Seedmark/PlantTech
Will Ladino	PGG Seeds
Medium – large leaved	
Grasslands Challenge [Ⓢ]	Wrightson Seeds
Grasslands NuSiral [Ⓢ]	Pacific Seeds
Grasslands Tribute [Ⓢ]	Pacific Seeds
Medium – leaved	
Grasslands Demand [Ⓢ]	Cropmark Seeds
Grasslands Huia	Public variety
Grasslands Pitau	Public variety
Irrigation	Public variety
Mink [Ⓢ]	Heritage Seeds
Sustain [Ⓢ]	Heritage Seeds
Small – leaved, medium stolon density	
Grasslands Prestige [Ⓢ]	PGG Seeds
Grasslands Tahora [Ⓢ]	Wrightson Seeds
Prop	Heritage Seeds

TEMPERATE GRASSES

COCKSFOOT (*Dactylis glomerata*)

A tussocky perennial grass suited to low fertility soils. Tolerates acid soils. Moderately persistent under good grazing management. In drier situations, it will perform better at higher altitudes. Sow in autumn or spring (irrigated and tablelands). Minimum average rainfall for species: 450 mm Southern NSW, 750 mm Northern NSW. Sowing rate: 1–3 kg/ha.

Select varieties on the basis of:

- **Plant type:** Varieties of Mediterranean origin tend to be less erect in habit and are less sensitive to grazing pressure than those of European origin that tend to be more erect and summer active.

They are less forgiving of harsh grazing. Mediterranean varieties have greater summer dormancy than European varieties. They have a greater chance of persisting in a summer dry environment (e.g. southern NSW) than a summer active variety. Intermediate types have characteristics between the two main plant types.

- **Rust resistance:** Check details of the resistance of varieties if located in a high rainfall area (e.g. Northern Tablelands). Rust reduces yield, especially in autumn.
- **Performance:** Persistence and seasonal productivity – check local trial results where available.

Seed available:

Variety/brand	Main Seed Source
Mediterranean type, high summer dormancy	
Kasbah	Seedmark/ PlantTech
Mediterranean type, moderate summer dormancy	
Currie	Public variety
Gobur	Vicseeds
Intermediate type, summer active	
Porto	Public variety
Grasslands Kara [Ⓛ]	PGG Seeds
Grasslands Tekapo	Wrightson Seeds
Howlong	Heritage Seeds
Grasslands Vision [Ⓛ]	Cropmark Seeds
Grasslands Wana	Cropmark Seeds
Yarck	Vic Seeds

GRAZING BROME (*Bromus stamineus*)

A perennial grass closely related to prairie grass but finer-leaved and finer tillered but resistant to head smut. Most growth in the winter-spring. Suited to well-drained soils. It requires close frequent grazing to

perform well and persist.

Sow in autumn. Sowing rate: 25 kg/ha. Minimum average rainfall: 600 mm in Southern NSW to 750 mm in Northern NSW.

Variety: Grasslands Gala [Ⓛ]
(PGG Seeds)

PASTURE BROME (*Bromus valdivianus*)

A perennial providing most growth in the spring/summer period with moderate growth in winter. Suited to fertile, well-drained soils.

Sowing rate 25–30 kg/ha. Suggested minimum average annual rainfall, 600 mm in Southern NSW, 750 mm in Northern NSW

Variety: Bareno (Heritage Seeds)

PERENNIAL VELDT GRASS (*Ehrharta calycina*)

Most growth in autumn, spring and summer. Suited to light sandy soils and useful for erosion control. Sow in autumn or early spring. Sensitive to heavy grazing. Rotational grazing preferred for good persistence.

Sowing rate: 0.5–3.0 kg/ha.

Average annual rainfall: 550 mm Southern NSW, 600 mm in Northern NSW

Variety: Mission (Public variety)

PHALARIS (*Phalaris aquatica*)

Perennial. Grows mainly in late autumn, winter and spring. Suited to fertile soils. Sensitive to acid soils. Tolerates wet soils, flooding, and moderately saline soils. Can be very persistent.

All varieties can cause phalaris poisoning. Rotational grazing preferred, especially for semi erect and erect types. Sow in autumn or early spring (irrigated and tablelands).

Sowing rate: 1–3 kg/ha. Minimum annual rainfall: 525 mm Southern NSW and 700 mm in Northern NSW

Select varieties on the basis of:

- **Plant habit:** The more prostrate types are more competitive with weeds, but tend to have less winter production and when well established tend to be more persistent. Erect types require greater attention to grazing management techniques where persistence is a priority.
- **Seedling vigour:** Phalaris is difficult to establish and as such better seedling vigour can enhance establishment, particularly in drier marginal establishment conditions. The more erect varieties have greater seedling vigour.

- **Need for summer dormancy:** In areas where summer storms may encourage growth and where good growing conditions are unlikely to follow, summer dormancy is a defence mechanism that may enhance persistence. This is important in areas such as the northern slopes and western areas of the State.
- **Phalaris poisoning potential:** While all varieties can potentially cause poisoning, some have been selected to reduce the risk. In

areas with a known problem, selection for this aspect may assist, although livestock management of this problem is critical.

- **Acid soil tolerance:** Phalaris as a species is relatively intolerant of soil acidity especially where soil aluminium is high and phosphorus fertility low. In marginal situations selection for improved tolerance may assist.
- **Performance:** Seek local trial results (if available), for seasonal yields and persistence.

Seed available:

Variety	Comment	Main Seed Source
Prostrate, semi winter dormant, low summer dormancy		
Australian		Public variety
Uneta		Public variety
Grasslands Maru		Wrightson Seeds
Australian II (D)		Seedmark/PlantTech
Semi erect to erect, winter active, low summer dormancy		
Sirosa		Public variety
Sirolan		Public variety
Holdfast (D)	Improved acid soil tolerance	Seedmark/PlantTech
Landmaster (D)	Improved acid soil tolerance	Seedmark/PlantTech
Erect, winter active, medium to high summer dormancy		
Atlas PG (D)		Seedmark/PlantTech

PRAIRIE GRASS (*Bromus willdenowii*)

An annual to short-lived perennial. Most growth in autumn, winter and spring. Suited to fertile, well-drained soils. Must be rotationally grazed for good production and persistence. Sow in autumn. Sowing rate: 7–60 kg/ha up to 40–60 kg/ha for under irrigation. Minimum average rainfall: 850 mm

Seed available:

Grasslands Matua (Wrightson Seeds)
Atom (PGG Seeds)
Tango (Pacific Seeds)

PUCCINELLIA (*Puccinellia ciliata*)

Perennial. Growth in autumn, winter and spring; dormant in summer. Tolerates saline soils better than tall wheatgrass, but is less vigorous. Tolerant of poorly drained areas. Sown generally in mixtures, with tall wheatgrass and strawberry clover, except in very saline soils. Sow in

autumn (dryland); autumn or late winter to early spring (irrigated). Low production. Sensitive to heavy grazing. Sowing rate: 3 kg/ha.

Minimum average annual rainfall for this species: 400 mm Southern NSW
500 mm Northern NSW.

Variety: Menemen (Puccinellia is also sold as sweet grass) – Public variety

RYEGRASS – PERENNIAL (*Lolium perenne*)

A highly nutritious winter/spring growing perennial. It is best suited to fertile soils. Low drought resistance. Short-lived on North Coast. In drier situations it suits higher altitudes. Minimum average annual rainfall 700 mm in Southern NSW, 800 mm in Northern NSW. Sowing rate: 3–20 kg/ha.

Select varieties on the basis of:

- **Maturity:** Earlier flowering varieties tend to be suited to the drier areas of the perennial ryegrass zone. These varieties tend to produce feed earlier in winter, and less yield later in spring. Later maturity enables later feed production where moisture (e.g. irrigation) and temperature permit.
- **Plant type:** Tetraploid types have double the number of chromosomes that diploid types have. This characteristic means that plant cells are larger, and as a consequence, plant parts tend to be larger (e.g. larger leaves). There is some evidence that they are more palatable than diploid types. They produce well under high input systems of management.
- **Rust resistance:** On the coast and in humid growing areas, resistance to rust can be very important. Check with your seed source as to latest rust resistance information for your area.
- **Persistence and seasonal production:** Refer to local trial results (if available).

- **Endophyte:** Endophyte is a fungus living within the plant and capable of producing toxins. The type of endophyte present can affect production and/or persistence. High endophyte ryegrass has been associated with better establishment and persistence, although detrimental effects including ryegrass staggers and other production losses have been attributed to the presence of specific endophytes. The effects in NSW have yet to be clarified although positive effects on establishment and persistence are apparent on the South Coast where black beetle is a problem. Varieties are available with or without endophyte.

Varieties are now available that contain novel endophyte. Meridian Plus AR1, Cannon AR1, Bronsyn Plus AR1 and Samson AR1 contain AR1 endophyte. This endophyte relies on peramine to deter insects and produces no ergovaline (potential cause of a number of livestock health disorders) and no lolitrem B (cause of ryegrass staggers).

The varieties Boomer, Camel, Roper and Prolong sold under the brand 'Staggerfree' have no endophyte and hence no lolitrem B. Other varieties listed may or may not contain endophyte. (see NSW Agric. Agfact P2.3.9 - *Endophytes of perennial ryegrass and tall fescue* for further information).

Seed available:

Variety/brand	Main Seed Source
Very early maturing diploids	
Boomer ^(D)	Valley Seeds
Fitzroy ^(D)	Wrightson Seeds
Kangaroo Valley	Public variety
Matilda	Parkseeds
Meridian ^(D)	Heritage Seeds
Meridian Plus AR1 ^(D)	Heritage Seeds
Skippy	Vicseeds
Early maturing diploids	
Ausvic ^(D)	Vicseeds
Camel ^(D)	Valley Seeds
Kingston ^(D)	PGG Seeds
Roper ^(D)	Valley Seeds
Victorian	Public variety
Mid season diploids	
Aries HD ^(D)	Wrightson Seeds
Avalon ^(D)	Vicseeds
Bronsyn ^(D)	Heritage Seeds
Bronsyn Plus AR1 ^(D)	Heritage Seeds
Cannon	PGG Seeds
Cannon AR1	PGG Seeds
Embassy	Pacific Seeds
Extreme	Wrightson Seeds
Grasslands Nui	Public variety
Lincoln ^(D)	Wrightson Seeds
Prolong ^(D)	Valley Seeds
Samson ^(D)	Pacific Seeds
Samson AR1 ^(D)	Pacific Seeds
Late season tetraploids	
Grazmore ^(D)	Seedmark/ PlantTech
Quartet ^(D)	Wrightson Seeds

RYEGRASS – SHORT-TERM FORAGE

This large group of ryegrasses range from those suited for use as annual forage crops to varieties with a high content of perennial component which are capable of producing good yields of good quality forage under good management and growing conditions for up to 3 years. They require high fertility soil and good moisture for best results. Minimum average rainfall, 750 mm in Southern NSW, 800 mm in Northern NSW. Sowing rate: 8–25 kg/ha. 2 kg/ha useful in mixtures with short-term legumes.

Select varieties on the basis of:

- **Length of production period needed:** (1–3 years).
- **Maturity:** Earlier flowering varieties tend to be suited to the drier areas of the perennial ryegrass zone. These varieties produce feed earlier in the winter, and less later in the spring. Later maturity enables later feed production where moisture (e.g. irrigation) and temperature permit.

- **Plant type:** Tetraploid types have double the number of chromosomes that diploid types have. This characteristic means that plant cells are larger, and as a consequence, plant parts tend to be larger (e.g. larger leaves). There is some evidence that they are more palatable than diploid types. They produce well under high input systems of management.
- **Rust resistance:** On the coast and in humid growing areas, resistance

to rust can be very important. Check with your seed source as to latest rust resistance information for your area.

- **Persistence and seasonal production:** refer to local trial results (if available).
- **Endophyte:** Endophyte is a fungus living within perennial ryegrass and capable of producing toxins. The type of endophyte present can affect production and/or persistence. High endophyte ryegrass has been associated with better establishment and persistence, although detrimental affects including ryegrass staggers and other production losses have been attributed to the presence of specific endophytes. The effects in NSW have yet to be clarified although positive effects on establishment and persistence are apparent on the South Coast where black beetle is a problem.

Varieties are now available that contain novel endophyte (i.e. AR1). They are Grasslands Supreme ^{Plus} AR1, Impact Plus AR1 and Galaxy AR1. This endophyte (AR1) relies on peramine to deter insects and produces no ergovaline (potential cause of a number of livestock health disorders) and no lolitrem B (cause of ryegrass staggers). Other varieties listed may or may not contain endophyte. (see NSW Agric. Agfact P2.3.9 - *Endophytes of perennial ryegrass and tall fescue* for further information).

Perennial type hybrids

These hybrids have more perennial component than Italian rye in their breeding. They are generally capable of 2-3 years production with potential for extended life under good management and seasonal conditions.

Matrix is a perennial ryegrass hybrid with *Festuca pratensis* (meadow fescue). It has similar characteristics and management requirements to

perennial ryegrass hybrids with other *Lolium* spp and is included in this category for these reasons.

Seed available:	
Varieties/brand	Main Seed Source
Mid season flowering diploid	
Grasslands Supreme ^{Plus}	Pacific Seeds
Grasslands Supreme ^{Plus} AR1	Pacific Seeds
Mid season flowering tetraploid	
Grasslands Greenstone [Ⓢ]	Pacific Seeds
Horizon	PGG Seeds
Mid - late season flowering tetraploid	
Banquet [Ⓢ]	Wrightson Seeds
Boxmore	Seedmark/PlantTech
Late season flowering diploid	
Impact [Ⓢ]	Heritage Seeds
Impact Plus AR1 [Ⓢ]	Heritage Seeds
Matrix [Ⓢ]	Cropmark

Italian ryegrass (*Lolium multiflorum*)

These varieties are capable of producing for 1-2 years under suitable growing conditions and management.

Seed available:	
Variety/brand	Main Seed Source
Early season flowering diploid	
Dargo [Ⓢ]	Vicseeds
Mid season flowering diploid	
Caversham	Wrightson Seeds
Eclipse [Ⓢ]	Valley Seeds
Late season flowering diploid	
Concord	Wrightson Seeds
Conquest	Wrightson Seeds
Crusader [Ⓢ]	PGG Seeds
Dargle [Ⓢ]	Pacific Seeds
Flanker [Ⓢ]	Heritage Seeds
Grasslands Status ^{Plus} [Ⓢ]	Pacific Seeds
Grasslands Warrior [Ⓢ]	Pacific Seeds
Mariner [Ⓢ]	Heritage Seeds
Marbella [Ⓢ]	Pacific Seeds
Tabu [Ⓢ]	Heritage Seeds
Late season flowering tetraploid	
Feast II	Wrightson Seeds

Italian type hybrids

These varieties have less perennial component than Italian ryegrass, and are capable of contributing worthwhile production for 1-2 years.

Seed available:	
Variety/brand	Main Seed Source
Mid season flowering diploid	
Geyser	PGG Seeds
Mid season flowering tetraploid	
Galaxy	PGG Seeds
Galaxy AR1	PGG Seeds
Late season flowering diploid	
Maverick Gold [Ⓢ]	Wrightson Seeds

Annual Italian ryegrasses (*Lolium multiflorum*)

These varieties/brands are limited to one years' production only - grown as a forage crop. This group is also referred to as the Westerwolds (or Westerwolds) ryegrasses.

Seed available:	
Varieties/brand	Main Seed Source
Early flowering diploids	
Aristocrat	Public
Noble [Ⓢ]	Valley Seeds
Early flowering tetraploids	
Betta Tetila	Parkseeds
Drummer	Seedmark/PlantTech
Growmore Plus	Seedmark/PlantTech
New Tetila	Vicseeds
Tetila (USA)	Public variety
Tetila Gold	Upper Murray Seeds, Seedmark/PlantTech
Mid season flowering diploids	
Ceres Missile	PGG Seeds
Progrow [Ⓢ]	Valley Seeds
Surrey	Heritage Seeds
Mid season flowering tetraploids	
Andy	Cropmark
Grasslands Tama	Public variety
Robust [Ⓢ]	Seedmark/PlantTech, Upper Murray Seeds
T Rex	Heritage Seeds
Winter Star	Wrightson Seeds

RYEGRASS – ANNUAL (*Lolium rigidum*)

Annual self-regenerating aggressive winter-spring growing ryegrass. Suited to drier margin of ryegrass zone. Note that this species can be a weed in winter crops. Annual ryegrass toxicity, ergot and herbicide resistance can be a problem with this

species. Minimum average annual rainfall: 400 mm in Southern NSW, 600 mm in Northern NSW. Usually sown at 15 kg/ha when sown alone or 5–10 kg/ha in a mixture.

Varieties:

Guard [Ⓢ] (Valley Seeds) – selected for resistance to Annual Ryegrass Toxicity

Wimmera (Public variety)

TALL FESCUE (*Festuca arundinacea*)

Perennial. It is suited to a wide range of soils and tolerant of acid and moderately saline soils, but also tolerates short periods of flooding. It is moderately persistent and drought tolerant depending on plant type and situation. In drier areas it is best suited to high altitudes. Sow in autumn or spring (irrigated and tablelands).

Sowing rate: 6–15 kg/ha. Minimum annual rainfall for temperate fescue: 650 mm with a summer dominance and 450 mm (winter dominant) for Mediterranean types (see below)

Select varieties on the basis of:

- **Plant type:** Two types are marketed – Temperate and Mediterranean. Temperate types grow vigorously in spring, summer and autumn but less in winter. They are adapted to those areas with summer dominant rainfall and higher elevated areas or under irrigation. Mediterranean types have a more pronounced winter and spring production but are dormant over summer and so are more tolerant of summer moisture stress than temperate types.
- **Seedling vigour:** Fescue is slow to establish. Varieties with improved seedling vigour may enhance establishment.
- **Rust resistance:** Rust can be a problem in the autumn especially in high rainfall districts. Select varieties with high rust resistance where rust is known to be a problem.
- **Performance:** Seek local trial results (if available), for seasonal yields and persistence.
- **Endophyte:** Endophyte is a fungus living within the plant and

Seed available:		
Variety/brand	Comments	Main Seed Source
Temperate type, very early flowering		
AU Triumph		Wrightson Seeds
Dovey		Heritage Seeds
Quantum		Wrightson Seeds
Quantum Max P		Wrightson Seeds
Temperate type, mid – late flowering		
Advance [Ⓢ]		Pacific Seeds
Advance Max P [Ⓢ]		Pacific Seeds
Demeter		Public variety
Jesup		Pacific Seeds
Jesup Max P		Pacific Seeds
Lunibelle		Cropmark
Torpedo	More rhizomatous habit	PGG Seeds
Typhoon		PGG Seeds
Temperate type, late flowering		
Vulcan II		Wrightson Seeds
Mediterranean type, mid season flowering (= 'winter active - summer dormant types')		
Flecha [Ⓢ]		Pacific Seeds
Flecha Max P [Ⓢ]		Pacific Seeds
Fraydo [Ⓢ]		Seedmark/PlantTech
Prosper [Ⓢ]		Heritage Seeds
Resolute [Ⓢ]		Wrightson Seeds
Resolute Max P [Ⓢ]		Wrightson Seeds

capable of producing toxins. The type of endophyte present can affect production and /or persistence. Varieties of fescue sown in recent years do not contain endophyte, although endophyte have been detected in tall fescue in NSW. The distribution is unknown.

The novel endophyte Max P (Max Q overseas) is now available. This endophyte produces Peramine and

Loline to deter insect attack, but no ergovaline (the potential cause of a number of livestock health disorders) (see NSW Agric. Agfact P2.3.9 - *Endophytes of perennial ryegrass and tall fescue* for further information).

- **Other factors** that may be of importance are maturity, leaf digestibility or quality, rhizomatous spread potential.

TALL WHEATGRASS (*Thinopyrum ponticum*)

Perennial. Grows mainly in spring and autumn. Suited to saline, poorly drained soils. Sow in early autumn for best results (dryland) or late winter to early spring (irrigated and

high rainfall). Slow to establish. Tall growth. Useful pioneering species in saline soils. Sowing rate: 3–12 kg/ha. Minimum average annual rainfall: 400 mm Southern NSW, 500 mm Northern NSW

Varieties:

Tyrrell (Public variety)
Dundas ♂ (Wrightson Seeds) – selected for increased feed quality.

TIMOTHY (*Phleum pratense*)

A shallow rooted tufted perennial, growing in spring, summer and autumn. Grows best in high fertility, high moisture holding capacity soils in areas not prone to drought. Has

high livestock acceptability. Minimum average annual rainfall 900 mm (winter dominant). Sowing rate 1–2 kg/ha in mixtures, 5–8 kg/ha alone as the only grass.

Varieties:

Viking (PGG Seeds)
Charlton (Pacific Seeds)

WALLABY GRASS (*Austrodanthonia* spp.)

A perennial drought tolerant year-long green native grass. Will tolerate low soil fertility but will respond to fertiliser applications if soil is deficient in nutrients. Sow in late autumn/early winter, no deeper than 0.5 cm.

Sowing rate: 0.3–2.0 kg/ha.

Minimum average annual rainfall; 400 mm Southern NSW, 500 mm Northern NSW

Select varieties on the basis of adaptation to soil type. Seed is very scarce and expensive.

Varieties:

Taranna ♂ (*A. richardsonii*), suited to medium textured soils (Premier Seeds)
Bunderra ♂ (*A. bipartita*), Heavy textured clay soils (Native Seeds P/L)

Seedwise Pasture Mixes

- ◆ Pasture legumes
- ◆ Pasture grasses
- ◆ Perennial herbs
- ◆ **Seedwise** Regional mixes
- ◆ **Seedwise** Coated pasture products
- ◆ **Seedwise** Custom blends to suit your environment



Contact AUSWEST SEEDS on Ph: 02-6852 1500 Fax: 02-6852 1393
Email: auswest@auswestseeds.com.au Web: www.auswestseeds.com.au

ONE SUPPLIER – ALL SEED VARIETIES – ANY MIX YOU NEED

APPENDIX X. Sources of pasture seed listed in this guide

These sources are the primary sources of seed. They are in many cases the head licensee for that variety or a contact that will be useful if seed cannot be sourced readily through a retailer.

Alfagreen Pty Ltd:

29 Elm Avenue
KEITH SA 5267
Ph: (08) 8755 1298
Fax: (08) 8755 1713
Email: alfagreen@cmsfirst.net
Web: www.cmsfirst.net/alfagreen.html

Auswest Seeds:

Tobias Street
FORBES NSW 2871
Ph: (02) 6852 1500
Fax: (02) 6852 1393
Email: auswest@auswestseeds.com.au
Web: www.auswestseeds.com.au

AWB Seeds:

PO Box 17
DIMBOOLA VIC 3414
Ph: (03) 5389 0150
Fax: (03) 5389 1121
E-mail: awbseeds@awb.com.au
Web: www.awbseeds.com.au

Ballard Seeds:

PO Box 7
TINCURRIN WA 6361
Ph: (08) 9883 2005
Fax: (08) 988 32063
Email: ballardseeds@westnet.com.au

Cropmark Seeds Pty Ltd:

475 Mickleham Road
ATWOOD VIC 3049
Ph: 1800 889 039
Fax: 1800 889 037
Email: nigeljohanson@bigpond.com.au
Web: www.cropmark.com.au

DM & IA McFarlane

'Westport'
NARRABRI WEST 2390
Ph: (02) 6793 2154

Heritage Seeds:

Heritage Seeds Pty Ltd
PO Box 4020
MULGRAVE VIC 3170
Ph: (03) 9561 9222
Fax: (03) 9561 9333
Email: sebast@heritageseeds.com.au
Web: www.heritage-seeds.com.au

Keith Seeds:

Keith Seeds Pty Ltd
PO Box 123
KEITH SA 5267
Ph: (08) 8755 1777
Fax: (08) 8755 1815
Email: admin@keithseeds.com

GN Lummis:

'Wilga View'
GILGANDRA NSW 2827
Ph: (02) 6848 5010
Fax: (02) 6848 5010
Email: noeline@tpg.com.au

G&J Godfrey:

MUTCHILBA QLD 4872
Ph: (07) 4093 1245
Fax: (07) 4093 1245
Email: godfrey@pintopeanut.com.au
Web: www.pintopeanut.com.au

Native Seeds Pty Ltd:

PO Box 133
SANDRINGHAM VIC 3191
Ph: (03) 9521 6473
Fax: (03) 9598 7895
Email: enquiries@nativeseeds.com.au
Web: www.nativeseeds.com.au

Newseeds:

PO Box 33
BALLDALE NSW 2646
Ph: (02) 6035 1222
Fax: (02) 6035 1229

Pacific Seeds:

Pacific Seeds Pty Ltd
PO Box 1217
ALTONA MEADOWS VIC 3028
Ph: (03) 9369 355
Fax: (03) 9369 6129
Email: pastures@pac.com.au
Web: www.pacificseeds.com

Parkseeds Pty Ltd:

RMB 2150
MANSFIELD VIC 3722
Ph: (03) 5779 1888
Fax: (03) 5775 1407
Email: parkseeds@parkseeds.com.au

PGG Seeds:

PGG Seeds
PO Box 532
BAULKHAM HILLS NSW 2153
Ph: 0407 263 826
Fax: (02) 9686 9735
Email: dbaker@pggseeds.com
Web: www.pggseeds.com

Pioneer Hi-Bred Aust. Pty Ltd:

PO Box 4043
BENDIGO VIC. 3550
Ph: (03) 5444 1434
Fax: (03) 5441 7899
Email: kevin.morthorpe@pioneer.com
Web: www.pioneer.com/australia

Seedmark/PlantTech Pty Ltd:

2 Selwyn Court
THURGOONA NSW 2640
Ph: 0412 655 158
Fax: (02) 6043 2921
Email: dmckenzie@planttech.com.au

Premier Seeds (Lachlan Valley Seeds):

Tobias Street
FORBES NSW 2871
Ph: (02) 6852 1500
Fax: (02) 6852 1393
Email: auswest@auswestseeds.com.au

Progressive Seeds:

Lot 2 Lake Manchester Road
MT CROSBY QLD 4306
Ph: (07) 3201 1741
Fax: (07) 3201 1006
Email: info@pseeds.com.au

Seed Genetics Australia Pty Ltd:

PO Box 492
MITCHAM SA 5062
Ph: (08) 8271 6000
Fax: (08) 8271 6077
Email: mharvey@seedgeneticsaustralia.com
Web: www.seedgeneticsaustralia.com

Selected Seeds:

PO Box 210
PITTSWORTH QLD 4356
Ph: (07) 4693 1800
Fax: (07) 4693 1899
Email: tonyilling@selectedseeds.com.au

Upper Murray Seeds:

Tumbarumba Road
TOOMA NSW 2642
Ph: (02) 6948 4497
Fax: (02) 6948 4494

APPENDIX X. Sources of pasture seed listed in this guide
(continued)

Valley Seeds:

Valley Seeds Pty Ltd
295 Maroondah Link Hwy
ALEXANDRIA VIC 3714
Ph: (03) 5797 6203
Fax: (03) 5797 6307
Email: info@valleyseeds.com

Vicseeds Production Pty Ltd:

PO Box 1544
GEELONG VIC 3220
Ph: (03) 5221 7577
Fax: (03) 5221 7877
Email: vicseeds@vicseeds.com.au
Web: www.vicseeds.com.au

Wrightson Seeds:

Wrightson Seeds (Aust) Pty Ltd
85 Cherry Lane
LAVERTON NORTH VIC. 3026
Ph: (03) 9931 6600
Fax: (03) 9931 6601
Email: robecbles@bigpond.com.au

Annual legume and perennial grasses

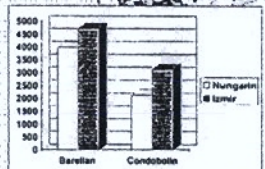


Belinda Hackney and Brian Dear
WAGGA WAGGA
AGRICULTURAL INSTITUTE

NSW DEPARTMENT OF
PRIMARY INDUSTRIES

New legume varieties

- Sub clovers
- Izmir
 - Early maturing alternative to Nungarin
 - Flowers about 110 days after mid May sowing
 - 360 mm+ rainfall
 - Very high hard seed to carry over under cereal crop 1:1 rotation
 - Target environment low rainfall WA wheat belt



NSW DEPARTMENT OF
PRIMARY INDUSTRIES

New legume varieties

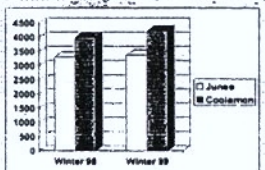
- Sub clovers
- Urana
 - Alternative to Daliak
 - Fits between Dalkeith and Seaton Park
 - 400-500 mm rainfall
 - More hard seed to withstand false breaks
 - Yield about 14% better than Dalkeith
 - Susceptible to root rot but not a problem in target area



NSW DEPARTMENT OF
PRIMARY INDUSTRIES

New legume varieties

- Sub clovers
- Coolamon
 - Alternative to Junee
 - 12 % more autumn-winter production
 - 16% more spring production
 - 12% more seedlings
 - More erect than Junee
 - Resistant to Racel and 2 clover scorch
 - Seed yield 6% higher
 - 450-550 mm rainfall



NSW DEPARTMENT OF
PRIMARY INDUSTRIES

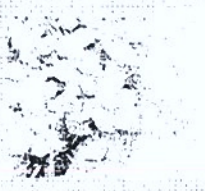
Sub clover cultivars

Cultivar	Days to flower (Wagga)	Maturity	Hard seed	Rainfall Southern NSW
Izmir	110	Very early	Very High	>360
Nungarin	110	Very early	High	>360
Dalkeith	120	Early	High	>375
Urana	125	Early	High	>400
Seaton Park LP	130	Early-mid	Moderate	>425
York	130	Early-mid	High	>425
June	138	Mid season	Moderate	>475
Coolamon	138	Mid season	Moderate	>475
Goulburn	145	Mid-Late	Low-moderate	>550
Denmark	149	Late	Low	>650
Leura	155	Late	Low	>700

NSW DEPARTMENT OF
PRIMARY INDUSTRIES

New legume varieties

- Napier - yanninicum sub clover
 - Replace Larisa and Meteora
 - More hardseeded than Larisa
 - 35% more plants than Larisa in 3rd year
 - 5% more autumn feed than Larisa
 - 7% more winter feed than Larisa
 - 15% more spring feed than Larisa
 - 46% more spring feed than Trikkala
 - only suited to irrigation or long growing season 750 mm+ (late Nov)



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PRIMARY INDUSTRIES

yanninicum cultivars

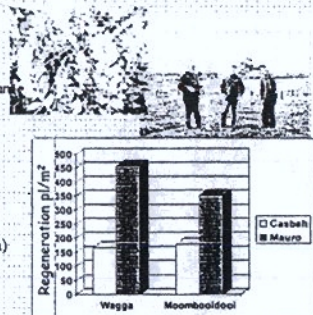
Cultivar	Days to flower (Wagga)	Maturity	Hard seed	Rainfall Southern NSW
Trikkala	122	Mid season	Low	>500
Riverina	128	Mid season	Moderate	>525
Gosse	136	Mid-late	Moderate	>600
Larisa	150	Late	Moderate	>750
Napier	150	Very late	High	>800 (irrig)
Meteora	158	Very late	High	>800 (irrig)

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New legume varieties

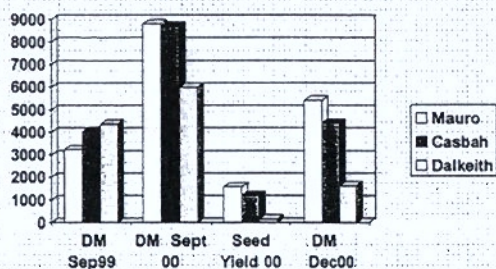
Biserrula

- Cv Mauro
- 10 days later flowering than Casbah (ca 120 days)
- Hard seeded (70%) but less than Casbah (87%)
- Direct head seed
- Limited herbicide choice
- Used to control herbicide resistant ryegrass
- High yield potential (9t/ha)
- Need to manage regeneration



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Biserrula-Wagga

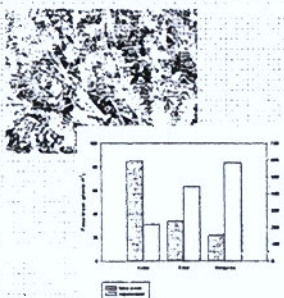


NSW DEPARTMENT OF PRIMARY INDUSTRIES

New legume varieties

French serradella

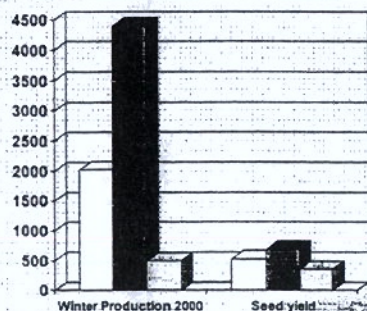
- Erica and Margurita
- Direct header harvest of seed, 400-900 kg seed /ha
- Selected at Wagga and Ardlethan
- More hard seeded (ca 50%) than Cadiz
- 375 mm+ rainfall Sth NSW
- Will regenerate after 1-2 years crop
- Tolerant acid soils



NSW DEPARTMENT OF PRIMARY INDUSTRIES

New French Serradella cultivars

Erica Margurita Cadiz

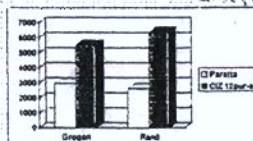


NSW DEPARTMENT OF PRIMARY INDUSTRIES

In the pipeline

Purple Clover

- Replacement for Paratta
- Resistance to clover scorch
- Deep rooted, flower at 140-150 days
- Adaptable to wide range of soils
- Highly persistent at Grogan and Rand

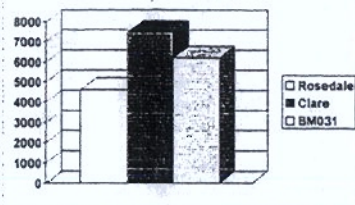


NSW DEPARTMENT OF PRIMARY INDUSTRIES

In the pipeline

Brachycalycinum sub clover

- Replacement for Rosedale
- Rosedale hybrid
- Less hardseed than Rosedale for better regeneration
- Higher hardseed than Clare for protection from false breaks
- Evaluated at Urana and Grogan

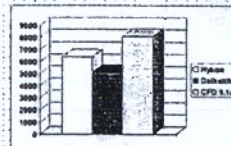


NEW DEPARTMENT OF
PRIMARY INDUSTRIES

In the pipeline

Rose clover

- Higher hardseed
- Improved harvestability
- Higher herbage production compared to Hykan
- Evaluated at Rand



NEW DEPARTMENT OF
PRIMARY INDUSTRIES

Current evaluations

- Bolana clover - mid season selecting for higher winter production than Paradana
- Grogan and Cookardinia
- RLEM tolerant sub clover - mid and late season types
- Wagga, Gerogery and Harden
- Spotted medic - *Medicago arabica* suited to waterlogged soils
- Cookardinia



NEW DEPARTMENT OF
PRIMARY INDUSTRIES

Current evaluations

- Late purple clover
- Holbrook
- Mid-late French serradella
- Holbrook and Binalong
- Late straight pod yellow serradella
- Holbrook and Binalong
- Slender serradella
- Holbrook and Binalong
- Diffuse clover
- Gerogery



NEW DEPARTMENT OF
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Current evaluations



Diffuse clover



NEW DEPARTMENT OF
PRIMARY INDUSTRIES

NAPLIPs record

- Coulburn
- Denmark
- Leura
- Gosse
- Riverina
- Seaton Park LF
- York
- Napier
- Urana
- Izmir
- Boltra balansa
- Frontier balansa
- Prima gland clover
- Erica and Margurita French serradella
- Yelbini yellow serradella
- Mauro biserrula
- Mogul medic
- Caliph medic
- Herald medic
- Jester
- Toreador medic
- Scimitar
- Cavalier medic
- New rose clover
- New brachycalycinum cultivar
- New purple clover
- New strawberry
- New sulla cultivar

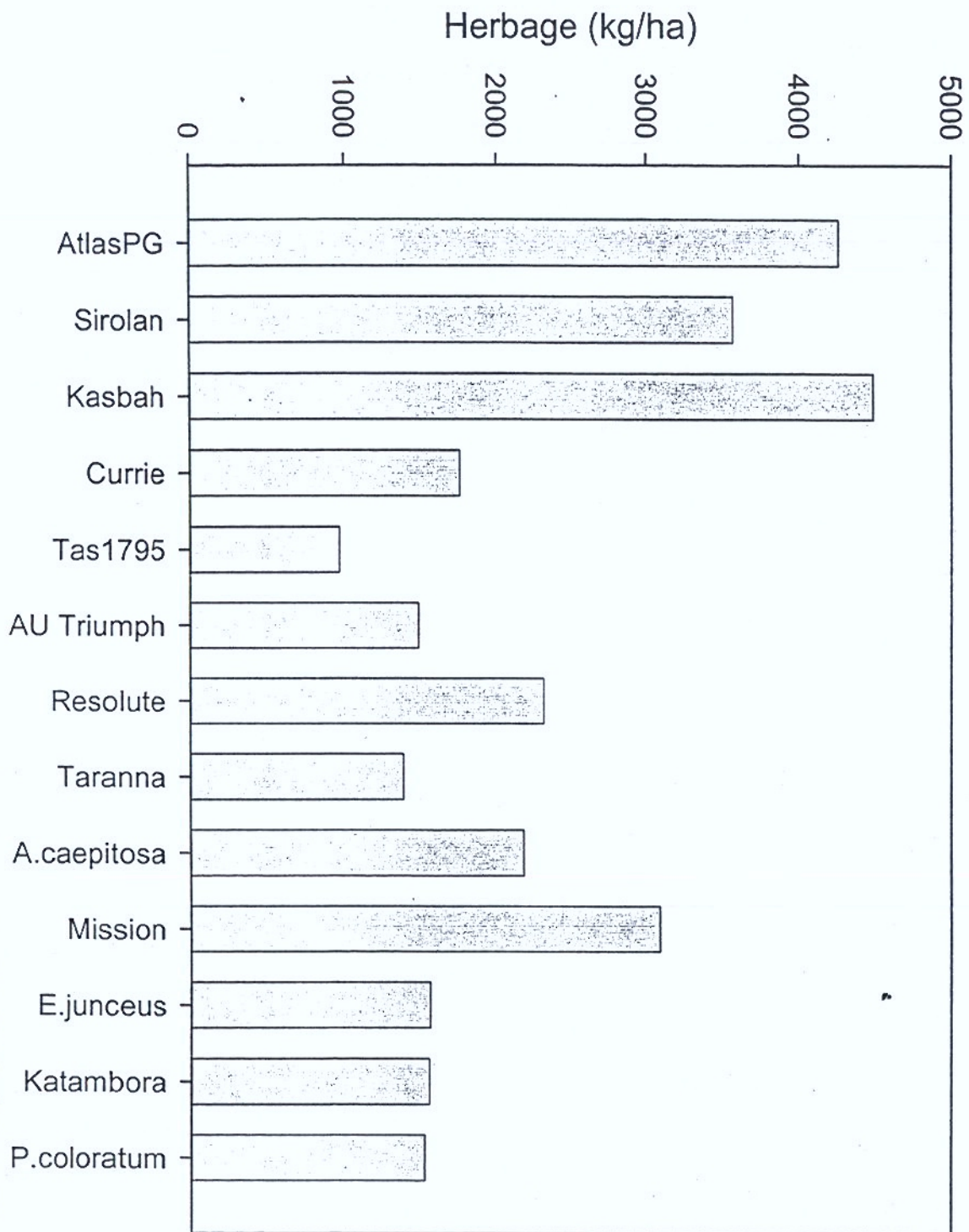
NEW DEPARTMENT OF
PRIMARY INDUSTRIES

Perennial grass nurseries

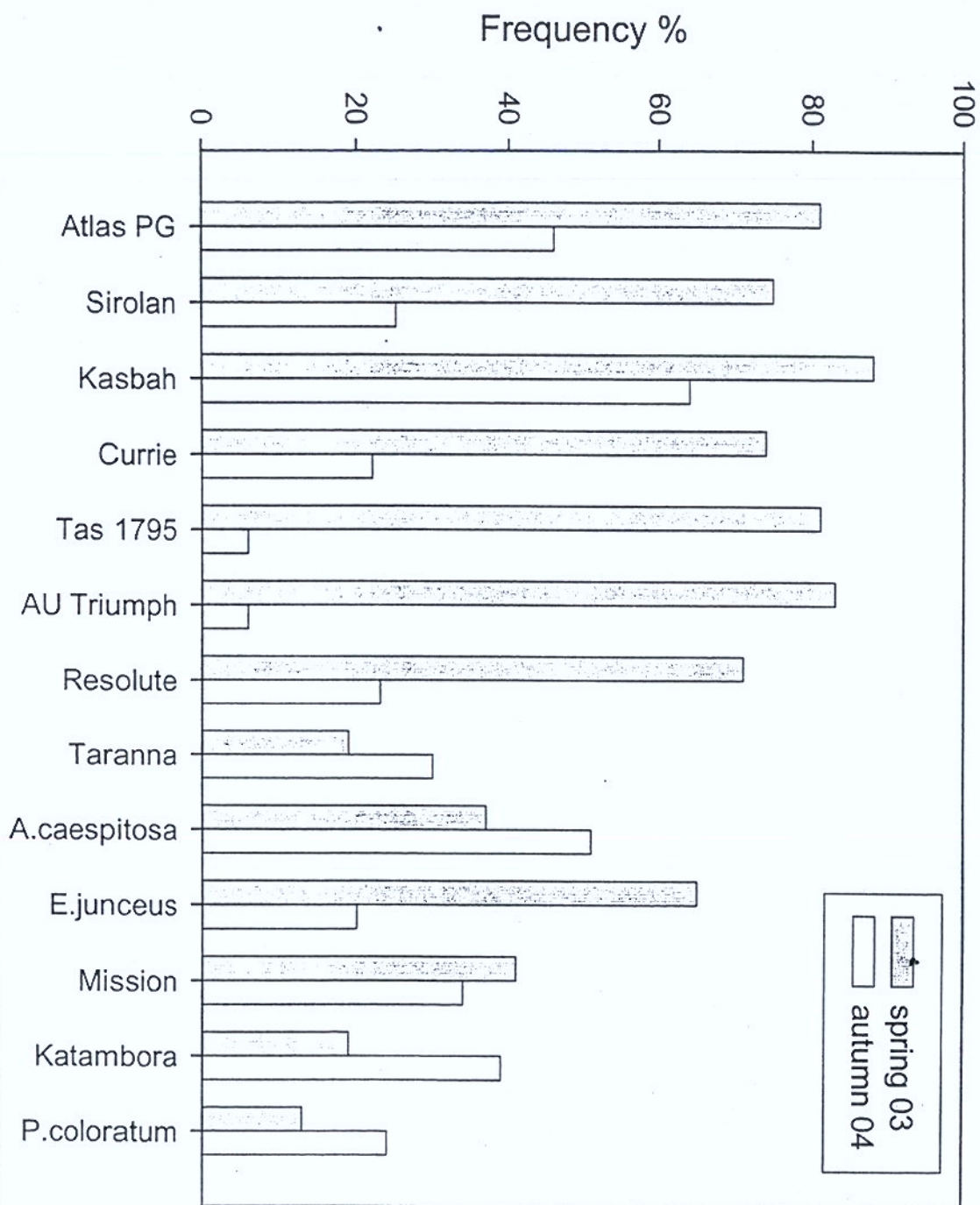
- Evaluate a wide range of perennial grasses for productivity and persistence
- Best performers
 - Cocksfoot – summer dormant types much more persistent in summer dry areas e.g. Kasbah
 - Phalaris – strongly summer dormant types such as AtlasPG most persistent in summer dry areas
 - Tall fescue – new winter active types showing improved persistence compared to summer active types
 - Perennial bromes – capable of very high winter DM production

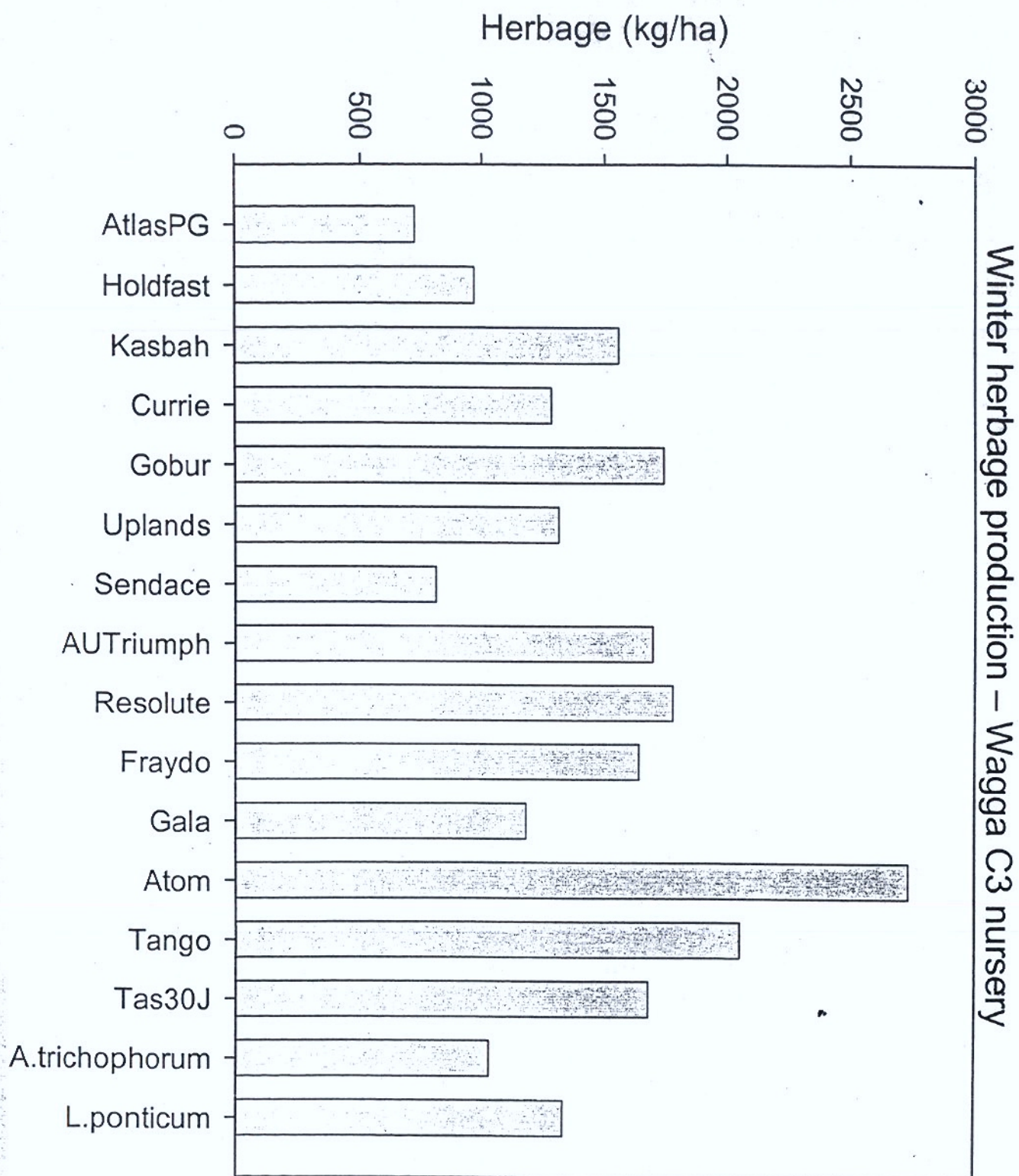


Herbage production - Barmedman 2004



Frequency - Barmedman





NSW Agriculture

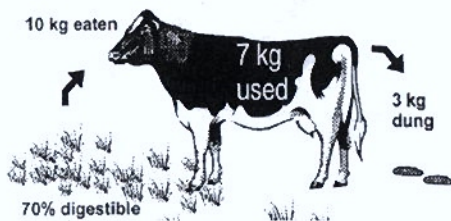
What drives the performance of animals grazing pasture?

Intake

-Quality
&
-Quantity

Digestibility

A measure of the amount of pasture retained and used by the animal compared to that which they consume



What drives Pasture Quality

Digestibility:

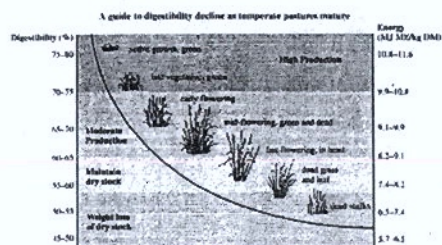
- Directly and positively related to energy
- Positively related to protein
- Influences speed of digestion

Digestibility is influenced by:-

Stage of maturity
Part of plant
Pasture species

The logo of the American Society of Animal Pathologists (ASAP) is located in the bottom right corner of the page. It features a stylized 'A' and 'S' intertwined, with the text 'ASAP' and 'American Society of Animal Pathologists' below it.

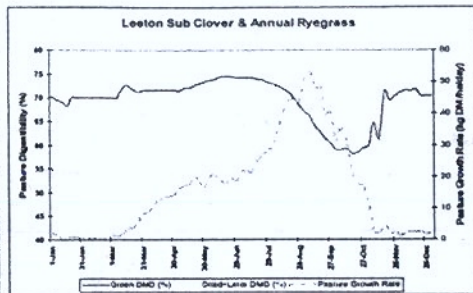
Relationship between Digestibility and Pasture Maturity


 A small logo consisting of a stylized letter 'A' inside a square frame.

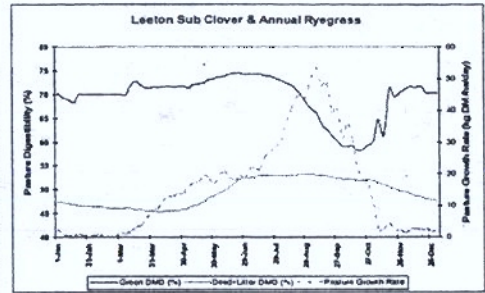
What is the quality of your pastures?

 Noble Agriculture

Digestibility/growth rates

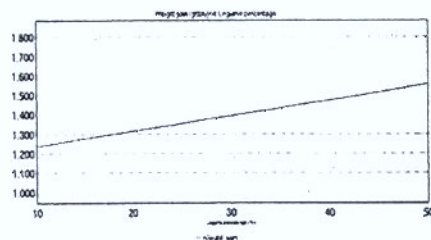


Digestibility/growth rates



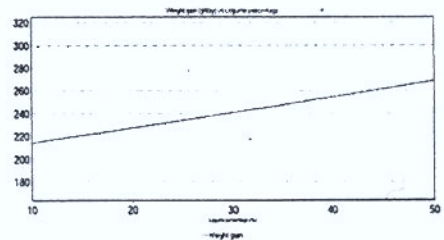
Effect on weight gain from increased legume content

(300kg steers 2500kg/ha 75%)



Effect on weight gain from increased legume content

(25 kg lambs 2500kg/ha)

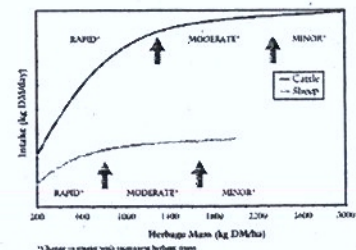


What drives animal performance grazing pasture?

Intake

-Quality
&
-Quantity

The relationship between pasture quantity and Intake



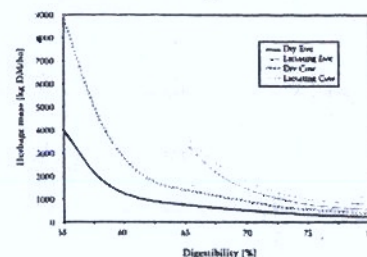
Relationship between Pasture, Feeding, Feeding Behaviour and Pasture Intake

Pasture made available (kg DM/ha)	Sheep's appetite	Intake per head	Pasture intake
1000	High	1.2 kg/day	1200 kg/ha
500	Medium	0.8 kg/day	400 kg/ha
100	Low	0.2 kg/day	20 kg/ha

The principle is the same for sheep



The Trade-off between Digestibility and Herbage Mass



Minimum Herbage Mass (kg green DM/ha) To Maintain Satisfactory Production Levels in Sheep

Sheep Class	Pasture Digestibility (green)		
	75%	68%	60%
Dry sheep	400	600	1200
Pregnant ewes			
- mid	500	700	1700
- late months	700	1200	ns
Lactating ewes			
- single	1100	1700	ns
- twins	1500	ns	ns
Growing Stock			
% of Potential Growth			
50 (0.75 kg/d)	400	700	1700
50 (1.25 kg/d)	600	1000	ns
70 (1.75 kg/d)	800	1700	ns
90 (2.25 kg/d)	1000	ns	ns

* Potential growth rates as presented are based on a ewe of 4 months old (approximately 12 kg) from a purebred flock with a standard maintenance weight of 15 kg.



Minimum Herbage Mass (kg green DM/ha) To Maintain Satisfactory Production Levels in Cattle

Cattle Class	Pasture Digestibility (green)		
	75%	68%	60%
Dry cow	700	1100	2600
Pregnant cow (7-8 months gestation)	900	1700	ns
Lactating cow (Cal 2 months)	1100	2200	ns
Growing stock			
% of Potential Growth			
50 (0.59 kg/d)	600	1100	2600
50 (0.61 kg/d)	800	1600	ns
70 (0.85 kg/d)	1200	2500	ns
90 (1.12 kg/d)	2200	ns	ns

* Potential growth rates as presented are based on a steered 1.5 month old steer of approximately 220 kg from a purebred flock with a standard maintenance weight of 180 kg.



Summary

- Animal performance is driven by intake
- Intake is driven by Quality and Quantity
- Quality is driven by Digestibility which is primarily driven by Stage of growth, part of plant and partly species
- Quantity is driven by Kg of dry matter per hectare green and pasture height
- Quality without quantity or quantity without quality = poor animal performance





Sheep Breeding

Step 4.1

Segment contents:-

- Targets for the sheep enterprise
- Fat Scoring
- Phases of the breeding cycle
- Weaner growth
- Wool growth

ANWE Agriculture

The Sheep Enterprise

What are the targets?

Step 4.2

- Optimise per hectare production of wool and lambs
- Meet market specifications for products from the program (wool, lamb, surplus sheep)
- Cost efficient management.

ANWE Agriculture

Change in profit with weaning rate for two sheep enterprises

Weaning %	1 st cross lamb production*		Merino Breeding	
	**Profit \$/ha	% Change	*Profit \$/ha	% Change
60			83	
70	126		104	24
80	152	21	124	20
90	177	16	145	17
100	202	14	166	14
110	228	13		

ANWE Agriculture

Keys to Achieving the Targets

Step 4.3

- Skills in pasture assessment
- Skills in fat scoring
- Understanding the nutritional requirements of sheep
- Integrating these skills and knowledge to meet production and market targets

ANWE Agriculture

Fat Scoring

The "GR" Site

Step 4.4

ANWE Agriculture

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Fat Scoring ("GR" Site)

Fat Score	Description
1	Individual ribs easily felt. No tissue felt over ribs. Depression obvious between ribs.
2	Individual ribs felt. Some tissue felt over ribs. Depression between ribs still obvious.
3	Individual ribs felt but rounded. Tissue felt over ribs. Depression between ribs less obvious.
4	Individual ribs less obvious, only some depression between ribs. Tissue movement over ribs is apparent.
5	Difficult to feel ribs or depression between ribs.

NSW Agriculture

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Fat Scoring ("GR" Site)

Fat Score	Description
1 (0-5mm)	Individual ribs easily felt. No tissue felt over ribs. Depression obvious between ribs.
2 (6-10mm)	Individual ribs felt. Some tissue felt over ribs. Depression between ribs still obvious.
3 (11-15mm)	Individual ribs felt but rounded. Tissue felt over ribs. Depression between ribs less obvious.
4 (16-20mm)	Individual ribs less obvious, only some depression between ribs. Tissue movement over ribs is apparent.
5 (20mm+)	Difficult to feel ribs or depression between ribs.

NSW Agriculture

Managing flock reproduction

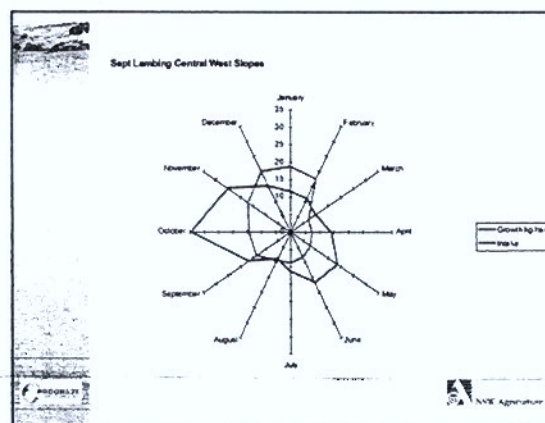
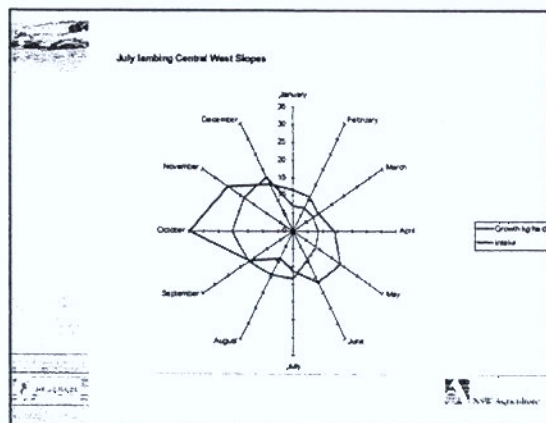
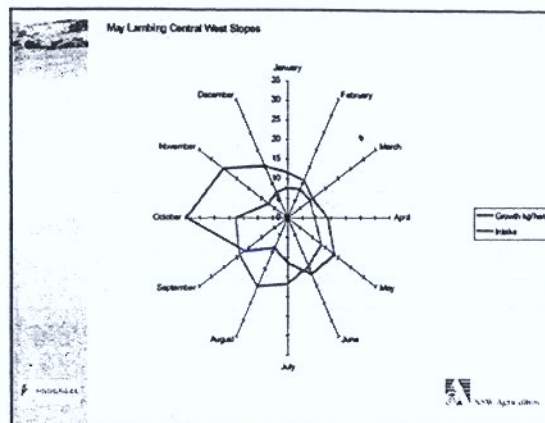
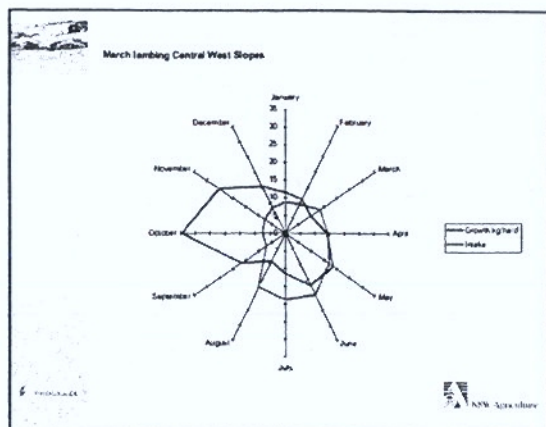
NSW Agriculture

- Page 45
- ### Managing the Sheep Breeding Program
- Weaning to joining
 - Joining
 - Joining to lambing
 - Lambing
 - Lambing to weaning
- NSW Agriculture

- Improving the reproduction and productivity of the sheep breeding enterprises through:
- ### Understanding ewe feed requirements
- matching flock needs to available pastures
 - pasture quality and quantity
 - use of supplements
- NSW Agriculture

Matching management to feed supply

NSW Agriculture



Minimum herbage mass (kg green DM/ha) to maintain satisfactory production levels in sheep.

Sheep Class	Pasture Digestibility		
	75%	68%	60%
Dry sheep	400	600	1200
Pregnant ewes			
- mid	500	700	1700
- last month	700	1200	ns
Lactating ewes			
- single	1000	1700	ns
- twins	1500	ns	ns

ns- not suitable

Weaning to joining

NW Agriculture

Weaning to Joining

- Wean lambs 14 weeks after the start of lambing
- Ensure ewes recover fat score and bodyweight
- Monitor fat score and bodyweight
 - 1 fat score = 7 kg bodyweight
 - (for every fat score increase = 12 more lambs)
- Meet nutritional targets

"Ewes to be fat score 3 or 4 at joining"

These objectives can be achieved by:

Designing an annual program

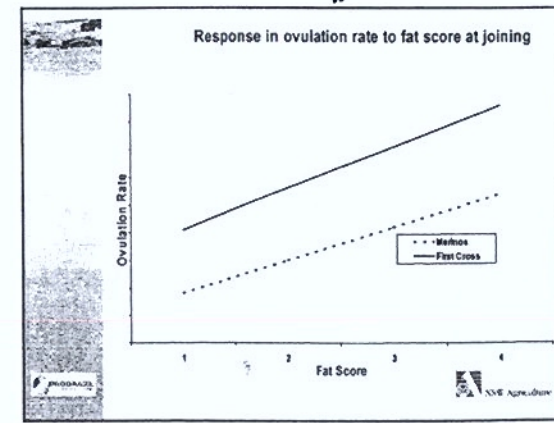
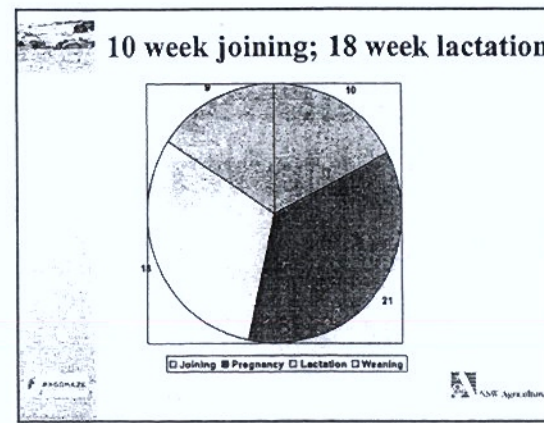
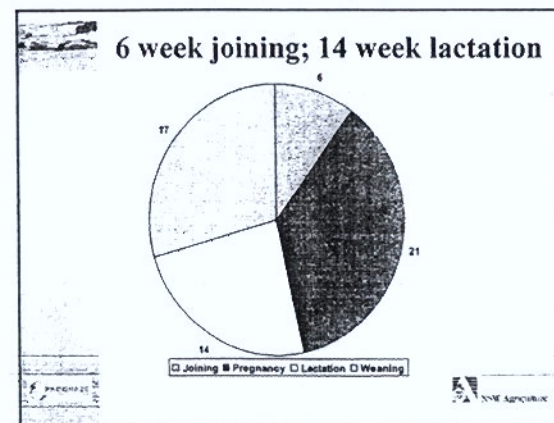
- Developing skills in pasture assessment
- Understanding the nutritional needs of the flock
- Monitor ewe fat score
- Set flock fat score targets: Nutrition

The effect of a 6 week joining and a 14 week weaning on ewe recovery

Joining 6 weeks	Start of lambing	Weaning
Pregnancy 21 weeks	Lactation 14 weeks	Time to recover fat score 17 weeks

The effect of a 10 week joining and a 18 week weaning on ewe recovery

Joining 10 weeks	Start of lambing	Wean
Pregnancy 25 weeks	Lactation 18 weeks	Time to recover fat score 19 weeks



Effect of liveweight at joining on percentage of lambs born.

Joining weight (kg)	Lambs born per ewe joined (%)	
	Merino	Crossbred
40	92	-
45	100	118
50	108	126
55	116	134
60	124	142

NSW Agriculture

Rams

Pre Joining: Target fat score 4

- Check ram health- 4 T's (teeth, toes, tossle and testicles)
- Feeding for 8 weeks prior to joining on a diet of 500 g/h/d of lupins will increase testicle size (28cm circ.)

Sperm development: it takes 49 days for sperm to develop:

- Avoid rams getting fevers which will raise the body temperature like fly strike.
- Rams should be joined in 2 months wool

Join rams: at 1% +1 (5 rams to 400 ewes)

NSW Agriculture

FACTORS AFFECTING SEMEN QUALITY:

Fever:

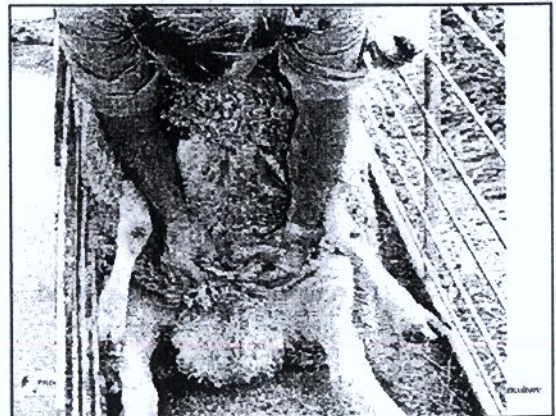
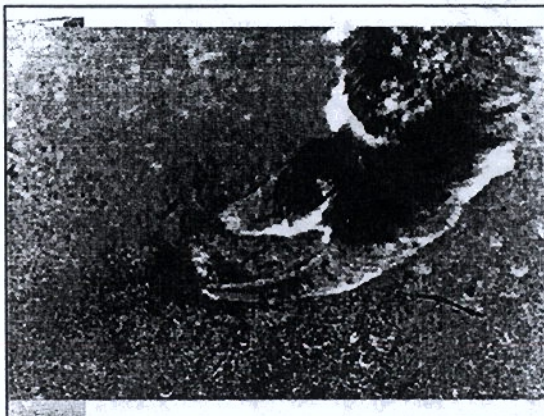
- Foot rot
- Foot abscess
- Fly strike
- Abscesses
- Wound infection

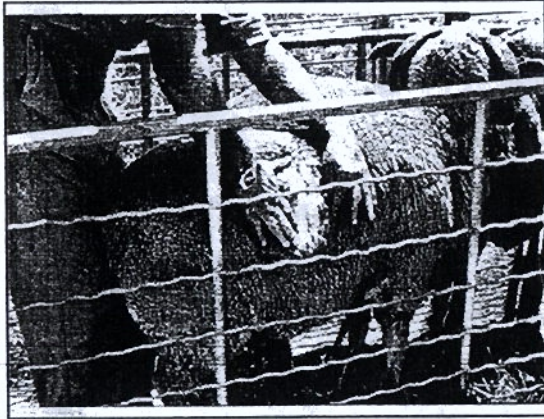
Temperature:

- Shearing
- Movement of rams
- Skin wrinkle
- Fat score 5

Disease: Ovine Brucellosis

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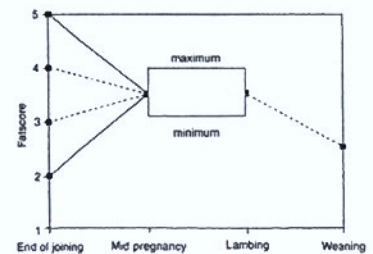


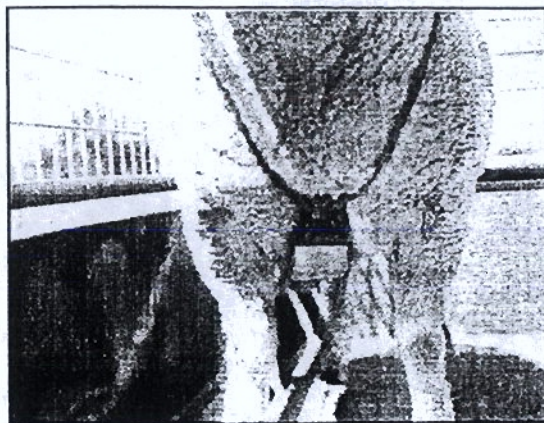
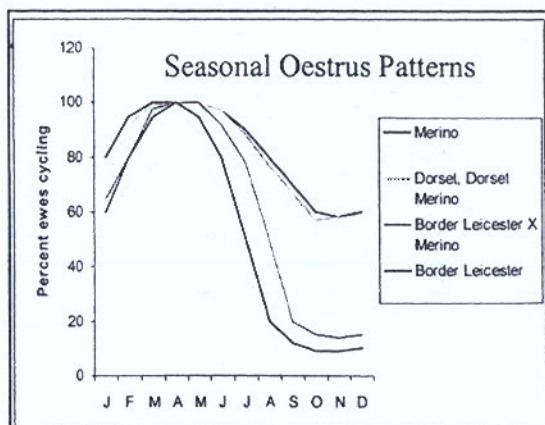
Joining

Joining recommendations:

- Join during the main breeding season for 42 days (2 cycles + 8 days)
- Target fat score 3 to 4
- Monitor joining with ram harnesses
- Use the "ram effect"
- Adjust ram % with age and fat score of ewes

Fat Score Targets for Ewes



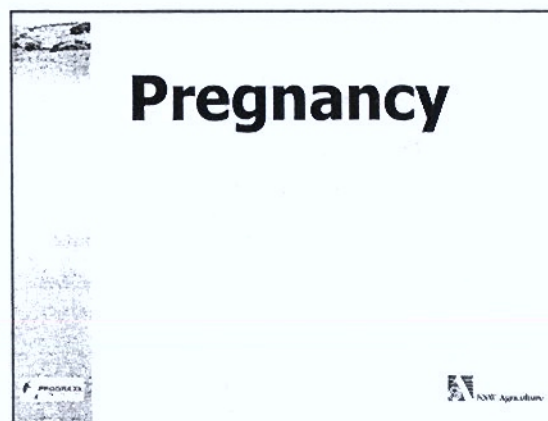


How many lambs will you get? (90% Lamb marking)

	Ewes	Lambs	Lambs lost
Ewes Joined	100		
Ovulation rate 1.4		140	6
Ewes mating	96	134	
Embryo loss			17
Scan- single	62	62	
Twin	28	56	
Scan error			3
Ewe death- preg tox			3
Ewes lambing- single	60	60	
twin	26	52	
Lambs born		112	
Lambs lost birth to marking (11% single/ 21% twins)			18
Lamb marking % of ewes joined		94%	
of ewes lambing		109%	

4% loss

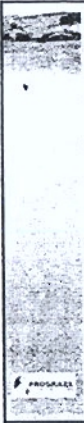
NSW Agriculture



Recommendations for Pregnancy

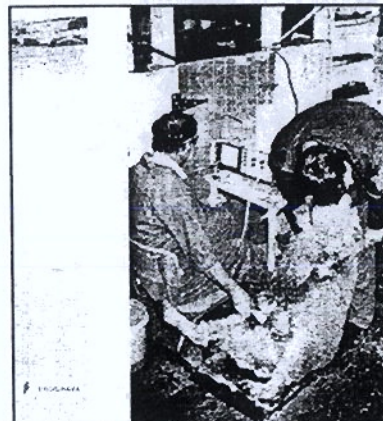
- Target fat score 3 by day 100
- Over fat ewes (4 and 5 fat score) can lose $\frac{1}{2}$ a fat score from day 85 of pregnancy to day 115
- Pregnancy scan for multiples around day 100
- Manage scanned groups accordingly
- Vaccinate and drench (if necessary) prior to lambing

NSW Agriculture



Maintaining fat score during pregnancy will:

- Reduce the risk of pregnancy toxaemia
- Reduce lambing difficulties
- Save feed
- Increase lamb birth weights and survival
- Provide flexibility if the season collapses

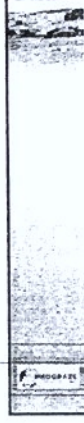


Managing scanned ewes:

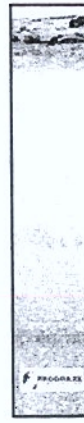
In the last month of pregnancy graze ewes on the "best" pasture:

Singles: 700 - 1000 kg green DM/ha

Twinnings: 1500 - 2000 kg green DM/ha



Lambing



SELECTING THE LAMBING PADDOCK

- Feed
- Good water
- Protection from adverse weather:
 - + paddock aspects
 - + trees and shelter belts
 - + grass and tussocks
- Ease of lambing supervision
- Big enough to:
 - + Prevent lamb stealing and mismothering through high stocking rates
 - + Workable size flock for lamb marking
- Free of predators



Lambing recommendations:

- Eliminate predators
- Lamb: twinnings in mobs of 250 with plenty of shelter and privacy
 - singles in mobs of 400 - 500
 - maidens in mobs of 250 - 400
- Move: twinnings into lambing paddocks 1 week before lambing
 - singles and maidens when the first lamb appears
- Supplement if feed is below 1500 kg green DM/ha and feed between 2 and 4 pm

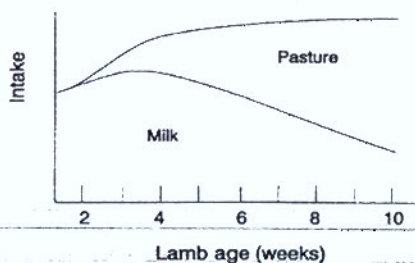


Lamb management to weaning

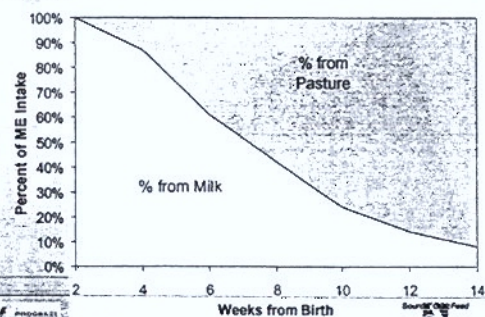
Lamb management:

- Target fat score 3 - optimises milk yield
- Lactation is directly related to nutrition
- Pasture target- 1500 kg green DM /ha
(70% dg, 30% legume)
- Expect bodyweight and fat score loss
- Allow plenty of time to regain fat score and bodyweight after weaning
- Wean 14 weeks after the start of lambing

Relative Change in Intake by Lambs between Milk and Pasture



Intake of milk and pasture



Lamb loss:

Loss category	Cause	Control
Birth injury / still born	* Brain bruising- Dystokia, malpresentation, prolonged labour	Ewe fat score Rough handling
Starvation / mis-mothering	Deaths 1 - 2 days after birth and evidence of starvation Delayed lactation	Poor teats / udder Pirating Forage quality Inspection procedures Supplementation techniques Dystokia Ewe density
Primary predation	Mutilation by birds, dogs, foxes or pigs	Identify predator Develop a control program Strategic baiting Synchronise lambing with neighbours Selection of lambing paddock
Exposure / hypothermia	Chill / cold stress	Choice of lambing paddock Reduce wind speed through shelter - strategic wind breaks, perennial grasses Topography Fencing
* haemorrhage in the cranial and spinal meninges		

Weaning recommendations:

- Train lambs to eat supplements before weaning
- Lambs can be weaned as early as 8 weeks
(at 8 kg's)
- Pasture targets for weaners- 1500 kg green DM/ha 70% digestible and 30% legume

POST-LAMBING WET and DRYING

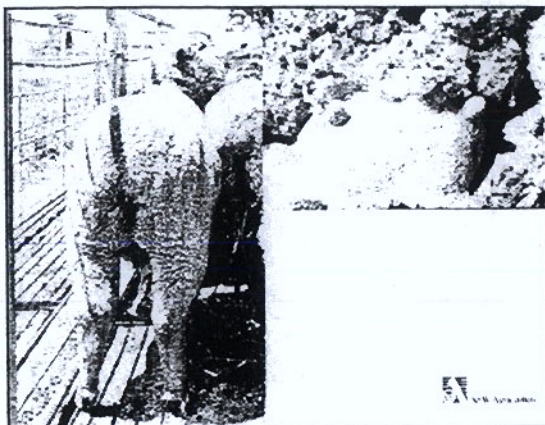
Indicates: Proportion of dry ewes
Magnitude of lamb loss

Provides the opportunity to cull ewes with:

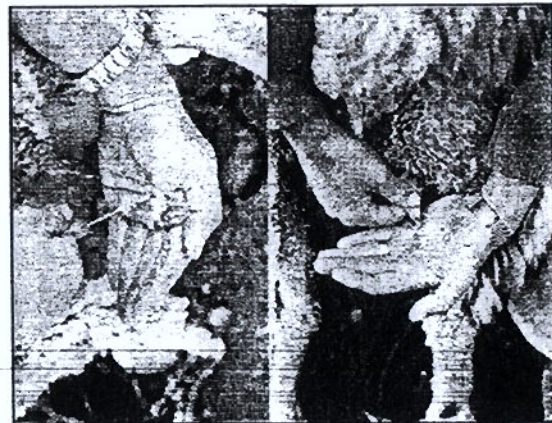
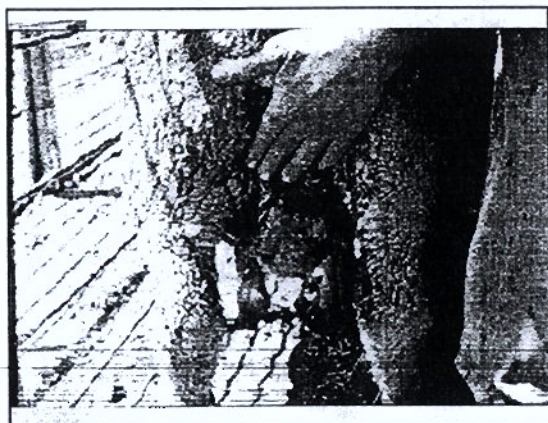
- Defective udders
- A history of failing to lamb
- Lambing but failing to rear

PROGRESS

NSW Agriculture



NSW Agriculture



Summary:

- Match feed supply to production- know your flock fat scores and pasture targets
- Forward planning and organisation are essential
 - Develop an annual program and stick to it!
- Lifting flock lambing rate is management based and is virtually free - the pay off is big \$\$\$

Weaning %	Profit \$/ha	% Change
90	271	
110	342	+ 21%

PROGRESS

NSW Agriculture



Page 4.10

Joining

- Ewe fat score
- Joining period
- The 'ram-effect'
- Ram management

NSW Agriculture

Page 4.11

Joining to Lambing

- Managing ewe fat score
- Nutrition in late pregnancy
- Preparing the lambing paddocks

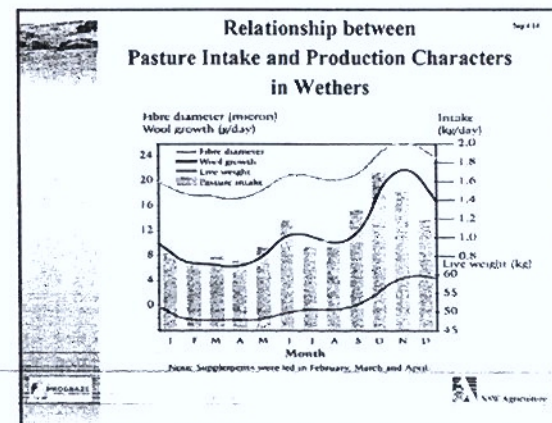
NSW Agriculture

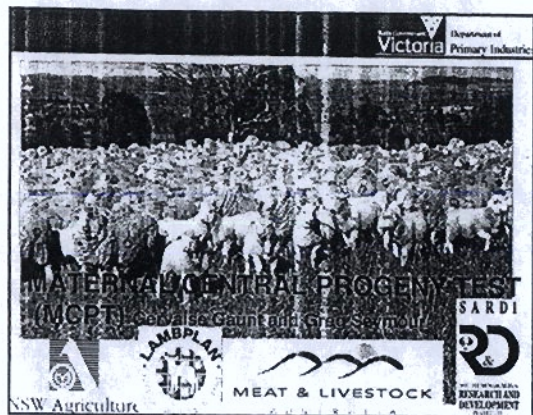
Page 4.12

Lambing to Weaning

- Manage pastures to reflect the high nutritional requirements of both ewe and lamb
- Grazing management through lambing
- Lamb weaning age

NSW Agriculture





- Add \$20,000 profit to your ewe enterprise per annum
- Top genetics v average crossbred flock
- Range \$40 gross margin/ewe/year
 - within maternal sire breeds
 - twice range between breeds
 - top sires represent several breeds

 The State of Victoria

MCPT Design

Maternal sire Central Progeny Test (MCPT)
Cowra, Hamilton, Struan/Rutherglen

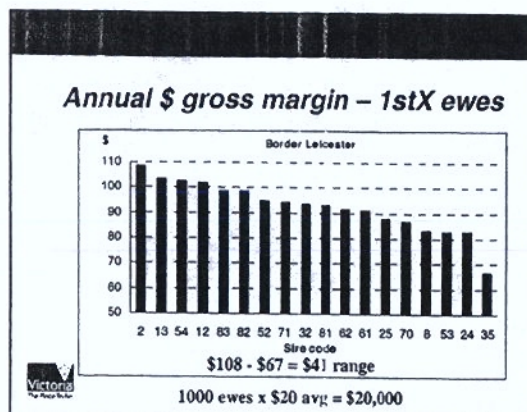
Maternal sires x Merino ewes

1stX ewes (grown out) 1stX wethers (slaughtered)

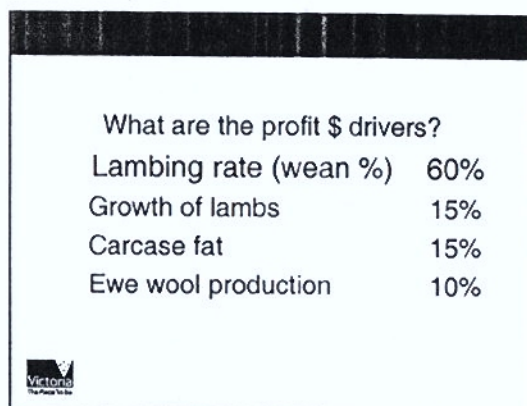
Terminal sires x 1stX ewes (x3 years)

2ndX lambs (slaughtered)

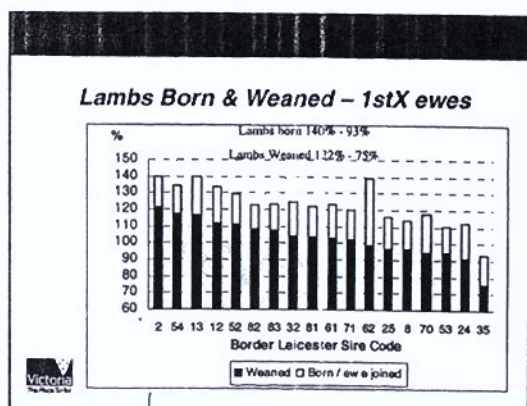
 The State of Victoria



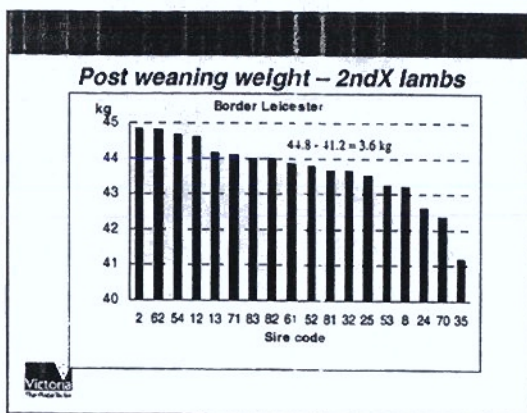
Se creían \$1 carneros y la
dif. que hubo en weanen
total por más u costeo
desde \$100 hasta 35.



Ingresos adicionales:
+ tiempo extra de prep.
+ la sola tasa de
proliferación & ingresos
en 60%. Crecimiento
orden de explicación
15%, eugenes. en 15%.
↑ prod. lana 10%.



se muestran % de nacimientos
dentro de \$1 carneros
carneros 2: más terneros
10% de total en 140% prep.
El 62 punto & % prep,
pero % de detección sig.
carneros ingresados
pueden haber entrado
a sus hijos



Match genetics to environment and management

Lambing time

- ⇒ Difference between sire groups for spring vs autumn lambing
- ⇒ Ewes in season, lamb survival, proportion of multiples

Victoria
The Power To See

Puberty – join at 7 months?

- Critical liveweight (+45 kg)
- Genetics to achieve early puberty
- Breeding season – joined in autumn
- Breed effects (join 7 mths MCPT)
 - 82% East Friesian, 65% Finnsheep, 60% BL
- Sire effects – 6 ewe groups >90% weaned
- Ewes lamb @ 1yr no effect on later years
- Reduces cost of replacement ewes

Victoria
The Power To See

How do you get top ewes?

- Ensure they are by LAMBPLAN sires
 - Sire EBVs correlated with progeny performance
- Ensure they are from good (Merino) ewes
 - Lambing % & growth
- Demand more information on genetic background
- Develop alliance or contract mating



Take home messages

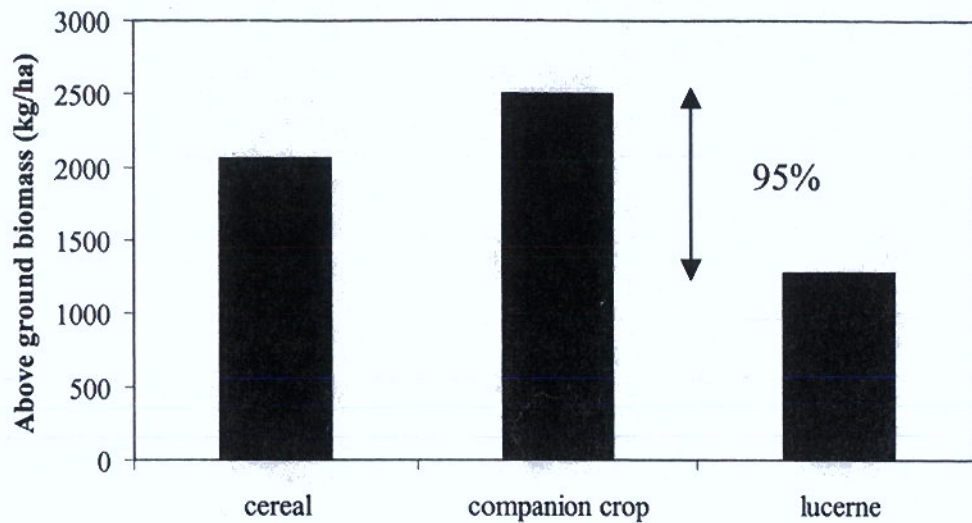
- Range of \$40 GM/ewe/yr among sire groups of 1stX ewes
 - Twice range between breeds
- Lamb weaning rate (%) – major profit driver
- Growth rate & fat level important
 - Proportion meeting carcase specifications
- Use rams with high LAMBPLAN EBVs
- Crossbred ewes from high performing Merino flocks



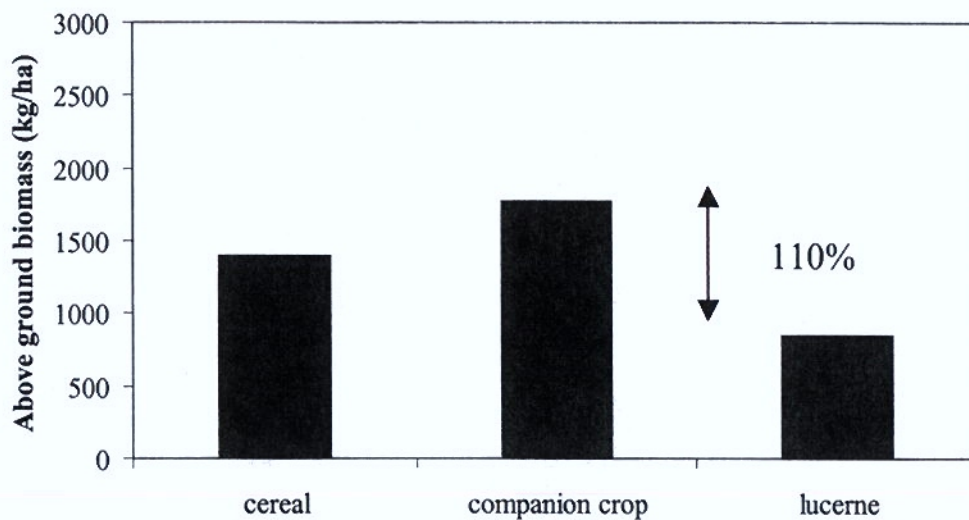
Lo q' han intr o trans del LAMBPLAN - es q' do imp. no es la raza. Hay 3 ras. genéticas entre la raza.

Lo important es escoger indiv de la raza q' han los mejores

ANEXO 4



Total (lucerne and cereal) aboveground biomass production at Nth Boorhaman from 4/06/2004 to 14/09/2004



Total (lucerne and cereal) aboveground biomass production at Nth Boorhaman from 2/06/2005 to 6/09/2005

N →

Whistler Wheat

Dictator Barley

Dictator/Lordship

Lordship Oats

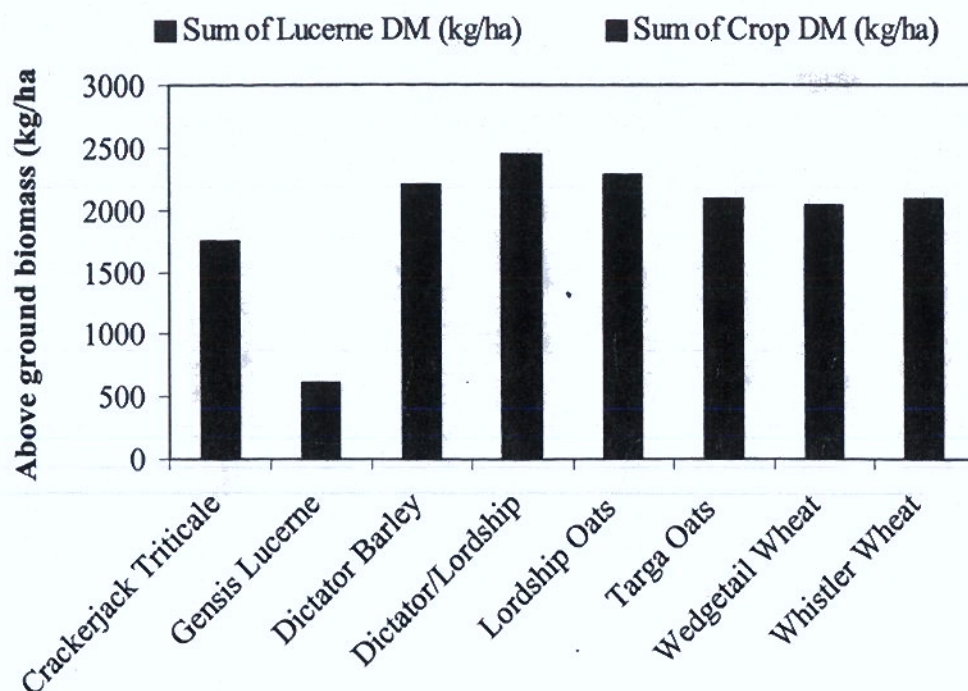
Targa Oats

Lucerne

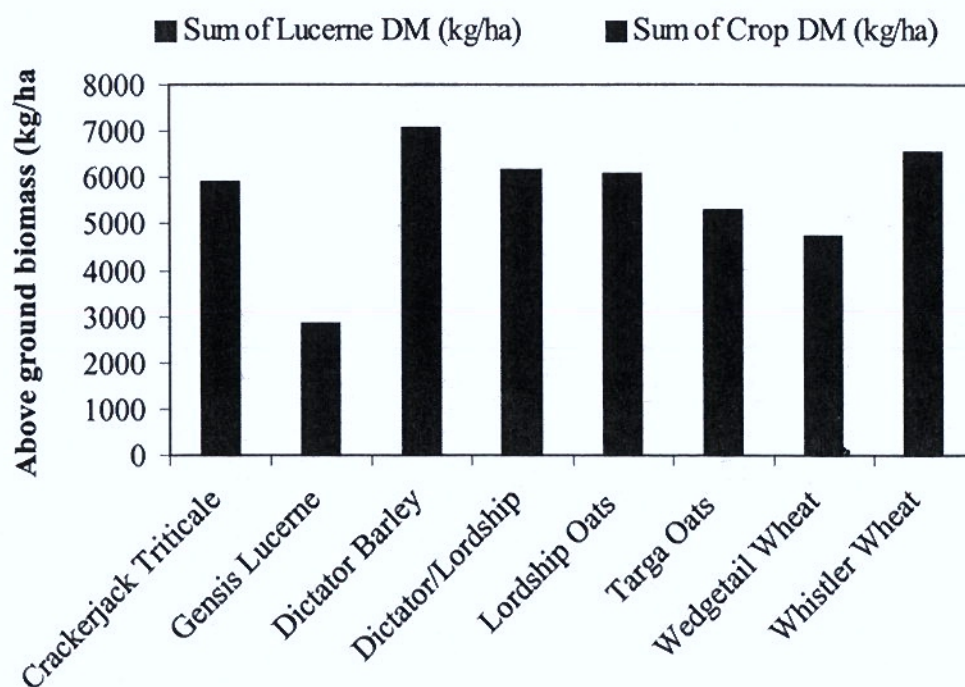
Wedgetail Wheat

Crackerjack Triticale

Chiltern Valley Rd



Total (lucerne and cereal) aboveground biomass production at V1 from 15/06/2005 to 1/09/2005.



Total (lucerne and cereal) aboveground biomass production at V1 from 15/06/2005 to 22/09/2005.

Table 1. Total (lucerne and cereal) aboveground biomass production at V1

Date	Treatment	Lucerne biomass (kg/ha)	Crop biomass (kg/ha)	Total biomass (kg/ha)	Increase in biomass (%)
1/09/2005	Crackerjack Triticale	684	1073	1757	187
	Gensis Lucerne	612		612	
	Dictator Barley	819	1393	2212	262
	Dictator/Lordship	806	1647	2453	301
	Lordship Oats	1029	1266	2294	275
	Targa Oats	1041	1050	2091	242
	Wedgetail Wheat	1068	979	2048	235
	Whistler Wheat	822	1264	2086	241
22/09/2005	Crackerjack Triticale	1305	4617	5922	107
	Gensis Lucerne	2858		2858	
	Dictator Barley	1936	5139	7076	148
	Dictator/Lordship	1321	4847	6168	116
	Lordship Oats	1522	4556	6078	113
	Targa Oats	1703	3634	5337	87
	Wedgetail Wheat	1902	2851	4753	66
	Whistler Wheat	2047	4519	6566	130

Ram Sales

Kardinia rams have again sold to solid and consistent demand across a range of seasonal conditions and varying climates in our sales throughout eastern Australia in spring 2005. Repeat clients were prominent in our sales as well as first time buyers.

Sale results for 2005 were

- Bendigo Sheep & Wool Show Av \$1,437.00
- Sheepvention Hamilton \$1,940.00
- Dubbo National Sale \$2,525.00
- Hay Riverina Sale \$1,844.00
- Wagga Eastern Riverina Sale \$1,690.00
- Bendigo Vic Sale \$1,800.00

Sale Team 2006

This years sale rams will be by some new and exciting young Kardinia bred sires.

KD03.0158 is a very long bodied, white woolled ram showing good style and crimp.

KD02.0030 who had some sons through in 2005 will be represented again in 2006.

We will also have progeny of a syndicate purchased Western Australian in PD03.0338 who was a stand out animal with excellent figures to match.

Our policy of sourcing top genetics from throughout Australia will also see young sale rams bred from semen purchases from three other sires.

Highly successful and one of Australia's leading sires IH02.0409 (still the highest priced ram sold at auction in Western Australia, purchased in 2003) will again be well represented. At +15.0 this ram has the highest body weight EBV of any ram in the Australian sires list (653 progeny). Progeny of this ram exhibit very good growth rate and early maturity along with excellent confirmation and a white medium wool.

Part of the 2005 sale team.



Kardinia Breeding Update



Embryo transfer has given Kardinia the opportunity to rapidly increase numbers of pure bred sheep in the stud using superior genetics, but we have become increasingly mindful of evaluating sheep in natural joining prior to selection for extensive embryo transfer use.

Pictured is KD01.0011 who has consistently produced quality sheep as an embryo donor, showing us she is also capable when naturally mated.



Commercial results of our F1 wethers has been very encouraging with a consignment to Castricum Brothers Dandenong receiving favourable comments on overall carcase composition, degree of muscling, meat colour and produced excellent kill results. Achieving 71% in the premium range which attracts a .20 cent / Kg price increase under the viascan payment system. This is against the average of all consignments which average 22% in that range.

DRENCH TEST KIT

What is drench resistance?

Drench resistance is the ability of worms to survive doses of drench that would normally remove them.

ANEXO 6

How does resistance occur?

Drench resistance can occur as a result of:

- Frequent drenching
- The use of ineffective or inappropriate drenches
- Underdosing
- Drenching at times of low refugia (pasture contamination)
- Introduction with purchased livestock



RESISTANCE DOES NOT GO AWAY!

Benefits of drench resistance testing may include

1. Decreased chemical and labour costs
2. Decreased pasture contamination
3. Production increases
4. Decreased livestock mortalities

**Drench resistance testing
should be an integral part of
your worm control program**



Now exclusively
working with



**TECHNICAL
SERVICES**



How can I slow the development of resistance?

1. **Worm monitoring** – To determine if a drench is required and which drench is appropriate
2. **Drench resistance testing** – To determine which drenches are effective on your farm. Using an ineffective drench is not only costly, but will accelerate the development of resistance
3. **Management** – To ensure that both chemical and non-chemical methods of worm control are employed

What is The Drench Test Kit?

The drench test kit is a complete and fully supported tool that enables graziers to test six drenches (including one combination) on farm, at the same time. The Drench Test Kit is a faecal egg count reduction test (FECRT), which provides you with an accurate assessment of the effectiveness of each individual drench against each of the worm species present on your farm. Included in the package is a full interpretation of the results by VHR's veterinarians and parasitologists.

Drenches included in the Kit are:

- Levamisole (clear)
- Albendazole (white)
- Ivermectin
- 'Rametin'
- Closantel

The inclusion of these drenches allows you the flexibility to test each of these drenches at the recommended dose rates or in combination

The Drench Test Kit contains:

- Eight worm testing kits (initial monitor, control and six treatment groups)
- Ear tag applicator and coloured ear tags for group identification
- Gloves for sample collection and chemical handling
- Syringes for chemical application
- Pre-paid 'postpak' for return of samples to the VHR laboratory
- Easy to understand instruction sheets, treatment sheets, dosing tables, chemical labels and submission form
- All the drenches required to perform the test

For more information on the Drench Test Kit please contact your local Elders store.





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tips & tools

BUSINESS MANAGEMENT



Calculating cost of production for your lamb enterprise

For producers wanting to improve the performance of their lamb enterprise, a good understanding of the current health of the business is essential.

Cost of production is a key factor affecting the profitability of lamb-producing businesses. Calculating your cost of production is an important step in assessing flock performance and a first step to making change.

Cost of production

Cost of production (CoP), measured in cents per kilogram, is an indication of the outlay required to produce each kg of lamb. However, as there is more than one way to calculate CoP, and people can confuse it with other indicators, CoP may not always provide a meaningful comparison between businesses.

The MLA cost of production calculator has been developed to standardise this very common performance indicator, so you can easily compare the performance of your enterprise with others in the lamb industry. A quick comparison of your CoP will indicate whether you have great scope for improvement, or are already performing reasonably well.

CoP is simple to calculate. It is not complicated by how you have financed the business, how much of it you own or how you acquire your land, and it only deals with one enterprise at a time. CoP does not automatically reveal what aspects of production you are in a position to improve, but it will provide a very useful start. You can use it to compare the health of your business year on year, and then compare it against other lamb producers with similar resources to your own.

In developing a standard approach to calculating CoP, care has been taken to ensure that while the easiest method has been applied at every step, the usefulness of the measure has not been compromised.

Designed as a 'do-it-yourself' tool, we hope that every lamb producer will use the MLA cost of production calculator to figure out their CoP and compare their performance annually.

Finally, knowing your CoP is just the first step. Once you have a rough idea of how you are performing, we strongly urge you to measure the performance of your business in more detail and for all enterprises. There are a number of benchmarking groups already established, run by state departments or private farm management consultants.

Key benefits

- Learn to use the MLA cost of production calculator to measure the performance of your lamb enterprise year on year
- Compare the health of your business annually with other lamb producers and find out if there is scope for improvement, or if your enterprise is already performing well

How to use the MLA cost of production calculator

The calculator is intended to be used for only one enterprise at a time, for example a specialist prime lamb flock. If you have a Merino wool flock and you join a percentage of the ewes to a terminal sire and the rest to Merino sires, then you would break that flock into two enterprises: 1) a dual purpose lamb flock that includes the ewes joined to a terminal sire, and 2) a wool flock that includes those ewes joined to Merino sires and all Merino wethers. The income and costs should be apportioned accordingly throughout the calculator. Use the most appropriate 12-month period for your situation and keep the same period for each enterprise, if you have more than one.

The CoP calculator is split into the following seven sections:

1. Total lamb production
2. Lamb enterprise income
3. Total labour costs for all enterprises
4. Lamb enterprise costs
5. Overhead costs for whole farm business
6. Calculation for allocating overheads to lamb enterprise
7. Final CoP calculation

Each section has a number of questions to be answered from your own records, with a number next to the question referring to a comment in the explanatory notes box where required.

There is a box at the end of each section with a letter beside it that refers to the figures used in the final CoP calculation.

Once you have calculated your CoP, the next section of this *Tips & Tools* gives you an idea of how your performance ranks against other lamb enterprises.

Please heed the WARNING section about the accuracy of CoP for different enterprise mixes.

Total lamb production

Day/month/year	Opening number	Closing number
	7/7	7/7
Ewes*	(a)	(b)
Lambs*	(c)	(d)
Rams	(e)	(f)

Lamb production

	kgs/head lwt	Total kgs lwt	
Lamb opening liveweight	(g)	(c) x (g)	1
Lamb closing liveweight	(h)	(d) x (h)	2
Total liveweight of lamb purchased		kg	3
Total liveweight of lamb sold		kg	4
TOTAL KG OF LAMB PRODUCED (4+2-3-1)		kg	A

Lamb enterprise income

Lamb trading income

	\$/head	Total value (\$)	
Lamb opening value	\$ 60 (i)	(c) x (i)	5
Lamb closing value	\$ 60 (j)	(d) x (h)	6
Total value of lamb purchased		\$	7
Total value of lamb sold (including skins)		\$	8
NET LAMB TRADING INCOME (8+6-7-5)		\$	B

Sheep and wool trading income

Lamb enterprise opening values

	\$/head	Total value (\$)	
Ewe opening value	\$ 80 (k)	(a) x (k)	9
Ram opening value	\$ 300 (l)	(e) x (l)	10
Wool opening value		\$	11
Total opening value (9+10+11)		\$	C

Lamb enterprise closing values

Ewe closing value	\$ 80 (m)	(b) x (m)	12
Ram closing value	\$ 300 (n)	(f) x (n)	13
Wool closing value		\$	14
Total closing value (12+13+14)		\$	D

Lamb enterprise purchases/transfers

Total ewe purchases/transfers (\$)	\$	15
Total ram purchases (\$)	\$	16
Total purchase value (15+16)	\$	E

Lamb enterprise sales

Total ewe and ram sales	\$	17
Total wool sold	\$	18
Total sale value (17+18)	\$	F
NET SHEEP AND WOOL INCOME (D+F-C-E)	\$	G

Explanatory notes

- * Include replacement ewes
- # These are lambs carried over from previous lambing
- Note:** All figures are GST exclusive
- 1-4** Liveweights (lwt) - from transaction records or weighing a sample; if not available, use an estimate
- 7-8, 15-18** From transaction records
- (i), (j), (k), (l)** These are the standard values used in Holmes Sackett & Associates Benchmarking and it is assumed that the opening and closing values are the same
- 8** Value of lamb sales includes skins
- 15** Include any ewes transferred from the Merino flock at a standard value (eg \$60/head)
- 18** Include only wool sold from this enterprise

Total labour costs for full year for all enterprises

Cost of permanent employees	\$	19
Owner/operator allowance Number ____ x \$50,000 pa =	\$	20
Cost of additional family labour (not already included in above) Number ____ x \$28,000 pa =	\$	21
Total cost labour (19+20+21)	\$	22
Percentage time on lamb enterprise work	%	23
TOTAL LABOUR COST OF LAMB ENTERPRISE (22x23)	\$	H

Lamb enterprise costs

Total flock health costs	\$	24
Contractors and casual labour for lamb work	\$	25
Total quantity of home grown feed fed out: t x value/tonne \$ = \$		26
Total quantity of purchased feed fed out: t x value/tonne \$ = \$		27
Transport and cartage	\$	28
Selling costs (lambs, sheep and wool)	\$	29
Shearing and crutching	\$	30
TOTAL LAMB ENTERPRISE COSTS (add 24 through 30)	\$	I

Explanatory notes (cont.)

- 19** Include any permanent paid labour (casual labour goes in 25) and not owner/operator or family members; include all on-costs, eg workers compensation, superannuation, etc.
- 20** This is an allowance for the 'manager' of the business; if 'manager' is less than full time, pro rata the \$50,000 annual allowance, ie 50% = \$25,000 pa; exclude off-farm labour
- 21** Only include if not already included in 19, eg 1 full time and 1 part time = 1.5
- 23** Estimate if time records not available
- 24** Includes drenches, dips, vaccines and vet costs

Overhead costs for whole farm business

Repairs and maintenance: shed, yards, fences, land	\$	31
Repairs and maintenance: plant and equipment	\$	32
General insurance	\$	33
Administration	\$	34
Rates, agistment	\$	35
Fuel and oil	\$	36
Electricity and gas	\$	37
Depreciation	\$	38
Pasture costs	\$	39
Other	\$	40
TOTAL OVERHEADS (add 30 through 39)	\$	J

- 25** Includes marking, classing, mustering and casual labour used for the lamb enterprise (excluding shearing and crutching)
- 26-27** Feed should be valued at market price, not cost of production because if it wasn't fed to stock it could have been sold on the market
- 28** Include cost of all lamb, ewe and ram transport (not involved in selling costs)
- 29** For all sheep and wool sold; include freight, commissions, fees, taxes and levies
- 30** Include cost of shearing, crutching, mulesing, wool packs, emery paper, combs, cutters, and any other associated expenses
- 32** Includes vehicles, motor bikes, tractors, etc; do not include labour if already accounted for previously
- 33** Includes public liability, sickness and accident insurance
- 34** Telephone, fax, postage, general office expenses; do not include labour if already accounted for previously
- 35** Rates include shire, RLP Board and council
- 36** Includes petrol, distillate, fuel oils and lubricants exclude personal use
- 37** Exclude personal use
- 38** Use the depreciation figures from your most recent; tax return
- 39** Include chemicals, fertiliser, irrigation, seed
- 40** Include items not already accounted for

Calculating the percentage of overhead costs allocated to lamb enterprise

(Your most recent tax return may be useful. If not able to separate gross incomes, only **LAMB ENTERPRISE GROSS INCOME** and **TOTAL GROSS INCOME** are necessary)

Year _____	GROSS INCOME
LAMB ENTERPRISE (B+G)	\$
	+
OTHER SHEEP ENTERPRISE(S)	\$
	+
CATTLE ENTERPRISE	\$
	+
CROPPING ENTERPRISE	\$
	+
OTHER*	\$
	=
TOTAL GROSS INCOME	\$
Percentage of income from lamb =	% K
$\left(\frac{\text{GROSS LAMB INCOME} \times 100}{\text{TOTAL GROSS INCOME}} \right)$	

Explanatory notes (cont.)

K Overhead costs are allocated according to the income produced from the lamb enterprise

***Other** Do not include off-farm contracting or labour or off-farm investment income

Calculating cost of production per kg lamb dressed weight

Overhead costs (from J)	\$	L
Overheads attributed to lamb enterprise (KxJ)	\$	M
Total cost of lamb production (H+I+M)	\$	N
Proportion income lamb of total lamb enterprise (B ÷ (B+G))		O
Total cost of lamb production (NxO)		P
Total kg lamb produced (liveweight) (from A)	kg	Q
Total kg lamb produced (dressed weight — Qx0.46)	kg	R

COST OF PRODUCTION PER KG LAMB DRESSED WEIGHT (P÷R)

Note: This figure is inclusive of skin values and therefore is not directly comparable to over-the-hook prices. If the price you are offered is not inclusive of skins then you can compare as follows:

- 1) Multiply your cost of production by the dressed weight of lambs for which you have been offered the price. This will give you the total cost of producing the lamb with its skin.
- 2) Deduct the current skin value from the total cost to give the net cost of producing the lamb without its skin.
- 3) Divide the cost of producing the lamb without its skin by the dressed weight to give the price required per kilogram of lamb dressed weight to ensure you meet the cost of producing the lamb with its skin on.

WARNING

CALCULATE CoP FOR A NUMBER OF YEARS TO GET AN IDEA OF YOUR AVERAGE

CoP can vary a lot between years due to a range of circumstances. These include but are not limited to:

- Unusual rainfall
- Changes to flock management or structure, such as lambing date
- Greater than normal expenses, such as capital fertiliser applications or pasture establishment

As a general rule, the more variable the rainfall for your location, the more years you should calculate to determine your average CoP.

THIS CoP CALCULATOR IS MOST ACCURATE FOR A BUSINESS THAT RUNS PRIME LAMB ONLY

For businesses that run both cattle and wool sheep, the calculator is reasonably accurate because costs can be split reliably by using the percentage of gross income each contributes.

For cattle, sheep and cropping businesses, calculating CoP for individual enterprises requires estimating how much of some costs should be allocated to each. This is difficult and can lead to significant inaccuracies. While this calculator attempts to address this with guidelines about how to proportion costs, a full benchmarking program across all enterprises is advised.

In any case, the results will be a useful starting point for further discussion with your farm management advisor or benchmarking group.

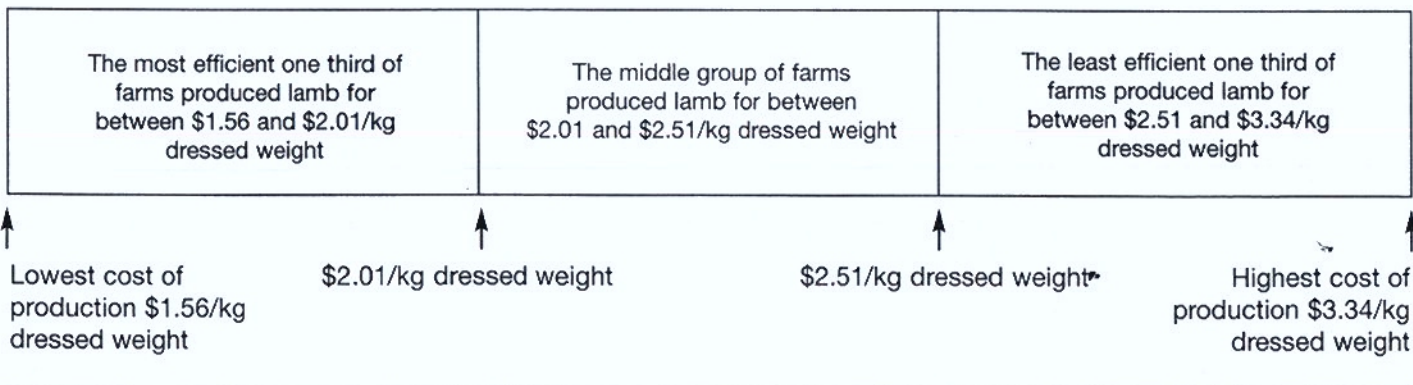
How does your CoP compare with others?

Prime lamb enterprise

By industry standards, if you have a cost of production of less than \$2.01/kg dressed weight, you are performing better than the average prime lamb producer. As shown in the diagram below, the most efficient third of producers have a regular cost of production of around \$1.50/kg dressed weight – a good goal for any producer interested in wealth creation.

A cost of production of between \$2.01 and \$2.51 per kgDW would suggest significant room for improvement.

If your cost of production is greater than \$2.51/kgDW, the future of your business may be at risk. Based on lamb prices less than \$3.00/kgDW, you will generally not be earning sufficient income to service debt. If you own all your assets your return on equity will be poor in comparison with other investment opportunities unless your land value is appreciating considerably.



Optional extras

Using the figures you have drawn on to measure CoP, there are a couple of extra indicators you can calculate. In many cases their accuracy may be limited because they require you to estimate the figures. However, should you choose to fill these extras out, the results will be a useful starting point for further discussion with your farm management advisor.

Kilograms of lamb produced per hectare (kgDW/ha)

You can calculate kgDW/ha by simply dividing the number of kilograms of lamb produced (Box R on the calculator) by the number of winter grazing hectares used for lamb production. If lamb is your only enterprise, this is easy to determine accurately. However, where you have a number of different enterprises, deciding on the number of hectares you allocate to the lamb enterprise as opposed to the others may be difficult, so don't rely too much on the result.

Average sale price

You should be able to get an idea of your average sale price per kilogram dressed weight from your sales records, especially if you sell over the hooks. Alternatively, divide the LAMB GROSS INCOME (Box B) by the total kilograms of lamb sold (Box R).

Margin

Subtracting your CoP from your average sale price (cents/kgDW) will give you an idea of the margin you are making from your lamb enterprise. If this figure is less than or close to 0, your business may be at risk.

Where to from here?

Congratulations! You have taken the first step. Benchmarking your CoP has given you an idea of the scope you have for improving the profitability of your lamb enterprise.

The next step is to very clearly decide the lifestyle and financial goals your business has to support, and then determine the enterprise strategy, flock structure and markets that will best achieve these goals.

Access to capital, attitude to risk, land class and rainfall are some of the factors that make your situation different to others and will govern the enterprise choices available to you.

However, all options you might take will influence either of two things – your feed supply or your feed demand.

Feed demand is influenced by the flock structure and target markets you choose. The tactical options you may choose from to change feed demand include: classes of stock, breed, time of lambing, age at weaning, target growth rates and turn-off weights. All of these factors influence the feed demand in terms of quality and quantity required at different times of the year.

On the other side of the equation, options for providing the feed required include: the pasture species grown on different

land classes; the grazing rotation, which includes fencing, grazing and rest times; the use of irrigation, supplementary feeding, and fodder conservation.

Based on your current enterprise structure, you need to determine how well your feed supply matches your feed demand. There are a number of programs provided by MLA to help you do this, such as Prograze, as well as various tools and information in *The lamb guide* and its regional and finishing supplements. Alternatively, you can contact your local state department or farm management consultant for assistance.

If the match between your feed supply and demand is poor, look for options to change either or both. Other producers, often from regions quite different to yours, can be a great source of new options for you to consider. Keep an open mind, listen to others and read widely.

When you have chosen a few possible options, you should do an economic analysis of each of those options to ensure they will meet the profit goals you have set.

Once you have decided on the flock structure, target markets and feed supply options you want to implement, you need to develop a transition plan to get from the current enterprise strategy to the new one. This plan needs to account for access to capital, and have defined limits for cash flow and liquidity against which you can monitor progress. If these limits are breached, action can be taken in advance to get the business back on track. This is critical to managing risk.

Developing an enterprise strategy is a complex task requiring many repetitive calculations. Most farm management consultants have a range of computer tools to automate this process, and they are aware of most of the pitfalls that may confront you. It is strongly advised that you seek professional support.

Acknowledgement

The method for calculating cost of production was developed by Holmes, Sackett and Associates for Meat & Livestock Australia.

Further information

For more information from MLA for your lamb enterprise, such as a free copy of *The lamb guide* or any of the regional and finishing supplements, call the MLA producer hotline on 1800 675 717



Level 1, 165 Walker Street
North Sydney NSW 2060
Ph: 02 9463 9333
Fax: 02 9463 9393
www.mla.com.au

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tips & tools



GENETICS

An introduction to LAMBPLAN

LAMBPLAN is a genetic information system for sheep. It ranks sheep in terms of their genetic potential for key production characteristics that affect the profitability of lamb and sheep enterprises. LAMBPLAN information assists ram buyers to choose rams that will produce slaughter lambs or first cross ewes that meet their breeding objectives.

For example, using LAMBPLAN, a lamb producer wanting to increase the weight and decrease fatness in his or her trade or export lambs can select rams that have genes that meet these criteria. Similarly a first cross breeder can select a ram that will produce daughters that have higher fertility and produce heavier lambs at weaning.

If you consider that a ram contributes half of the total genetics of lambs and first cross ewes, you start to realise the potential of having such a high level of control over which rams are used.

LAMBPLAN provides breeders and producers with information on the value of animals' genes in the form of estimated breeding values (EBVs). You can use the EBVs to identify the best rams or ewes that meet your breeding objective.

LAMBPLAN EBVs describe genetic differences in production traits in livestock in simple, practical terms. LAMBPLAN delivers EBVs for growth traits, fat and muscle depth; wool weight and quality traits; reproduction ability, milk production and disease resistance. EBVs for structural traits (such as jaws, pasterns, and body length) are currently under development.

Key benefits

- LAMBPLAN enables sheep breeders and commercial producers to improve the capacity of their flocks to produce more profitable, viable sheep by sourcing the right breeding animals for their operation.
- Commercial buyers can use LAMBPLAN to assess the suitability of rams for their production system from different studs throughout Australia.

When should I use LAMBPLAN?

Any seedstock or commercial sheep producer who is serious about improving performance and profitability in their flock should be using LAMBPLAN information.

Commercial meat and wool producers should use LAMBPLAN information provided by seedstock producers to assist them with the choice of commercial flock sires. LAMBPLAN provides accurate and objective comparisons of the genetic merit of rams from different flocks. This applies to all sectors of the sheep industry – commercial wool producers, first cross or second cross lamb breeders, dual-purpose breeders, or purchasers of store stock and breeding stock can all benefit from using LAMBPLAN information to get the genetics that are suitable for their production system and market.

If you're a seedstock breeder, embracing LAMBPLAN as soon as possible will enable you to achieve high rates of genetic improvement and expand your client base. By using LAMBPLAN you can also ensure that your clients are getting the right genetics for their target market.

Why should I use LAMBPLAN?

LAMBPLAN EBVs are used to accurately select rams and ewes that will produce consistent and profitable progeny to the required specifications.

LAMBPLAN information provides a focus for producing better stock that provides more profit. Although the system revolves around breeding and production, it results in lambs that are more marketable. For instance, the production of fast growing, highly muscled, lean lambs that are destined for the US market can be made much easier by using LAMBPLAN.

Only LAMBPLAN provides a benchmarking system that allows breeders to track their level of improvement in the genetic make-up of their flock. LAMBPLAN provides genetic trends for seedstock breeders that show gains across years and it is the only system that accurately compares animals from different flocks for their genetic merit.

What do seedstock breeders need to do to start using LAMBPLAN?

- Contact the LAMBPLAN office or an accredited operator to obtain information relating to measurement programs relevant to your sheep or goat breeding objectives and details of membership.
- Accurately record all breeding, pedigree, performance and management information on your flocks using either recording books or in a computer program (both of which are provided to members). All LAMBPLAN data can be recorded in books or using standard LAMBPLAN data entry software (Pedigree Wizard). The software is suitable for any PC with Windows.
- Use an accredited LAMBPLAN operator to collect a live weight and measure the fat depth and eye muscle depth of rams using real time ultrasound to get this information to the database for analysis.

What do commercial breeders need to do to start using LAMBPLAN?

- Ask your seedstock supplier for their LAMBPLAN reports (see diagram on next page for guidelines on how to read one).

How does LAMBPLAN actually work?

The skill in breeding sheep for any purpose relies on the ability of the breeder to select parent animals that have a desirable set of genes to contribute to the next generation.

EBVs enable this to be done by estimating the genetic merit of animals for key production traits. This information is presented in simple units of production that specifically identifies those animals that you need for your breeding operation.

EBVs

Accurate pictures of the value of animal genes require three sorts of information:

1. Performance data (including performance of all relatives)
2. Knowledge of environmental factors affecting performance
3. Knowledge of how strongly different traits are inherited (heritability)

1. **Performance information.** No-one can actually look at a gene and figure out what it will do – LAMBPLAN simply uses a range of information to help identify those animals with the best genes for your production system and market.
- The animal's own performance. The performance of an individual animal for a specific trait is partly due to the expression of its own genes. Traits including body weight, eye-muscle depth and fleece weight etc measured using standardised methods.
- Related trait performance. One set of genes may affect more than one trait. For example, the genes that affect fleece weight also have a positive effect on fibre diameter; as well as eye-muscle depth affecting fat depth.
- The animal's relatives' performance. Related animals share genes. By comparing and contrasting the performance of related animals, a more accurate genetic assessment can be made.

In order to use information from relatives, LAMBPLAN must have pedigree information.

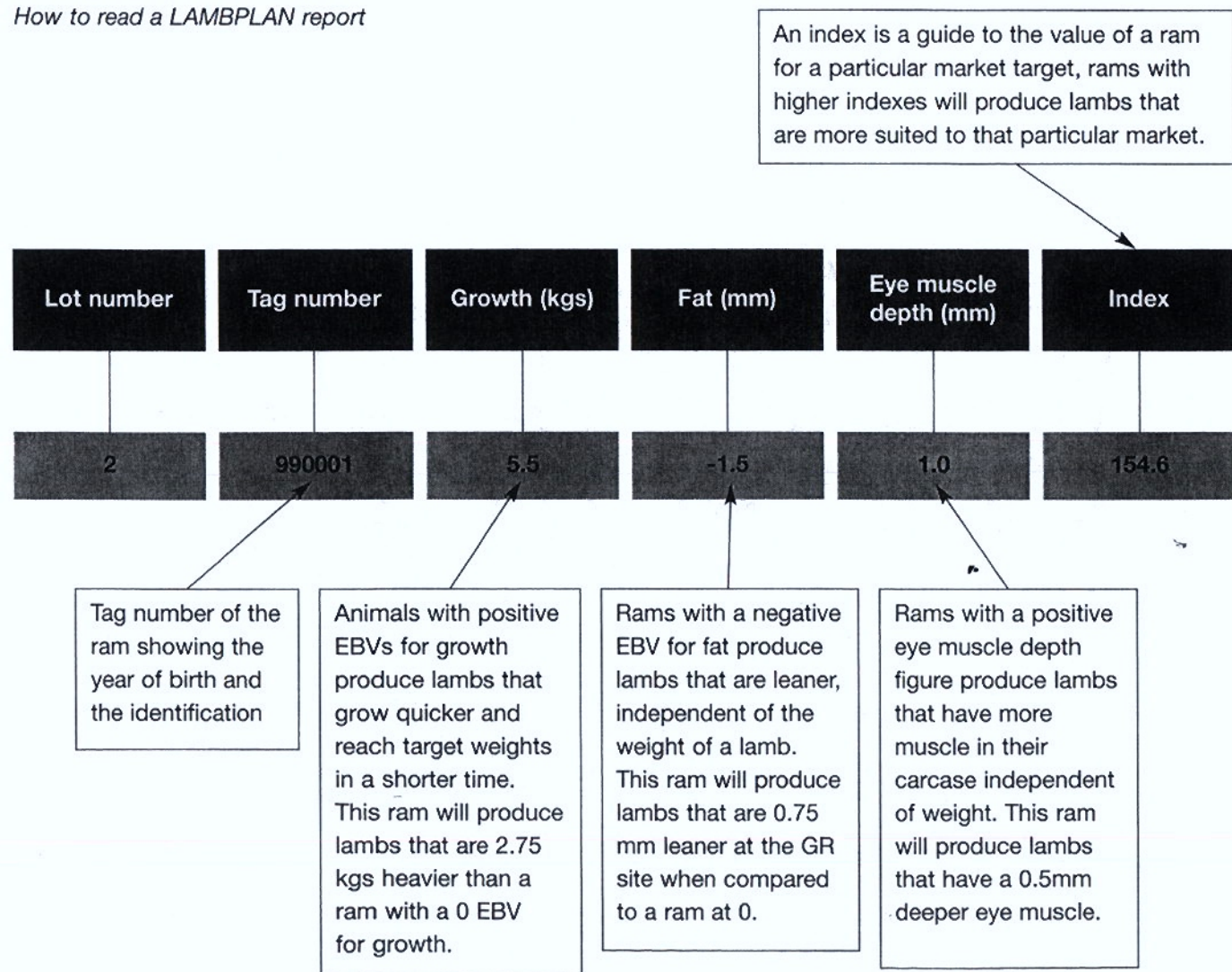
- 2. Environmental factors.** No matter what trait we are interested in, there are factors other than an animal's genes that influence its level of performance. Environmental effects include birth date, age of dam, birth type and rearing type, weaning group and management groups at post weaning. The adjustment of EBVs for environmental factors helps to achieve an accurate picture of genetic value of that animal.
- 3. The heritability of the traits controlled by those genes.** The degree to which differences are passed on – or inherited – is known as the heritability. Not all of what a gene may express in an animal is

passed on to its progeny when used in a breeding program. To produce sound estimations of breeding values, the heritability of the traits must be considered. Typical heritability of performance traits is about 30% for weight and growth; about 33-35% for fat depth; about 30-40% for eye-muscle depth; and about 10% for reproductive traits.

Producing LAMBPLAN EBVs

The process of producing EBVs in LAMBPLAN is completely standardised. This means that you know exactly what is going into your product and it gives you the best available idea of what to expect and a chance to further refine your operation to market specifications.

How to read a LAMBPLAN report



Note: A useful rule of thumb for converting ram EBVs into lamb production is to simply halve the EBV (as rams contribute half the genetics of the lamb)

Across-flock LAMBPLAN

LAMBPLAN EBVs use information from all relatives of each animal regardless of the flock or group. This across-flock feature of EBVs means that all animals can be directly compared for their genetic value, allowing the benchmarking of the whole breed.

Different groups within the same year can be compared for performance. Different years within a stud can be compared; and so can completely different studs.

This approach means that the best animals can be identified regardless of flock or the particular trait. It becomes straightforward to determine whether the flock is making any genetic change and to compare the value of flock sires across studs.

Commercial producers are now able to compare the performance of terminal sire rams from different breeds. This ensures that the best ram can be selected for a specific market target, regardless of which flock it is from.

The bottom line

LAMBPLAN uses a database of objectively measured characteristics known as estimated breeding values (EBVs). The EBVs represent just about all the traits a commercial operation would ever be concerned with. You can use these EBVs to select the best sire or dam for your purpose. This 'labelling' of genetic information makes it easier for you to select rams that best suit your production system and market.

Resources available

- Genetics Tips & Tools: *Using LAMBPLAN to select the right terminal sire ram*
- Genetics Tips & Tools: *An introduction to Merino Genetic Services*
- LAMBPLAN produces EBVs and indexes for all breeds of sheep in Australia. These are primarily Terminal sire breeds, maternal sire breeds and Merinos. Further information on the breeds that use LAMBPLAN can be obtained from the LAMBPLAN website or by contacting the LAMBPLAN office
- LAMBPLAN newsletter – quarterly
- How do I read a LAMBPLAN report? The basics for a commercial breeder



Department of Animal Science
University of New England
Armidale NSW 2351
Ph: 02 6773 2948
Fax: 02 6773 2707
www.lambplan.com.au



Level 1, 165 Walker Street
North Sydney NSW 2060
Ph: 02 9463 9333
Fax: 02 9463 9393
www.mla.com.au

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tips & tools



GENETICS

Using LAMBPLAN to select the right terminal sire ram

The Australian prime lamb industry offers lamb producers a range of market options, from the very light carcass weights suitable for the Middle East through to the heavy export markets dominated by the US market (see figure 1).

Efficient lamb production to suit market needs requires selection of the most appropriate terminal sire ram to suit the breed and type of ewes, the production and finishing system, and the desired carcass specifications.

Terminal sires are used to breed commercial lambs for slaughter so the critical traits to look for when purchasing terminal sires are growth rate, appropriate leanness (fat depth) and muscling. Birth weight and internal parasite resistance are influenced through terminal sire selection.

The key to selecting terminal sires lies in identifying those rams that produce the right balance of birth weight, growth rate, carcass characteristics and internal parasite resistance to suit your production system and the requirements of your target market.

Terminal sire breeders can use LAMBPLAN information to provide an estimate of the value of a ram's genes assessed by looking at his performance and the performance of his relatives.

This estimate is called an Australian Sheep Breeding Value (ASBV).

The main challenge commercial ram buyers face when trying to get the right balance of production traits is how to make a valid comparison of rams among the range of flocks within a breed and across the range of terminal sire breeds from which rams are available.

This challenge can be met through the use of LAMBPLAN ASBVs.

ASBVs allow you to evaluate a ram's genetic potential for growth, leanness and muscularity to select the terminal sire most suited to your prime lamb production system.

Key benefits

- Improve the accuracy of terminal sire ram selection to produce prime lambs to meet domestic and export market specifications.
- Identify key traits that influence lamb performance and market suitability.
- Compare the value of your rams' genes both across flock and across terminal breeds.

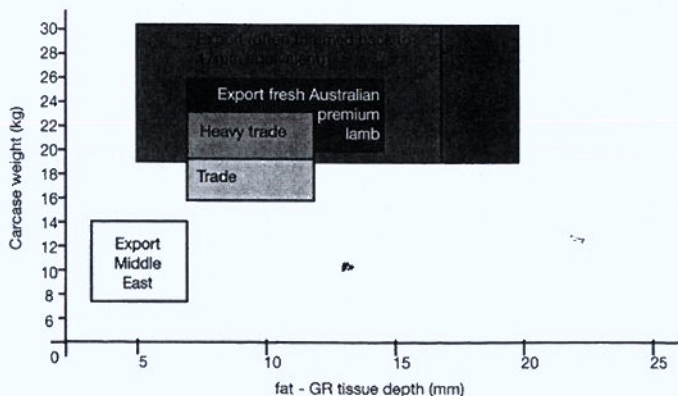


Figure 1: Weight and fat specifications for key domestic and export markets

Why should lamb producers use LAMBPLAN?

For an introduction to breeding values and LAMBPLAN, read the first title in this series of MLA genetics *Tips & Tools: An introduction to LAMBPLAN*.

LAMBPLAN is a valuable tool for both commercial ram buyers and ram breeders to select the best genetics to achieve their breeding and production objectives.

As illustrated in figure 1, lamb markets are primarily defined by carcass weight and fat ranges. The ability to produce prime lambs with the appropriate carcass weight and fatness is important for the profitability of both the lamb producer and the processor.

Sire selection is not 'one size fits all'. Producers who are able to more reliably select the right terminal sire to suit their ewe type, production system and market specifications, can more readily turn off lambs at the appropriate weight and fat score in a shorter time period.

LAMBPLAN ASBVs enable comparison across flocks within a breed and across terminal sire breeds.

Key traits affecting lamb production

Post weaning weight (PWWT)

In general, producers aim to achieve the target weight for their market in the shortest period of time. Numerous industry trials have demonstrated that the progeny of terminal sires with higher ASBVs for weight achieve target weight more quickly.

Producers also benefit from animals with higher genetic potential for growth, as they are generally more efficient converters of feed to body weight.

Post weaning fat depth (PFAT)

GR tissue depth is the depth of tissue over the 12th/13th rib, 110mm out from the backbone. A deeper GR measurement indicates fatter carcasses. GR depth is the basis of carcass fat grading in Australia (see figure 2). Over fat lambs are more costly to process at the abattoir.

Presenting lean, but not under-finished, lambs to the abattoir is critical for achieving high lean meat yields. This will become increasingly important as processors look towards value based payment systems such as VIASCAN.

When selecting rams, breeders must consider their ewe type, production system and market requirements to ensure the appropriate level of leanness. For example, lambs bred from Merino ewes are unlikely to carry adequate fat at domestic trade carcass weight if sired by a ram with a highly negative PFAT ASBV.

Post weaning eye muscle depth (PEMD)

Research and industry trials have shown that eye muscle depth is an important contributor to carcass lean meat yield. Rams with more positive eye muscle depth ASBVs will sire lambs with greater muscling and the potential for higher yielding carcasses. Selection of rams with more positive EMD ASBVs will also produce progeny with a higher proportion of their carcass weight in the more valuable loin and hind quarter of the carcass.

MLA and the Sheep CRC's sheepmeat eating quality research program has identified that lambs with greater EMD are less prone to stress and dark cutting.

Other traits of interest

Birth weight (BWT): Animals with high growth potential will, on average, have higher birth weight. To manage this, many terminal sire ram breeders weigh lambs at birth. By doing this they can restrict increases in birth weight while selecting for higher growth rate. Birth weight should be optimised; if birth weight is too high lambing difficulties are likely and if too low will lead to reduced lamb survival.

Faecal egg count (FEC): Lamb producers in higher worm burden regions are increasingly looking at the genetics they use as part of their long-term worm management strategy. Terminal sire breeders are addressing this by individually sampling lambs to calculate FEC ASBVs.

Ultrasound carcass scanning

Ultrasound scanning of live animals to produce fat and eye muscle depth ASBVs is routine practice among progressive terminal sire ram breeders.

All ultrasound carcass scan measurements used to calculate LAMBPLAN ASBVs are collected by accredited operators. Scanning is done at the C site. This is 40–45mm from the midline at the 12th/13th rib.

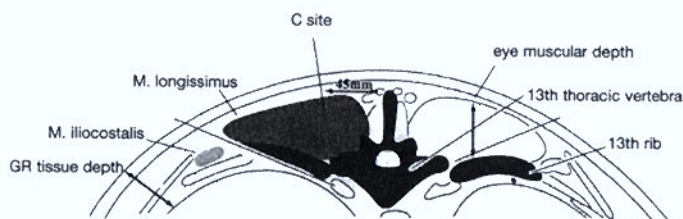


Figure 2: Cross section showing GR site for measuring fatness

Will ASBVs increase your returns?

The financial impact of ASBVs can be calculated by using a simple formula based on the fact that half the genes of each parent will be contributed to the progeny.

For example, if two rams have a difference in post weaning weight ASBV of 6kg we expect that their progeny would on average differ in weight by 3kg.

$$3\text{kg lwt} \times 46\% \text{ dressing} \times 60 \text{ progeny} \times 4 \text{ years} \times \$3.25/\text{kg} = \$1,076$$

Industry progeny testing programs have readily demonstrated variation in returns of this magnitude, and greater, from different terminal sires.

LAMBPLAN indexes

In addition to ASBVs for individual traits, LAMBPLAN produces market focused indexes. An index is calculated by combining a number of ASBVs based on their relative economic value to rank animals based on that combined criteria.

The two most common terminal sire indexes available are Carcase Plus and Trade \$ Index.

Carcase Plus

The Carcase Plus index is based on the weight, fat and eye muscle depth ASBVs at post-weaning age (7.5 months) with a relative emphasis of 60% PWWT, 20% PFAT and 20% PEMD.

Carcase Plus rewards lean animals with high growth and above average muscle. Due to rewarding leanness, some high Carcase Plus rams may be too lean for trade lamb production, particularly out of Merino ewes.

Trade \$ Index

The Trade \$ Index is designed to target production of 22kg carcase weight lambs. It combines post-weaning age ASBVs for growth, fat and eye muscle depth into a \$ index value.

The Trade \$ Index is expressed as dollars/ewe joined/year. In estimating the dollar variation the index assumes a weaning rate of 100% and lamb at \$3.50kg cwt.

The Trade \$ Index rewards animals with a post-weaning weight (PWWT) of +6 or greater. The greater the PWWT ASBV is above 6, the more points allocated to the index.

Production of trade weight lambs requires appropriate leanness, but excessive leanness is undesirable due to difficulties in finishing lambs at this weight. For this reason the Trade \$ Index optimises the post-weaning fat (PFAT) ASBV at -0.5. The further an animal's PFAT ASBV is from -0.5 the fewer points allocated.

The index also rewards animals with more positive post-weaning eye muscle depth EBVs, which are desirable for carcase conformation and yield. The more positive the PEMD EBV the more points awarded in the index.

Getting the most from LAMBPLAN

While LAMBPLAN produces indexes to rank rams, it is strongly recommended that ram buyers develop their understanding of LAMBPLAN to enable use of the index as an initial screening tool, then focus on using the individual trait ASBVs for the appropriate balance of growth, leanness and muscle to suit the breed and type of ewes, production and finishing system, and the desired carcase specifications.

Table 1 gives general guidelines to balance ASBVs to ewe and market type.

However, breeders should make adjustments for their personal situation and consult with their ram breeders to determine the most appropriate sire selection.

How do I find rams with ASBVs?

The LAMBPLAN website provides contact details for all terminal sire ram breeders who have ASBVs available on their rams. This site enables a customised search based on criteria such as state, postcode and breed of ram.

Additionally, some ram breeders have chosen to make their animal details available via the LAMBPLAN website. The animal search section enables a search for rams based on criteria such as ASBV, index, breed and location.

All web users can access the LAMBPLAN search at www.lambplan.com.au - use the 'search' option to access the breeder and animal search function.

Those without web access are encouraged to phone the LAMBPLAN office on 02 6773 2948 for assistance.

The bottom line

The key to making money through purchasing rams with LAMBPLAN information is to understand what they are worth to your business. Rams with the appropriate balance of ASBVs make more money because of their higher growth rate, lower fat and better muscling. The more lambs you get from these rams, the higher your profit.

**Table 1: Terminal sire ASBV guidelines
for trade and export markets and ewe types[#]**

Lamb carcass weight (CWT) and ewe type	ASBV specifications and reasons for recommendation		
18–22kg CWT lambs from XB ewes	PWWT	PFAT	PEMD
	6+	<-0.5	>0
	Note: If PWWT is >8 then PFAT range should be between -0.5 and 0. Rams with higher post-weaning weight ASBVs will produce lambs with faster growth rates and will have greater carcass weights at given ages. As new season lambs from first-cross ewes are usually fatter, rams should have average to below average ASBVs for fat. However, if sires' ASBVs for growth are high then pressure on fat should be lower.		
18–22kg CWT lambs from Merino ewes	PWWT	PFAT	PEMD
	6+	<0	>0
	In general, growth rate should be slightly higher and pressure on fat lower, particularly if the environment is such that the season is shorter. Emphasis on muscling should be moderate to high.		
Lamb carcass weight (CWT) and ewe type	ASBV specifications and reasons for recommendation		
24kg + CWT lambs from crossbred ewes	PWWT	PFAT	PEMD
	8+	<-0.8	>0
	Getting two, three or four fat score 24kg plus lambs is a challenge. Sires with negative ASBVs for fat will produce leaner lambs. Selecting sires with a higher growth rate and negative ASBVs for fat will produce higher yielding lambs. Please note that animals with higher EMD ASBVs tend to have higher FAT ASBVs. Therefore pressure placed on EMD ASBVs will depend on WT and FAT ASBV figures.		
24kg + CWT lambs from Merino ewes	PWWT	PFAT	PEMD
	8+	<-0.6	>0.2
	In general, ASBVs for fat do not need to be as low as for crossbred ewes. However it is important that you look at your feedback sheets as there is significant variation in the genes for fatness and growth amongst Merino ewes. In general Merino ewes may also be slightly poorer muscled so a little more emphasis on muscling should occur.		

[#] Note: These are general recommendations. Breeders should use their own experience and consult with the ram breeder to make the most appropriate ram selection.



PO Box U254
University of New England
Armidale NSW 2351
Ph: 02 6773 2948
Fax: 02 6773 2707
Email: info@lambplan.com.au
www.lambplan.com.au



Level 1, 165 Walker Street
North Sydney NSW 2060
Ph: 02 9463 9333
Fax: 02 9463 9393
www.mla.com.au

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The National Flock Identification Scheme (NFIS)



Photo courtesy NSW Agriculture

The National Flock Identification Scheme (NFIS) is a voluntary scheme developed to identify sheep and lambs using permanent, visually readable ear tags printed with a Property Identification Code (PIC) and the National Livestock Identification Scheme (NLIS) logo.

It is a proactive initiative developed with input from producers, processors, stock and station agents and state regulators in response to a number of international animal health and food safety events including Bovine Spongiform Encephalopathy (BSE) and Foot and Mouth Disease (FMD).

KEY TIPS ON THE NFIS

- The NFIS is a voluntary scheme for the permanent identification of sheep and lambs.
- The NFIS has been introduced to assist in maintaining market access, to strengthen product integrity, and to build Australia's competitive position in export markets.
- The NFIS consists of:
 - Sheep **Breeder Tags** - applied on the property of birth prior to moving to another property.
 - Sheep **Property Tags** - applied to sheep or lambs no longer on their property of birth.
- Tags will be identified with a Property Identification Code (PIC), the NLIS logo and the option of individual identification numbers.
- Traceback is achieved by documenting PICs on a current National Vendor Declaration (NVD) when sheep are consigned for sale and slaughter.
- Producers are required to confirm or obtain a PIC from their local State Department of Agriculture, Primary Industries or Rural Lands Protection Board (RLPB) in NSW.
- Sheep or lambs consigned from their property of birth direct to slaughter via Over The Hooks (OTH) trading do not require a tag unless specified by the processor.
- Once sheep are tagged with NFIS tags it will be illegal to remove them.



safe meat



KEY BENEFITS

- The ability to identify your sheep easily if they stray or get boxed with your neighbours.
- Unique individual sheep identification for management purposes if you have an individual identification number added when ordering tags.
- Sheep tagged in accordance with the 'colour of the year' system will meet a nationally recognised standard used to determine the age of sheep at a distance by the colour of their ear tags.
- The ability to identify the breeder of sheep and lambs that perform best on your property.

The NFIS is endorsed by SAFEMEAT, the industry/government partnership responsible for strategic policy advice on red meat safety and hygiene issues. The introduction of the NFIS provides the basic building blocks for the development of a 'best practice' system for the identification and tracing of sheep and lambs.

The NFIS will deliver the following key benefits to Australia's sheepmeat industry.

- Assist in maintaining market access by demonstrating that Australia's sheep industry is able to meet the traceback requirements of our domestic and international customers.
- Build our competitive position as one of the world's leading exporters of sheepmeat.
- Strengthen product integrity through the enhancement of product traceback systems to increase consumer confidence in the ability of the sheepmeat industry to identify and manage disease and chemical residue events should they occur.
- Assist other industry initiatives such as genetic improvement and supply chain management schemes by providing a standard method of identification in the sheep industry.
- Improve proof of ownership for lost or stolen sheep.

How does the National Flock Identification Scheme work?

The system uses visually readable tags supported by a National Vendor Declaration (NVD) to identify sheep and lambs to their property of birth and/or last property of residency.

1. Visually Readable Tags

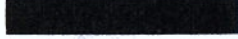
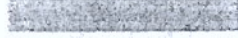
Permanent visually readable tags are used as the standard form of identification in the NFIS and can be obtained from approved manufacturers through current distribution channels.

There are two categories of tags:

- **Sheep Breeder Tags** - applied on the property of birth prior to moving sheep to another property.
- **Sheep Property Tags** - applied to sheep or lambs no longer on their property of birth.

Sheep Breeder Tags will be produced under a "colour of the year" system. This system allows for visual age identification of sheep and lambs at a distance by rotating through an eight-year colour cycle as defined below. Sheep Breeder Tags must only be used on sheep and lambs before they leave their property of birth.

The 'colour of the year' system*

Year	Colour	
1995	Light Green	
1996	Purple	
1997	Yellow	
1998	Red	
1999	Sky Blue	
2000	Black	
2001	White	
2002	Orange	
2003	Light Green	
Sheep property tag	Pink	

* The actual colours may vary slightly from the illustration.

Sheep Property Tags are pink in colour and, if applied when sheep arrive on a new property will assist to establish ownership of those sheep. Sheep Property Tags may also be used to identify sheep you have purchased that are already identified with an NFIS tag.

This practice is encouraged when the consignment consists of sheep or lambs originating from different properties as defined by the Property Identification Codes (PIC) on their tags. In this instance the Sheep Property Tags will identify the sheep and lambs in the consignment to their last property of residency.

2. A National Vendor Declaration (NVD) form

The NVD for sheep and lambs will provide a space for the vendor's Property Identification Code (PIC) to identify the last property of residency of the sheep and lambs in the consignment.

The NVD will allocate three additional spaces for producers to identify all other PICs on NFIS tags carried by sheep in mixed consignments where a previous owner has tagged the sheep and lambs.

If sheep or lambs are on-sold in a mixed consignment, producers will be encouraged to supply a current, completed NVD indicating the PIC of the consignor and the PICs, printed on the tags carried by all sheep and lambs in the consignment.

A separate tips and tools is available on the NVD for sheep "National Vendor Declaration for Sheep – 3rd Edition".

3. State Databases – PICs and Legislation

States and territories will progressively establish PIC databases for all sheep and lamb producing properties in that state or territory.

The states are also expected to introduce legislation to prevent:

- The removal of NFIS endorsed Sheep Breeder and Sheep Property Tags;
- The use of Sheep Breeder Tags on sheep and lambs not bred on the property;
- The re-use or re-sale of NFIS endorsed tags without written permission from your state department or RLPB in NSW; and
- The use of endorsed tags on a property that does not correspond with the PIC printed on the tag.

What information will NFIS tags carry?

Official tags will be printed to carry a Property Identification Code, the NFIS logo and the option of individual identification numbers to assist with on-farm management.



Photo courtesy NSW Agriculture

Property Identification Codes (PIC) are identification codes used by the State Departments of Agriculture/Primary Industries to describe the parcel of land used for livestock production. If you also run cattle on your property a PIC has already been allocated to you - this is your 'tail tag number'.

If you have never run cattle or have purchased additional land you will need to apply for a PIC for your land. Applications can be made at your local State Department office or RLPB in NSW. You will have to provide information that describes the location of the land eg: crown allotments, rate numbers etc.

PIC codes are made up of an eight digit alphanumeric number and are specific for each parcel of land. Producers who run livestock on separate parcels of land or have more than one property may have more than one PIC.

An example of a NSW PIC is provided below

NH020000

N= NSW

H= Check Digit (state specific)

02= RLPB District, eg **02**= Armidale

0000= Serial property identifier for parcel of land.

Note: Western Australia will continue using the established three letter/number brands until PIC legislation is introduced.

When do I tag sheep and lambs?

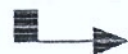
To achieve the full benefits of the scheme you should tag lambs at marking or weaning. Lambs must be tagged with a Sheep Breeder Tag prior to leaving their property of birth.

Sheep Property Tags must be used to tag sheep and lambs on your property that you did not breed but would like to tag to comply with the system.

Which ear do the tags go in?

If you decide to tag sheep and lambs brought onto your property with your PIC you are required to use the pink Sheep Property Tag. Producers should consider using this tag in the opposite ear to the existing Sheep Breeder Tag eg if ewes are tagged in the right ear with the Sheep Breeder Tag then ideally the Sheep Property Tag should be placed close to the base of the opposite ear.

If these ewes are subsequently on-sold, and the new owner wishes to identify them with tags carrying their PIC then another pink Sheep Property Tag will need to be applied. It is recommended that this tag be applied beside the original pink tag, closer to the tip of the ear.



This option will enable you to identify all sheep and lambs on your property with a tag that displays your PIC. When these sheep leave your property you will only need to record your PIC (that appears on the Sheep Property Tag) on the NVD that accompanies these sheep to sale or slaughter.

Because the system has been introduced on a voluntary basis there is no requirement for all sheep on your property to be tagged retrospectively. If you wish to tag sheep born in previous years you will need to notify your tag manufacturer of the number of tags you require for each drop as per the "colour of year" system.

Any excess tags can be kept to replace lost tags from that year's drop or for use during the next year corresponding with that tag colour ie white tags can be used in 2001 and 2008.

How do I sell sheep or lambs under the National Flock Identification Scheme?

There are essentially only four possibilities when selling sheep or lambs under the NFIS:

1. Sheep or lambs from property of birth direct to slaughter via Over-The-Hooks (OTH) trading do not require a tag unless specified by the processor. You are still required to complete a current NVD indicating your PIC.
2. Sheep or lambs sold from their property of birth via methods other than Over-The-Hooks require a Sheep Breeder Tag with the PIC documented on a current NVD.
3. Mixed consignments consisting of sheep and lambs identified with Sheep Breeder or Sheep Property Tags printed with different PICs require a completed NVD indicating your PIC plus a list of all different PICs printed on tags carried by sheep in the consignment.
4. If you have added a Sheep Property Tag to all sheep and lambs in the consignment, document this PIC in the space provided on a current NVD.

How do I become involved in NFIS?

1. Make sure you have a Property Identification Code (PIC).

If you run cattle you will already have a PIC. This is commonly known as your 'tail tag number'. If not, you will need to apply for a PIC from your local Department of Agriculture / Primary Industries or Rural Lands Protection Board in NSW. You will need to provide information, eg rate notice, describing the location of the parcel of land prior to being issued with a PIC.

2. Order tags

Sheep Breeder and Sheep Property Tags range in price from \$0.25 to \$1.10.

Tags are expected to be available from July 2002, contact your local Department of Agriculture or RLPB to confirm your PIC and clarify ordering procedures prior to ordering tags.

You may need to present documentation to verify that the PIC you are requesting on your tags matches the location of the parcel of land you own or lease. This documentation will be prescribed by each State Department or RLPB and may differ between the states.

To obtain tags you will need to confirm that your current tag supplier is licensed under the NFIS. A list of NFIS suppliers is available from the Meat and Livestock Australia Hotline – 1800 635 445 or on Meat and Livestock Australia's web site www.mla.com.au.

3. Include relevant information on tags

When ordering tags you can add additional information including property name or individual identification numbers. Some tags will be able to display this information on the one face. Where tags have two faces one face will be dedicated to the NLIS logo and PIC. If the sheep or lambs to be tagged have been bred on your property, tags will be supplied in accordance with the colour of the year scheme as previously described.

4. Consign sheep or lambs

Complete the current NVD making sure your PIC and the PIC printed on the NFIS tags carried by all sheep or lambs in the consignment are documented on the NVD.

5. Keep records

Keep a record of the age, class and the PICs of all sheep brought onto your property. This will assist you in accurately completing the NVD when you consign sheep for sale or slaughter in the future.

Further Information

If you have questions that are not answered here or would like further information on how the NFIS and the NVD for sheep will operate, contact the Meat & Livestock Australia Hotline on 1800 635 445 or look at the Meat and Livestock Australia web site www.mla.com.au



165 Walker Street, North Sydney NSW 2060

Tel: (02) 9463 9333 Fax: (02) 9463 9393 www.mla.com.au

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SHEEPMEAT EATING QUALITY

A guide for Australian producers

Background

No single quality trait alone, such as tenderness, influences a consumer's liking of sheepmeat. All sheepmeat eating quality attributes – tenderness, juiciness, and flavour – contribute significantly, so a mixed score is the best measure of a consumer's satisfaction with sheepmeat.

A number of factors throughout the supply chain affect the eating quality of sheepmeat, these are listed below.

- Sheep breed
- Age of the sheep
- Nutrition and growth path, including pasture characteristics and finishing systems
- Stress and handling of the sheep pre-slaughter
- Type, frequency and voltage of electrical inputs during processing
- Method by which the carcase is hung following slaughter
- Rate of chilling and pH decline following slaughter
- Period of ageing from slaughter to consumption
- Type of cut and the cooking method used
- Skills of the chef or cook

Sheepmeat eating quality varies between processing treatments, age classes, feeding strategies and cuts, but in several cases our assumptions about what causes inferior eating quality were wrong. Now that we know what is really important we can maximise the probability of a good eating experience.

Key points

- Meat & Livestock Australia (MLA) and the Sheepmeat Council of Australia have undertaken research and development into defining and improving lamb and sheepmeat eating quality through the Lamb and Sheepmeat Eating Quality (SMEQ) program. The research component of the program included over 17 major projects at a cost of some \$2 million.
- Research undertaken through the SMEQ program has developed commercially relevant information that helps better define and improve the eating quality of lamb and sheepmeat products.
- For the producer, maximising lamb and sheepmeat eating quality does not require any investment. In fact, there are only benefits for producers wishing to maximise SMEQ.
- The research has also dispelled some myths in relation to eating quality and has shed light on areas that had previously been gaps in our understanding.
- The focus for producers is to reduce stress and maintain good nutrition leading up to slaughter.
- Overall, the eating quality for all sheepmeat is very good. Most sheepmeat eats "good every day", meaning that consumers are satisfied with their sheepmeat dining experience – even hogget and fat-denuded mutton.

Key benefits of adopting SMEQ outcomes

The good news for producers is that adopting SMEQ outcomes does not require any investment on your behalf. Maximising the potential eating quality of lambs and sheep only brings benefits such as those listed below.

Benefit	Example
Lower production costs	Research has shown that good quality pasture is just as effective as concentrated diets for producing high quality meat. If pasture can be grown it is a cheap alternative to grains.
Better yield for over-the-hooks trading	A reduced time between muster and slaughter helps maximise dressed weight.
Faster production turnover	Feeding to achieve high growth rates will enable slaughter at a younger age for target carcass weights, allowing production costs to be recovered sooner.
Extracting better value from slightly more mature lambs	Research has shown that eating quality of lamb is maintained during teeth cutting (during eruption but not in wear).
Good welfare standards	Providing water to animals during on-farm curfew, in saleyards and in lairage and minimising stress throughout these stages maintains good animal welfare standards.
Improved knowledge	All producers now have access to information on how to manage lamb and sheepmeat eating quality.

Why is eating quality important?

Consumers are demanding improved quality, consistency, versatility and value for money. The major competitors to lamb and sheepmeat in domestic and export markets (beef, chicken, pork, fish) are all looking to improve their product quality and consistency. This increases the competitive pressures on lamb and sheepmeat.

To secure existing markets and enhance the competitive position of lamb and sheepmeat, it is important to provide quality products that consumers demand.



On-farm myths

The SMEQ research has resulted in industry better understanding the effects of on-farm practices and lamb and sheep selection. Here we dispel certain myths and provide the latest recommendations from recent research in the following areas:

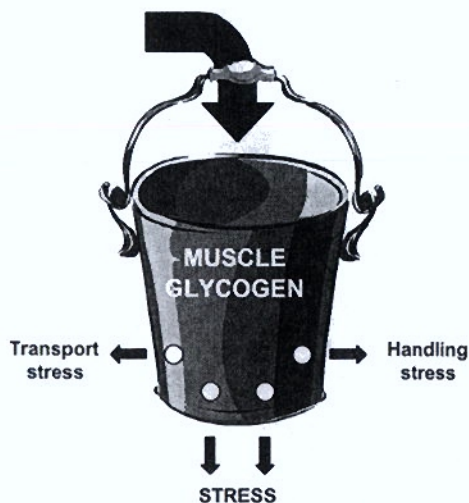
1. Stress and handling pre-slaughter;
2. Nutrition and finishing systems;
3. Breed; and
4. Age.

1. Stress and handling pre-slaughter

Myth: Levels of stress experienced by lambs and sheep cannot be controlled.

Fact: Stress can be minimised by careful pre-slaughter management.

Stress and handling of sheep pre-slaughter greatly influences an animal's glycogen levels. Glycogen is the energy store in the muscles of lambs and sheep. Low pre-slaughter glycogen levels can cause high pH meat that adversely affects meat colour, flavour and keeping quality.



Nutrition and stress are the key determinants of glycogen – good nutrition will fill the glycogen bucket while stress will empty it. High glycogen levels are desirable because they result in a lower ultimate pH, which is associated with bright red meat colour, improved flavour and keeping quality.

The following practices assist in maintaining glycogen levels to maximise eating quality:

The time between muster and slaughter should be as short as possible to maximise dressed weight and eating quality, subject to total time off feed. Hold animals for typically a minimum of 12 hours, up to a maximum of 36 hours, without access to feed before slaughter. The minimum time will depend on feed type, weather and processor demands.

- Minimise stresses between muster and slaughter. Stress factors to avoid where possible include:
 - Temperature extremes and electrical storms. Transporting in these conditions can place added stress on animals.
 - Use of dogs in yards.
 - Vigorously exercising sheep pre-slaughter.



Minimising stress while mustering and yarding assists in maintaining glycogen levels, maximising eating quality potential.

- Where practical, for product consistency aim for a standard time period between mustering and slaughter. Water should be available to animals during on-farm curfew.
- Merino lambs require more careful pre-slaughter management than other breeds to prevent high pH. Good nutrition and stress minimisation are the key factors. The tendency for high pH in Merino meat is heritable and probably related to temperament. Research in this area is continuing.

2. Nutrition and finishing systems

Myth: Diets that allow weight gain right up to slaughter are unnecessary.

Fact: Good finishing diets enhance sheepmeat eating quality. Diets that result in weight loss in the weeks before slaughter cause meat quality problems.

Myth: There are limited benefits associated with improving nutrition.

Fact: Well-fed lambs grow faster, can be slaughtered at a younger age and provide optimum eating quality.

SMEQ research has shown that the type of finishing system has little effect on eating quality, provided sheep are gaining weight before slaughter and they are finished to a fat score of 2-3. The exception is diets very high in cereal grains which may cause eating quality problems.



Well-fed lambs grow faster, can be slaughtered at a younger age and provide optimum eating quality.

Good nutrition and finishing are critical in defining sheepmeat eating quality.

1. It maximises juiciness and flavour

Good finishing guarantees high intramuscular fat levels. If intramuscular fat falls below 2%, consumers rate meat as dry and less flavoursome. Typically, a loin of a prime lamb finished to a fat score of 2-3 sits at around 4-5% intramuscular fat. Even a short period (two weeks) of declining nutrition before slaughter can dramatically reduce the level of intramuscular fat in lambs.

2. It can produce more tender meat

Good finishing optimises the amount of muscle leading to tender meat. Muscle tissue comprises soft muscle fibres surrounded by stronger connective tissue fibres which increase in toughness as the animals age. Poorly nourished animals which are losing weight will use muscle fibres to nourish the rest of the body, but the connective tissue fibres remain unchanged. Hence, poorly finished sheep are likely to be tougher.

3. It results in better colour, flavour and keeping quality

Good finishing optimises muscle glycogen levels at slaughter leading to better colour, flavour and keeping quality. Optimising glycogen is a combination of good pre-slaughter nutrition and reducing stress in the immediate pre-slaughter period.

To ensure maximum eating quality is achieved, the following nutrition and finishing are recommended:

- Allow animals to gain weight right up to slaughter (gaining at least 50g/day).
- Avoid diets very high in cereal grains because these lead to off-flavours, unusually soft, translucent fat and possibly high pH. For example, a diet such as 80% crushed barley, plus an ionophore, increases the risk of soft fat. Keeping barley whole can help. Another example is the soft fat seen when sheep are finished on lupin grain solely.
- For mainstream lamb production, select finishing systems based on production cost and maintenance of weight gain, not on perceived flavour advantages. Good quality pasture is just as effective as concentrated diets for producing high quality meat. In SMEQ testing, consumers could not detect an overall difference between sheepmeat finished on an actively growing clover/ryegrass sward versus grain-based diets.



Good quality pasture can be just as effective as concentrated diets for producing high quality meat.

It is worth noting that feeding to achieve high growth rates will enable slaughter at a younger age for target carcass weight. Eating quality is best in younger animals and production costs can be recovered sooner.

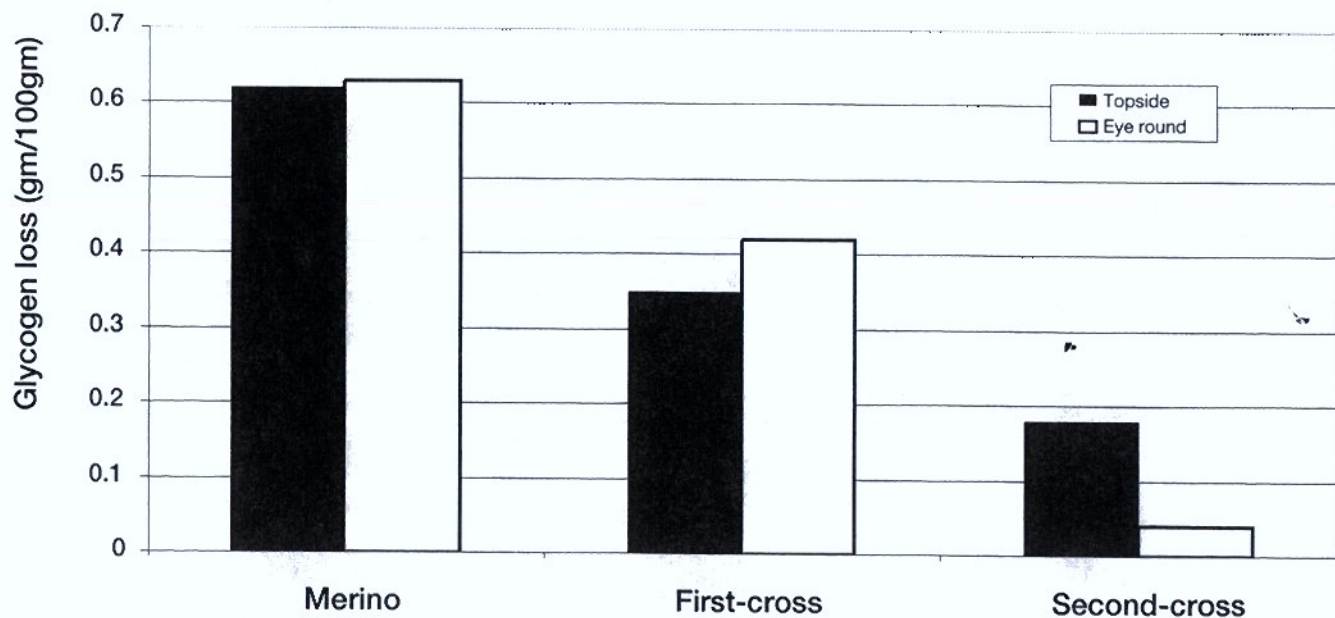
3. Sheep breed

Myth: Breed is a vital factor that affects eating quality.

Fact: Sheepmeat eating quality is not greatly affected by breed.

Sheepmeat eating quality is not greatly affected by breeds because of the higher variability of eating quality within breeds and between cuts. The apparent exception is the Merino, which is more susceptible to a high pH condition. However, if stress is minimised through careful pre-slaughter handling, the eating quality of the Merino can be as good as for other breeds.

Glycogen loss at slaughter



Merinos are most susceptible to glycogen loss at slaughter which can lead to meat quality problems. To maximise eating quality from Merinos, handle carefully in the two weeks leading up to slaughter to minimise stress.

Research has also found that certain sires can have an effect on eating quality and there is potential for selection based on eating quality if genetic markers can be found.

4. Sheep age

Myth: Animal age is the dominant factor in determining the eating quality of sheepmeat.

Fact: While lamb has the best sheepmeat eating quality when comparing like-for-like, some hogget and mutton cuts also perform well in terms of consumer rating.

Myth: The eating quality of lambs diminishes when teeth appear.

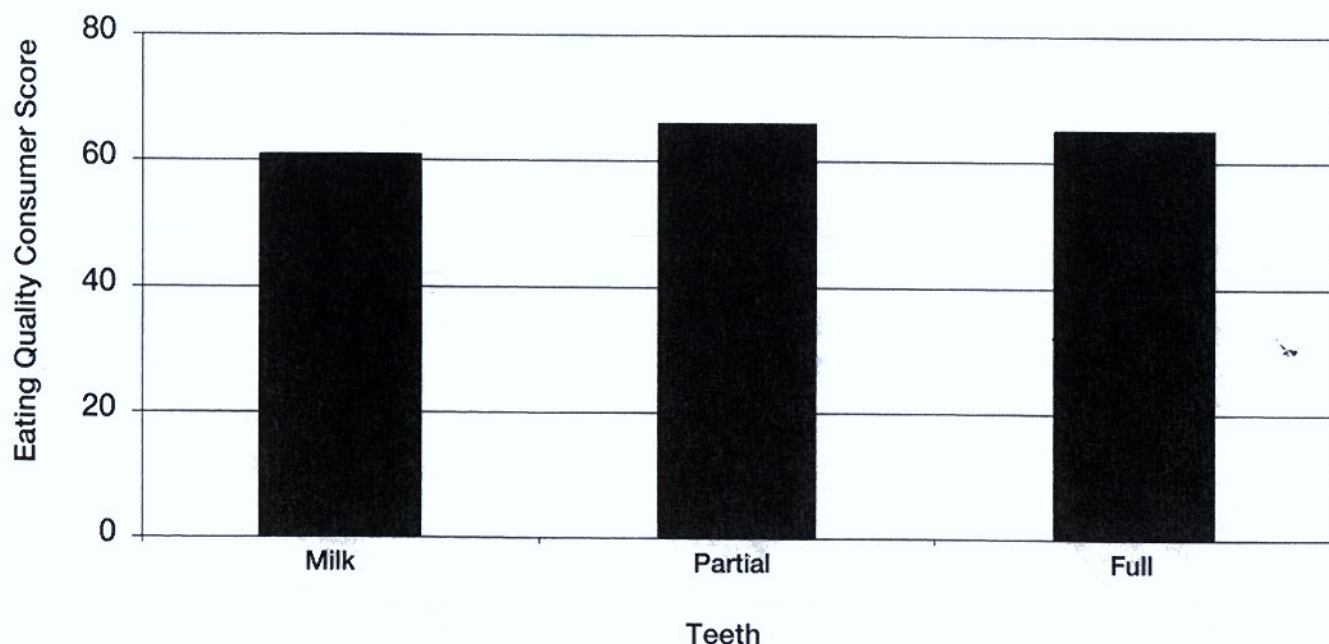
Fact: Eating quality of lamb is maintained during teeth cutting (during eruption but not in wear).

Based on consumer testing during the SMEQ research, lamb has the best sheepmeat eating quality when comparing like-for-like (eg same cuts, same processing methods), indeed the high eating quality of lamb stands out when an assessment of the whole carcass is made. However, some cuts of hogget and mutton also rated well.

Hogget loin cuts, processed under best practice conditions, have only slightly lower eating quality than weaned lamb loin processed under the same conditions.

A key finding of the research was that the eating quality of lamb is maintained during teeth cutting (during eruption but not in wear). It may therefore be possible to extract better value from slightly more mature lambs if agreed by industry.

Effect of teeth eruption on eating quality of sheepmeat



The eating quality of lambs is maintained during teeth eruption.

Summary of on-farm factors to improve SMEQ

- Minimise the time between muster and slaughter (subject to curfew requirements).
- Minimise stress between muster and slaughter:
 - avoid muster during temperature extremes
 - avoid use of dogs in the yards.
- Aim for a standard time between muster and slaughter.
- Make water available to animals during on-farm curfew.
- Manage lambs to achieve high growth rates and enable slaughter at a younger age.
- Ensure all sheepmeat categories are provided with nutrition that results in a weight gain of at least 50g/day right up to slaughter.
- To optimise intramuscular fat for SMEQ, finish lambs out to score 2-3 and keep them increasing weight up to slaughter.
- Avoid diets very high in cereal grains.
- For mainstream lamb production, choose finishing systems based on production cost and maintenance of weight gain, not on perceived flavour advantages.

Off-farm SMEQ factors

Producers who have supplied lambs and sheep on a good plane of nutrition with minimum stress must expect that the remainder of the chain would also maintain and improve sheepmeat eating quality. The SMEQ research extended to include all industry sectors with the results disseminated to each sector. A summary follows.

Processors

Research has demonstrated that processing is the most crucial step in maintaining or enhancing lamb and sheepmeat eating quality. Processing regimes are identifiable which will improve the eating quality and consistency of all classes of sheepmeat, not just lamb. Electrical stimulation, applied correctly, will guarantee

better consistency in all sheepmeat but may not be necessary for all operations, such as dedicated exporters who can chill age for longer periods. Tenderstretch has been identified as an alternative to electrical stimulation and is beneficial for the loin and hindquarter cuts. Ageing was confirmed as a key factor in eating quality. The relationship between pH and temperature decline plays a vital role in ultimate SMEQ.

Retail and foodservice

These sectors of the industry can contribute to maintaining eating quality by ensuring lamb and sheepmeat purchasing specifications match key criteria, particularly in terms of ageing requirements. This sector also has the opportunity to develop hogget and mutton products that will consistently meet "good everyday" eating quality.

Acknowledgements

MLA's research partners in the SMEQ work included Murdoch University, Agriculture Western Australia, Agriculture Victoria, University of New England, NSW Agriculture, Food Science Australia, AgResearch, Cosign and Sensory Solutions. The work was in accordance with the Sheep Industry Strategic Plan developed by the Sheepmeat Council of Australia.

Photos courtesy Murdoch University (Division of Veterinary and Biomedical Sciences) and NSW Agriculture.



For more information

Other SMEQ publications in this series include:

- *Lamb and sheepmeat eating quality – outcomes of the R&D program*
- *Maximising lamb and sheepmeat eating quality – A guide for Australian sheepmeat processors*
- *Maximising lamb and sheepmeat eating quality – A guide for retailers, foodservice and wholesalers*

Detailed technical information from the SMEQ program is available – *Technical Guide to Sheepmeat Eating Quality*

For more information contact 1800 155 900 or view the MLA website www.mla.com.au



Level 1, 165 Walker Street
North Sydney NSW 2060
Ph: 02 9463 9333
Fax: 02 9463 9393
www.mla.com.au

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Asistencia actividad de difusión Gira Tecnológica Producción ovina Australia

Fecha: 07/12/05

Lugar: Villa Alegre - CRT RAHUN

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ASISTENCIA ACTIVIDADES FUSION 6^{ta} PAQU. OVINA ALPACAS
FECHA: 14- DIC. 2005 LUGAR: FINCA QUITARAPU

FECHA: 14-Dic. 2005

WUČAR: ENIA OLUKARAC

NOMBRE	PROFESION	INSTITUCION	FONO
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Rosendo Montesinos	"	Fdo. La Montaña	83615182
Arturo Montesinos	Médico Veterinario	Sto. Domingo	9-3750764
Don Juan Pizarro	Médico Veterinario	Ormasa S.A	9-8433721
Edo. Fernández	Ing. Agrónomo	INIA-	73-512260
Regino Valladares	Médico Veterinario	Particular	9-8782615
Gerardo Anzueto	Ing. Exp. Agrícola	INIA	512260
Don/OS Alejandro	ENCUERO GANADERO	INIA	512260
ENCIO DONAN S.	ES	INIA	86682146
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Guillermo Wolk M.	Ing. Agrónomo	U. de Concepción	208875
LUANO FERRADA D.	Ing. Agrónomo	U. de CONCEP.	09-3436889
Don Juan Aguirre	Tec. Agrícola	INIA	09-8846611
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Transmiten conocimientos a productores de carne ovina



Productores ovinos de la Sexta, Séptima y Octava Región y diversos profesionales, están participando en actividades para dar a conocer las experiencias productivas que vieron durante su reciente gira tecnológica a Australia, apoyados por la Fundación para la Innovación Agraria, FIA. En los centros regionales de INIA Híndago de Litueche, Raihuén de Villa Alegre y Quilamapu de Chillán los integrantes de la gira se han reunido con productores ovinos, profesionales y técnicos, traspassando así lo que pudieron observar en los campos del Estado de Victoria y Nueva

Actividad se ha venido desarrollando en la Sexta, Séptima y Octava Región

Gales del Sur en Australia, país que es el segundo en el mundo en producción de carne ovina y que cuenta con 100 millones de cabezas de ganado ovino.

Esta gira, compuesta además de los productores por profesionales de INIA Raihuén, Fundación Chile, INDAP y el Profo Ovino de la VIII Región, tuvo como objetivo principal ampliar los conocimientos técnicos de los productores de carne ovina para mejorar su competitividad con el objeto de poder acceder en forma sostenible y creciente a los mercados de exportación, es así como pudieron conocer los sistemas de producción y gestión que se desarrollan en el principal país exportador de carne bovina a nivel mundial, ver el sistema y grado de implementación de Buenas Prácticas Ganaderas y programa de trazabilidad empleado en el proceso de producción para los mercados de exportación y observar en terreno las aplicaciones de innovación tecnológica y resultados de investigación relacionados con la producción bovina de carne de alta calidad.

Uno de los participantes fue el pro-

ductor Hellmut Serger, quien señaló que "esta gira fue espectacular en el sentido de que muchas de las cosas que vimos las estoy tratando de aplicar, en la medida que puedo, en mi producción y además tratando de traspassarlas a otros productores. Tenemos mucho que aprender y profundizar en el manejo reproductivo y productivo, en la parte sanitaria desde lo que vimos en Australia, podemos decir que tenemos que establecer los nuevos conocimientos e incorporarlos como rutina en nuestros campos".

En tanto Víctor Valencia, investigador de INIA Raihuén, sostuvo que "podimos ver en los productores ovinos de Australia un alto grado de especialización, el productor sabe lo que tiene que producir según lo que el mercado demanda y de acuerdo a eso enfoca su trabajo".

Esta gira tecnológica a Australia nació del trabajo de la Mesa para el Desarrollo Exportador Ovino del Sector Central, presidida por el subsecretario de Agricultura Arturo Barrera, que busca promover el desarrollo exportador de los productos de esta zona del país.



Agricultores vitivinícolas realizaron gira a Argentina

Productores del sector vitivinícola de la comuna de Villa Alegre que componen un Grupo de Transferencia Tecnológica en este rubro, coordinado por el profesional Ernesto Labra que pertenece al equipo de investigadores del INIA Raihuén, realizaron recientemente una gira a la ciudad de Mendoza en Argentina. En esta gira participaron nueve pro-

ductores que tuvieron como objetivo conocer en terreno la situación actual de la vitivinicultura en la provincia de Mendoza y capturar tecnología en el manejo de las viñas aplicado a la realidad local. Los productores pudieron conocer la experiencia de una cooperativa trasandina compuesta por pequeños y medianos vinateros que producen vi-

nos de alta calidad y recorrer sus viñas y bodegas. Otra actividad destacada dentro de esta gira fue la reunión sostenida con miembros del grupo CREA (similar argentino de los Grupos de Transferencia Tecnológica chilenos) del rubro vitivinícola, conociendo así cómo operan estas agrupaciones en Argentina.



Se incrementa valor en exportación de semillas

Octavio Sotomayor, director de la Oficina de Estudios y Políticas Agrarias (ODEPA), informó que en el período comprendido entre los meses

ciento superior a la registrada en el mismo período de 2004, cuando se vendieron 147,7 millones de dólares. El director señaló que la venta de

de semillas 2005-2006. Tanto en Europa, especialmente en España, como en los Estados Unidos (nuestro principal destino de las exportaciones de

de semillas en especial. En nuestro país, en contraposición, las disponibilidades de agua a la fecha hacen prever que sus requerimientos

las semillas fueron Estados Unidos (56 por ciento), Francia (12), Holanda (11), Alemania (5), Japón (3), Italia (2), Canadá (2), España

De Surin 15/12/05

Dieron a conocer experiencia de gira

Australia "la lleva" en exportación de ovinos

Productores ovinos de la Sexta, Séptima y Octava Región y profesionales que participaron en la reciente gira a Australia, país que tiene liderazgo en la exportación de carne ovina, están entregando antecedentes sobre la experiencia productiva que tuvieron la oportunidad de conocer en su gira tecnológica, apoyada por la Fundación para la Innovación Agraria, FIA.

En los centros regionales de INIA Hidango de Litueche, Raihuén de Villa Alegre y Quilamapu de Chillán, donde la actividad se efectuó ayer en la tarde, los integrantes de la gira se han reunido con productores ovinos, profesionales y técnicos traspassando así lo que pudieron observar en los campos del Estado de Victoria y Nueva Gales del Sur en Australia, país que es el segundo en el mundo en producción de carne ovina y que cuenta con 100 millones de cabezas de ganado ovino.

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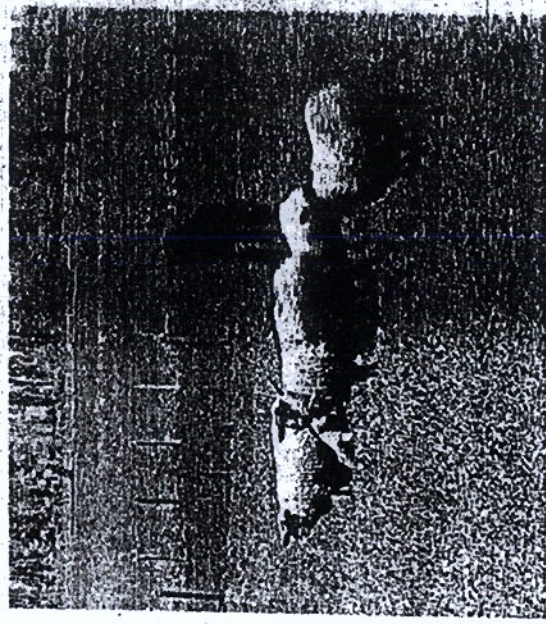
los nuevos conocimientos e incorporarlos como rutina en nuestros campos".

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La gerente del profo ovino que opera en Nuble, Oriana Baeza, señaló que las condiciones de la zona y el producto que se obtiene en la provincia tiene buenas condiciones para la exportación, aunque en Australia, señaló que usan una raza un poco más grande que permite obtener productos de más peso, que lo que se cria en la zona que es Shetland Down (conocido como cabra negra).

Señaló que en los lugares que visitaron la más común son las prácticas donde se crían ovejas blancas y algunas a por carne. En lo que respecta a carne, el productor más caro es el que produce carne de los 2000 pesos del orden de los 2000 pesos, lo que luego tiene una carne de 1 a 15 animales por hectárea, señaló. Este negocio le trae está muy por debajo de esta zona y hay mucho potencial en el área.



La crianza de corderos se presenta como una alternativa ganadera para la zona incluso para competir con la ganadería bovina.