



Winning against seeds

Management tools for your sheep enterprise

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Introduction

Winning against seeds provides Australian lamb and sheepmeat producers and their service providers with essential tools to produce 'seed-free' products. It identifies problem grasses and weeds, quantifies their impact on the industry and collates the experiences of producers who have won against grass seed contamination.

Producers who win against seeds:

- Identify problem plant species and are familiar with their time of flowering and seed set
- Determine the cost of seed contamination to their business
- Explore available seed reduction and seed avoidance strategies
- Determine the most cost effective and profitable strategies for their production system
- Obtain feedback from processors and monitor, review and improve their management strategies

Common seed management strategies include:

- Grazing management (stocking density, time of lambing, grazing rotation)
- Agronomic management (pasture manipulation, slashing, confinement crops, fodder conservation)
- Target market and time of turn-off

To control problem grasses in the short-term, producers make a start on one or two paddocks, rather than the whole farm. This usually provides enough feed to finish weaners or carry them through to stubbles and other feeds.

Processors are keen to support and work with producers and agents who are prepared to 'have a go'. They offer trial seed kills and formal feedback on lines sold over-the-hooks to ensure producers are paid for what they produce, no matter what district they come from.

The energy is there to reduce the incidence of seed in lamb and sheepmeat and *Winning against seeds* is a must read to help you get started.

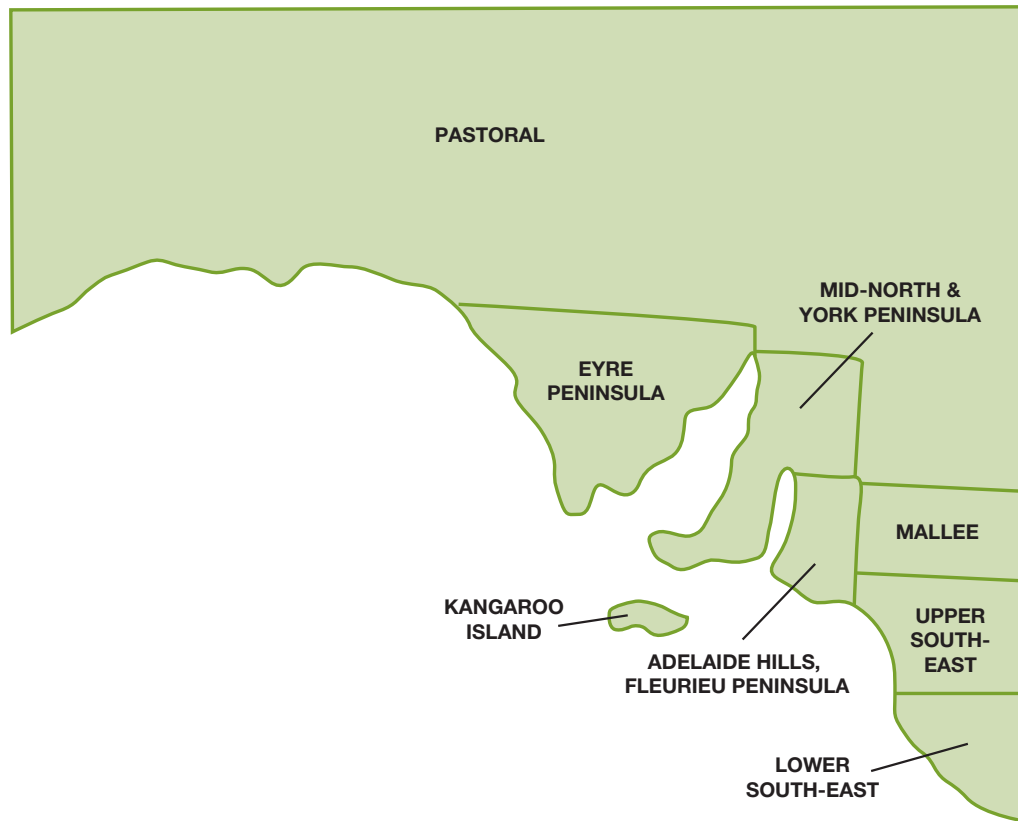
Bruce Hancock and Heidi Schuster
Rural Solutions SA



Premium quality lamb is our target

Problem weeds and location guide

South Australia



Grass and weed seeds that have a negative impact on lamb, sheepmeat and skin values in South Australia

Region	Weeds
PASTORAL	Spear grass Brome grass
EYRE PENINSULA	Spear grass Brome grass Barley grass Geranium Silver grass
MALLEE	Spear grass Silver grass Brome grass Barley grass Geranium

Region	Weeds
MID-NORTH and YORKE PENINSULA	Barley grass Geranium
UPPER SOUTH-EAST	Silver grass Brome grass Geranium Barley grass
ADELAIDE HILLS, FLEURIEU PENINSULA and KANGAROO ISLAND	Barley grass Geranium Chilean needle grass
LOWER SOUTH-EAST	Barley grass Chilean needle grass Geranium

New South Wales

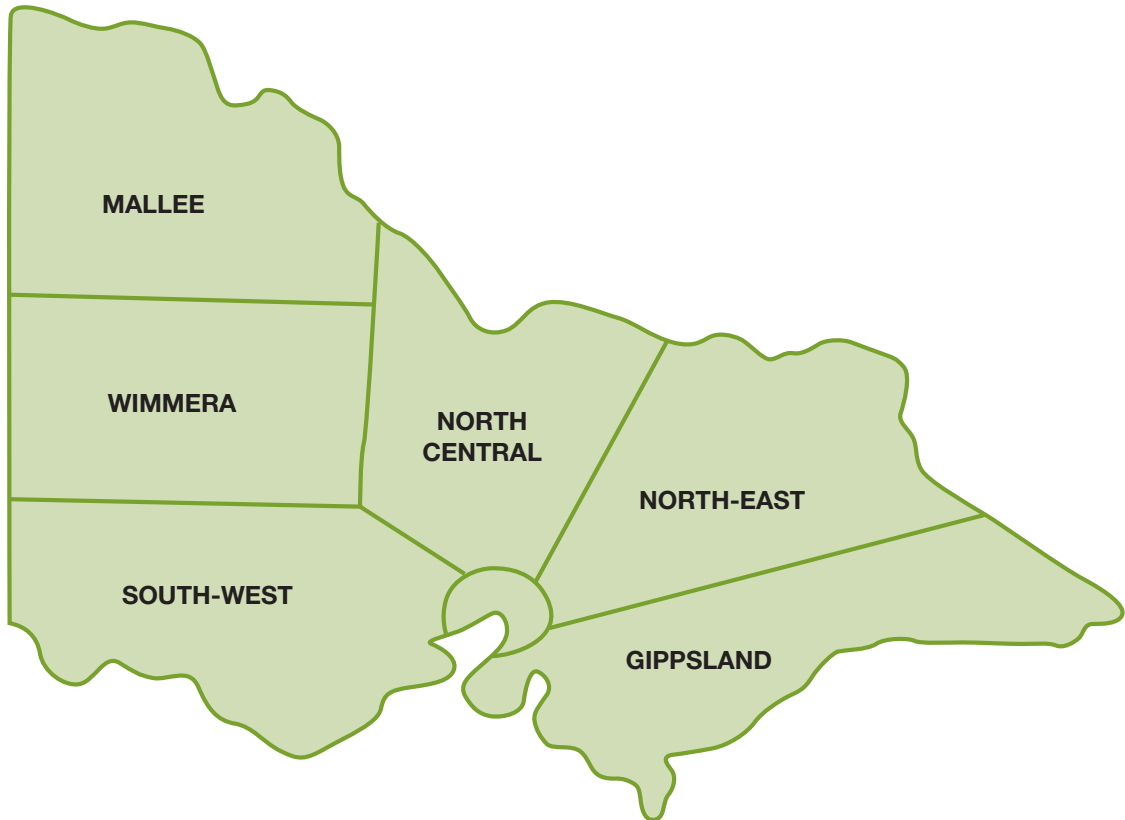


Grass and weed seeds that have a negative impact on lamb, sheepmeat and skin values in New South Wales

Region	Weeds
FAR WEST	Spear grass Wire grass Barley grass Erodium (also known as geranium)
BARWON	Wire grass Barley grass Chilean needle grass
NORTH COAST	Chilean needle grass
HUNTER	Barley grass Chilean needle grass

Region	Weeds
CENTRAL WEST	Spear grass Wire grass Barley grass Chilean needle grass Erodium (also known as geranium)
MURRAY/ MURRUMBIDGEE	Speargrass Wire grass Barley grass Erodium (also known as geranium)
SYDNEY SOUTH COAST	Chilean needle grass

Victoria



Grass and weed seeds that have a negative impact on lamb, sheepmeat and skin values in Victoria

Region	Weeds
MALLEE	Barley grass Brome grass Silver grass
WIMMERA	Barley grass Brome grass Chilean needle grass Silver grass
SOUTH-WEST	Barley grass Chilean needle grass Erodium (also known as geranium) Brome grass

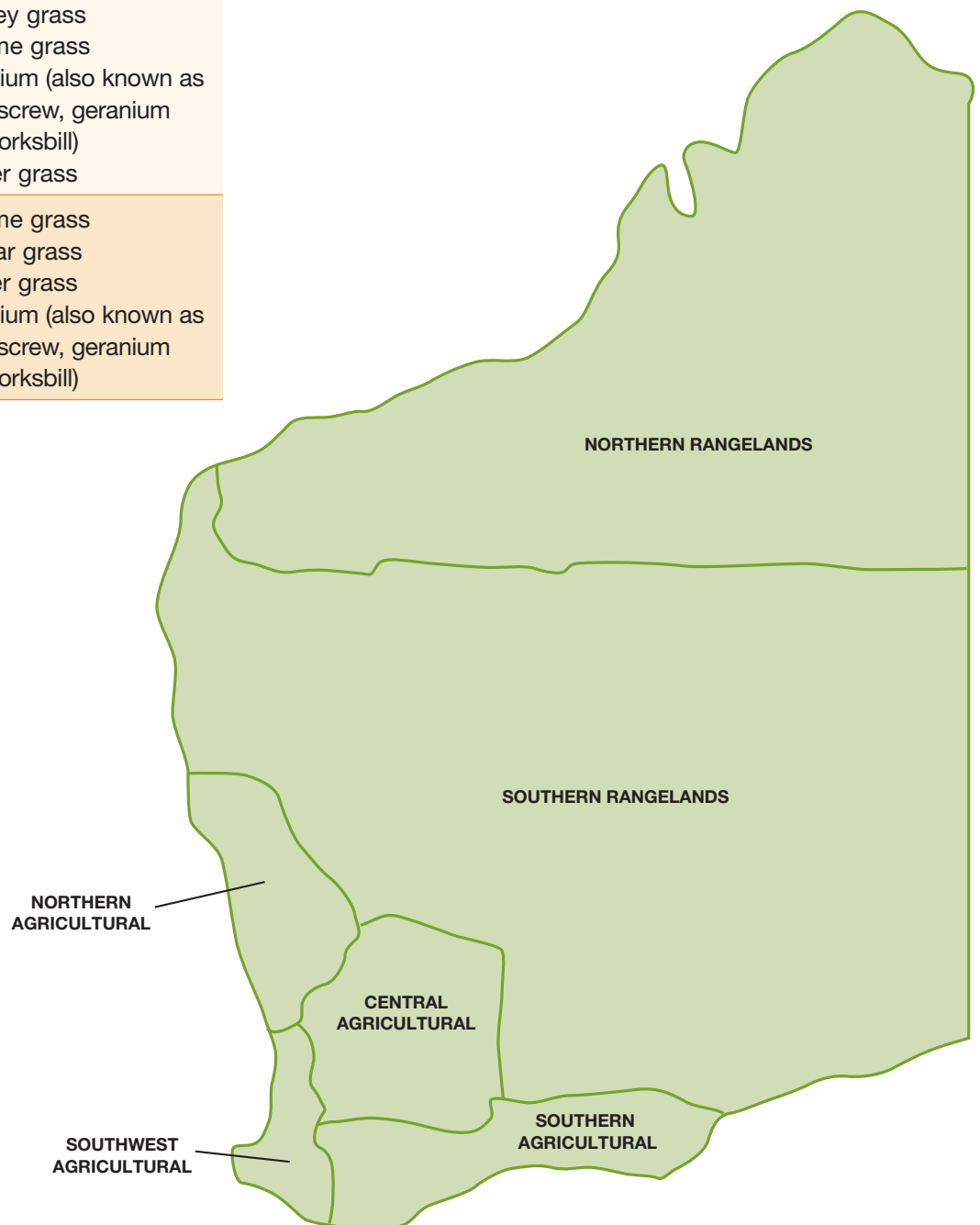
Region	Weeds
NORTH CENTRAL	Barley grass Chilean needle grass Silver grass Brome grass
NORTH-EAST	Barley grass Chilean needle grass Erodium (also known as geranium) Silver grass
GIPPSLAND	Barley grass Chilean needle grass Silver grass Erodium (also known as geranium)

Western Australia

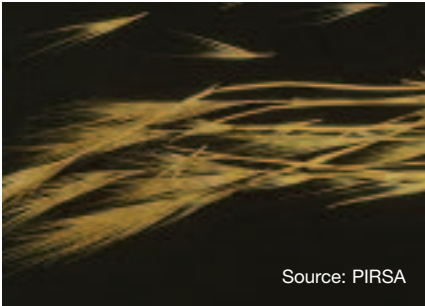
Grass and weed seeds that have a negative impact on lamb, sheepmeat and skin values in Western Australia

Region	Weeds
NORTHERN AGRICULTURAL (Geraldton)	Barley grass Brome grass Erodium (also known as corkscrew, geranium or storksbill) Silver grass
CENTRAL AGRICULTURAL (Moora and Northam)	Barley grass Brome grass Erodium (also known as corkscrew, geranium or storksbill) Silver grass
SOUTHERN AGRICULTURAL (Esperance)	Brome grass Spear grass Silver grass Erodium (also known as corkscrew, geranium or storksbill)

Region	Weeds
SOUTH-WEST AGRICULTURAL (Kojonup and Mt Barker)	Barley grass Brome grass Erodium (also known as corkscrew, geranium or storksbill)



Weed identification



Source: PIRSA



Source: Crop Weeds



Source: DPI Vic

Silver grass, sand fescue, dune fescue – *Vulpia fasciculata*



Source: DPI Vic



Source: DPI Vic

Great brome, Kingston grass, rippgut brome – *Bromus Diandrus*

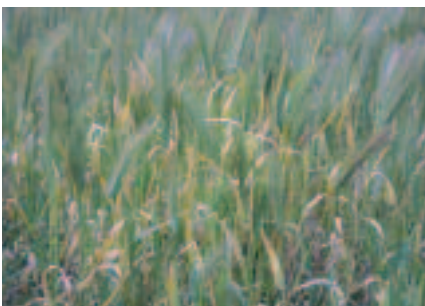


Source: DPI Vic



Source: DPI Vic

Rippgut brome, rigid brome, long-awned biotype – *Bromus rigidus*

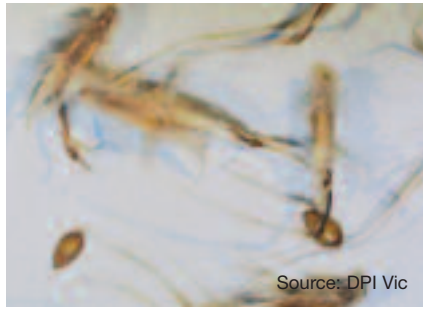


Barley grass – *Hordeum leporinum*

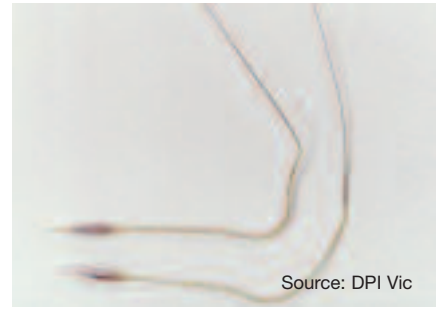




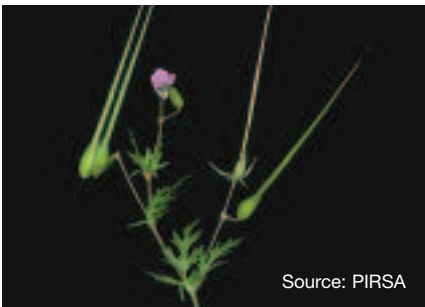
Spear grass – *Austrostipa nodosa*



Source: DPI Vic



Source: DPI Vic



Source: PIRSA



Source: DPI Vic

Wild geranium, erodium, common herons bill, common crow foot – *Erodium Cicutarium*



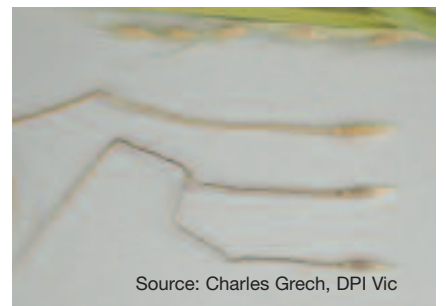
Wild geranium, erodium, long beak crow foot, long stalks bill – *Erodium botrys*



Source: Charles Grech, DPI Vic



Source: Charles Grech, DPI Vic

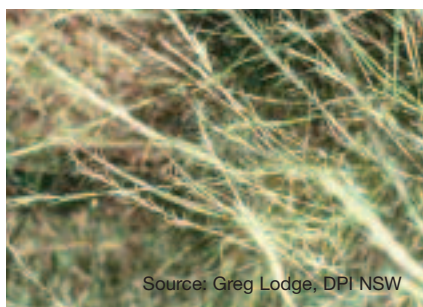


Source: Charles Grech, DPI Vic

Chilean needle grass – *Nassella neesiana*



Source: Greg Lodge, DPI NSW



Source: Greg Lodge, DPI NSW



Source: Greg Lodge, DPI NSW

Wire grass – *Aristida ramosa*

The issue

Impact statement WAMMCO

Growers can no longer afford to let their lambs be damaged by grass seeds. The cost of grass seeds to the Western Australian Prime Lamb industry is enormous and these costs are borne by both the processor and producer.

Processors

Seedy lambs create production inefficiencies along the slaughter chain and in the boning room. For example, heavily infested lamb lines cause the chain to slow and sometimes stop, as knife hands are required to move from production to trim affected carcasses.

The slaughter chain operates at about eight carcasses per minute so every minute lost impacts on production. One hour of lost production equates to about 500 carcasses or approximately \$50,000 in lost revenue.

If the grass seeds are 'deep-seated', the processor experiences further inefficiencies in the boning room where removing additional seeds results in up to a further 2kg loss of carcass weight. But more significant is the subsequent downgrading of the damaged primal, which can be sold only as boneless trunk meat returning \$2/kg after having paid the producer up to \$4/kg for the initial carcass.

Producers

Producers also lose when their lambs are contaminated with grass seeds. All carcasses infested with seeds are trimmed, reducing total carcass weight and attracting a trimming discount of 25% of the market price or about \$1/kg.

Grass seed awareness is now essential and producers who do not find effective methods to manage the problem will fall behind. For example, WAMMCO has a policy of not buying lambs from producers who have a record of delivering seedy lambs.

“Grass seed awareness is now essential and producers who do not find effective methods to manage the problem will fall behind.”

Last season WAMMCO International conducted a survey of all unshorn spring lambskins received. Of all unshorn sucker skins received during August–December, nearly 25% were seedy. This percentage increased as lambs were marketed later in the season.

Finally, and most importantly, grass seeds are a quality assurance and food safety issue. Presentation of a quality product is paramount to ensure growth of lamb sales in an extremely competitive world meat market. The last thing lamb needs is flack from an overseas customer who has come across a lamb roast containing unsightly cysts caused by seed penetration. Such bad experiences result in loss of markets and customers, with costs to both the processor and producer.

Peter Krupa and Peter Fowler, WAMMCO

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Carcass damage from small black seed heads

Impact statement Coles Supermarkets

Grass seed penetration is a contentious quality assurance and food safety issue and in most cases is almost impossible to detect, a factor which influences Coles' buying strategies.

On-farm livestock purchase now represents a major component of our supply, to improve quality assurance from paddock to plate. Purchasing lambs 'over-the-hooks' ensures producers obtain feedback on many issues, including seed infestation, and enables potential problems to be controlled. For example, 100% light seed in skins should ring alarm bells and encourage producers to shear carry-over lambs.

Purchasing seed-infested lambs at market results in major profit losses for processors, and in many cases the producer is unaware of the seed issue and is unlikely to become aware if there is no feedback system in place.

“...in many cases the producer is unaware of the seed issue and is unlikely to become aware if there is no feedback system in place.”

Impacts of grass seeds include:

- Reduced skin prices due to seed contamination and damage
- Loss of carcass weight due to trimming
- Poor overall presentation of carcasses due to trimming
- Products downgraded according to the extent of damage and trim required

Presentation of lamb on the supermarket shelf is paramount to ensure industry growth. Visible defaults often cause lack of confidence with consumers and bad experiences result in loss of customers, penalising all parties involved in lamb meat production.

Through awareness and improved farming practices, seed contamination has seen marked improvement over the past five years, but vigilance must be maintained for all parties to prosper.

Andrew Hay
Coles Supermarkets



Trimming is required to remove grass seeds from contaminated carcasses

Impact statement Fletcher International Exports, Dubbo NSW and Albany WA

Fletcher International Exports has been sourcing livestock from eastern Australia for more than 30 years. We are proud of the progression the Australian sheep, lamb and wool industries have made during this time and the part we have played in this.

We have also witnessed many changes in the requirements of the countries we export to and the clients we have in these countries.

All our clients demand the highest quality product and it is the responsibility of everyone to ensure that this high standard is achieved.

Sheep and lambs presented for slaughter with high levels of grass seed present massive issues to the processor, including:

- Extra trimming causing yield loss
- Downgraded product
- Reduced throughput
- Additional labour required
- Reduced quality of sheep and lambskins

The result is large economic losses not only to the processor but to the industry as a whole, and the reputation of Australian product is damaged.

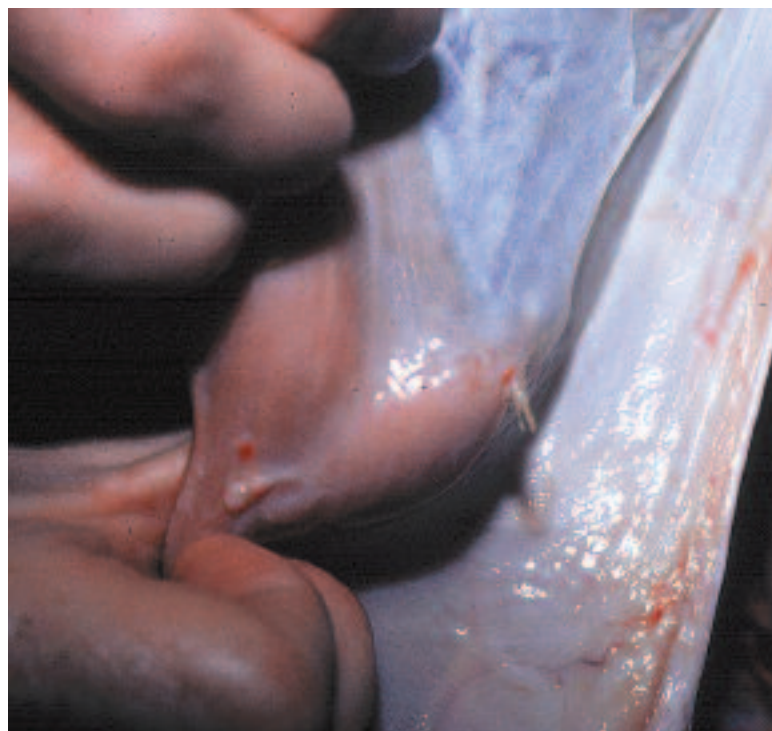
It is imperative we all work together on this issue to ensure the incidence of grass seed contamination in sheep and lambs is reduced.

“All our clients demand the highest quality product and it is the responsibility of everyone to ensure that this high standard is achieved.”

During 2004, Fletcher International Exports will introduce comprehensive feedback to farmers to identify these and other issues with livestock we process. We believe this information will help farmers with their management and enable them to target specific areas of concern.

We look forward to working closely with all our suppliers in the future to reduce the incidence of grass seeds present in the flock and increase returns for all.

Roger Fletcher
Fletcher International Exports



Carcass damage caused by large seed head

Impact statement Tatiara Meat Company

While individual growers are learning to manage grass seeds, as an industry we still have a way to go and it will take a unified approach to manage the seed problem successfully.

The ability of growers in traditionally 'bad' seed areas to manage their seed problem has been proven with regular out-of-season deliveries achieving seed-free results. Such success stories will play a significant role in motivating others.

As a processor we do not necessarily look for the amount of seed on the carcase, but where the seed is positioned, with the greatest impact coming from seed damage to the primal cuts such as the hind leg and loin areas. These cuts are high value and consequently their damage has the greatest impact on total carcase returns. Seed infestations of only one or two seeds in these areas can cause the carcase to be downgraded.

However, if a large proportion of a mob has heavy seed infestation in a low value cut area, like the brisket or belly region, the processor incurs significant losses due to frequent stopping to trim contaminated carcasses. The producer also loses since trimming occurs before the carcase is weighed (and paid for), and penalties for downgraded cuts could also result.

“...through co-operation we can assist producers to take ownership of this significant meat-quality issue.”

Factors impacting on the cost and efficiency of processing seed-infected carcasses include:

- Reduced throughput – frequent slowing or stopping of the chain causes fewer animals to be slaughtered and processed in a day
- Extra labour – seedy carcasses both on the slaughter floor and in the boning room can require twice the labour to process

- Downgraded product – contaminated carcasses are generally downgraded from a high value chilled product to a low value frozen product; legs alone can be discounted by \$10–15 per carcase
- Reduced meat yield – slaughter floor trim of seedy carcasses is often extreme in a bid to eliminate any seed entering the boning room

Some seedy carcasses appear during the late spring, but the worst occur during late autumn and early winter when carry-over lambs are marketed at heavy weights.

Professional finishers have driven significant change in this area by making their seed-free specification clear. For example, they have moved to buying direct from farm in breeder–finisher relationships or bypassing sale yards when lambs are being offered with seed.

We encourage producers to organise trial seed kills to receive feedback on how their production system is performing. We feel very strongly that through this co-operation we can assist producers to take ownership of this significant meat-quality issue.

Dale Cameron
Tatiara Meat Company



Carcase trimmed for grass seeds (left), non-contaminated carcase (right)

Skins statement Kreglinger

Spring triggers the time of year when grass seeds become a major problem for the skin industry, prime lamb producers and processors alike. In recent years, the meat processing and skin industries have been better able to estimate the enormous value of lost revenue and marketing opportunities caused by grass seed contamination.

Grass seed damage is by far the most widespread and serious problem found in lambskins today. Grass and weed seeds are picked up in the wool and then enter the pelt in a matter of days, producing puncture marks, scarring on the flesh side of the skin and abscesses. Scars created by seed do not absorb dyes and show up as pale spots on the pelt once it is tanned. Heavy pigments are required to disguise the affected areas of the skin, downgrading overall value. As well as damaging the pelt itself, removing grass seed from the wool is difficult, costly and in some instances impossible as woolskins cannot be scoured or carbonised.

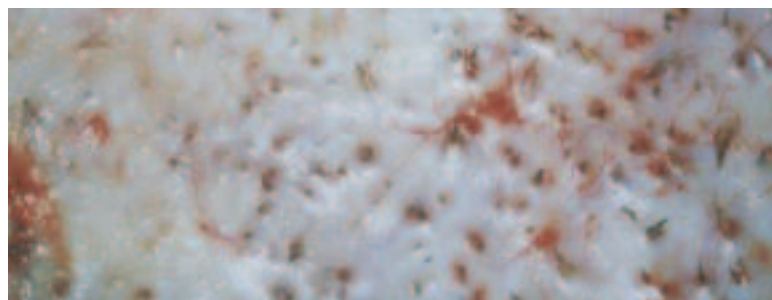
Barley grass, spear grass, brome grass, corkscrew (geranium), sand fescue, Mitchell grass and silver grass are the most common offenders found in Australia. Grass seed-affected skins are mostly unsuitable for the premium double-face wool-on garment and leather manufacturing markets. With reduced marketing options available to skin merchants and processors, seed-affected skins return far less than skins that are free of grass seed and vegetable matter contamination.

“Grass seed damage is by far the most widespread and serious problem found in lambskins today.”

New season sucker lambskins can be discounted by as much as 50% for grass seed penetration and vegetable matter contamination of the wool. New season lambskin prices are generally higher as some manufacturers use spring lambskins to purchase their entire annual requirements over only a few months.

Skins are a valuable product to the lamb industry and make a significant contribution to the total return on livestock. Although there has been a great deal of work in the past few years to reduce the percentage of seed-affected animals, there is still much to be done.

Paul Fitzsummons
Kreglinger (Australia) Pty Limited



Severe skin damage due to grass seeds



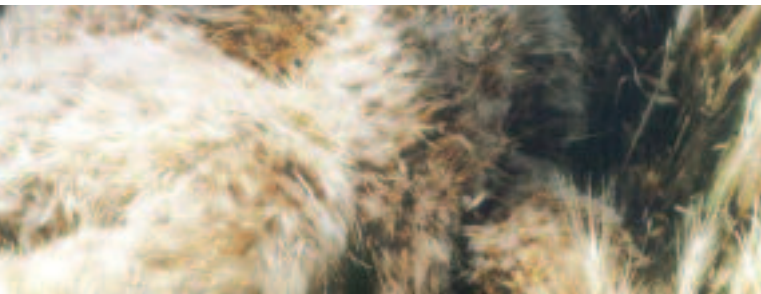
Seed contamination and damage in a processed lambs skin

On-farm losses

Grass seed contamination impacts on farm income by reducing sheep growth rates and health, and lowering wool, skin and carcase values.

Reduced wool production and value

Grass seeds and awns increase the shive content of wool, resulting in vegetable matter discounts and lower wool value. Wool production and quality also suffer when sheep become blowfly struck from grass seed irritation, or when they bite and rub the wool, resulting in discounts for cotted wool.



Severe seed contamination of a fleece

Wool type influences the amount of seed picked up and the degree of skin and carcase contamination. Down and Merino types are more severely affected than Romney, while Border Leicesters have the lowest contamination rate. Wool fineness within each type has little impact on the contamination rate compared with the wool type itself.

Skin and carcase damage

Grass seeds in wool can cause skin damage within days by penetrating the skin, causing puncture marks, scarring and abscesses. Pelt damage results in the skins being unsuitable for the wool-on garment and leather manufacturing markets because tanning chemicals and normal rates of dye are not absorbed into grass seed scars. Typically, grass seed-contaminated skins are discounted by 30–40%.

Contaminated carcasses also lose up to 50% of their retail value. These carcasses cannot be exported and are often only suitable for processed meats, with 4–5kg being trimmed from heavily infested carcasses.

Weaner ill-thrift

Eliminating the problem grass species from paddocks endemic with grass seeds can double lamb growth rates. Wool production also increases when weedy grasses are controlled.

Lambs in seedy paddocks will experience a sudden check in growth rates during mid-late spring and early summer in annual grass seed pastures and during summer–autumn in perennial grass seed pastures, when seed dispersal peaks.

Young sheep and lambs contaminated with grass seeds can become too sore to move and suffer damage to their eyes, ears, feet and mouths. Grass seeds can cause death through bacterial infection, tetanus and fly strike. As few as 25 seeds in a lamb can reduce post-weaning daily liveweight gain by up to 50%. In severe situations, especially in spring-born lambs, many lambs become mismothered and die of thirst or starvation, with reported losses as high as 30%.

As well as causing irritation and severe damage, many grass species – such as silver grass, spear grass and wire grass (*Aristida* sp) – also reduce stocking rates and provide very poor feed quality unless kept in their vegetative state.

Indirect costs

Producers can attract indirect costs associated with grass seed contamination if inefficient strategies such as premature shearing and earlier lambing are used to deal with grass seed problems. The benefits of such strategies in grass seed management need to be weighed up against potential production losses and price discounts that may be incurred, in addition to the advantages of alternate management strategies.

Premature shearing can result in length discounts on the finest fleece Merino weaners will produce in their lifetime, while earlier lambing may result in lower production rates and higher supplementary feeding requirements.

For example, prematurely shearing autumn lambs to avoid grass seed contamination can cost a farm business around \$90 profit per hectare each year in length discounts. This excludes additional long-term costs related to reduced carrying capacity from not maintaining suitable pastures.

Maintaining areas of improved grass seed-safe pastures and lambing during late winter or spring will deliver higher total production per hectare while tackling the grass seed problem proactively.

Karl Behrendt, Agrorum Consulting

Parts of this article and further contributions by Karl Behrendt, are based on information published in the magazine *Farming Ahead* and reprinted with kind permission of Kondinin Group. Phone 1800 677 761 for membership information or visit www.kondinin.com.au for a full list of Kondinin Group publications.



Grass seed penetration of the face and eye

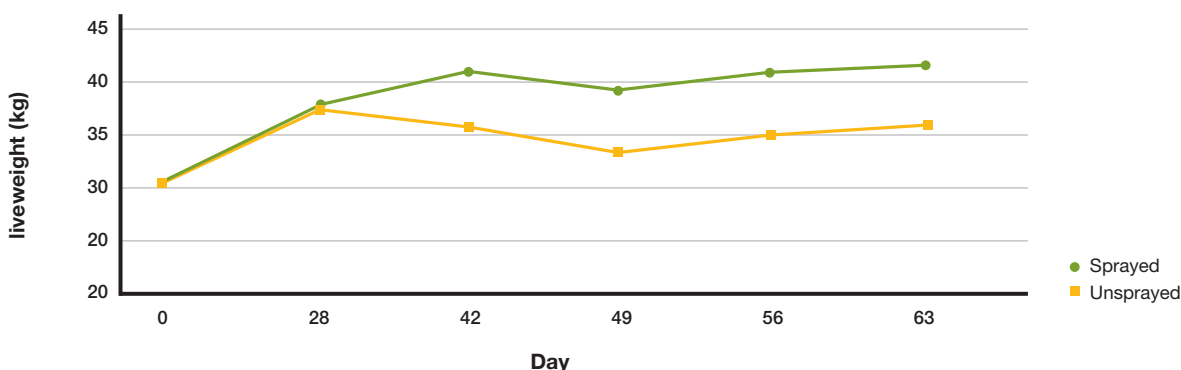
Effect of grass seeds on spring production

Results from a trial at the Turretfield Research Centre, South Australia, during spring 1990 illustrate the dramatic impact grass seeds (mainly barley grass) can have on Merino lamb production. A comparison was made of the performance of lambs grazed on pastures sprayed to control grass seeds (350ml/ha Fusilade® during September) and lambs grazed on unsprayed pastures.

Grass seed contamination of lambs grazed on the unsprayed pastures resulted in:

- Reduced growth rates – bodyweight down 6kg
- Damaged pelts
- Carcase weight reduced by 2.4kg
- Carcase value reduced by 78%

Lamb liveweight gain on sprayed or unsprayed pasture



Seed penetration and carcase data from lambs grazed on sprayed or unsprayed pasture

	No. of lambs	Seed penetration of eyes (%)		Mean carcase weight (kg)	Mean fat score	Mean carcase value (\$)
		Day 42*	Day 61**			
Sprayed	105	1	0	16.1	1.38	7.57
Unsprayed	108	58	14	13.7	1.05	1.64

*by day 42 the grassy pastures had matured ** 2 weeks after shearing
 SOURCE: Little DL, Carter ED, Ewers AL (1993), *Wool Tech. Sheep Breed*, 41, (4), p369–378

Management strategy

Grass seed management strategy

Identifying problem weeds and becoming familiar with their growth patterns and potential impacts on livestock underpin an effective management strategy for grass seed contamination.

The ultimate, long-term goal in grass seed management is to reduce seed set of grass species using strategic grazing, pasture improvement and to a lesser extent chemical control.

Lambing earlier, feedlotting and changing target markets aim to avoid grass seed contamination rather than tackle the core problem of grass seed set. While these strategies can help in the short-term, they will not fix the seed problem and could even increase the costs of production.

Minimising grass seed contamination of lambs and weaners during their first spring and summer is the main concern of most producers. A successful grass weed management strategy will focus on preparing enough grass seed-safe paddocks for lamb and weaner production (see diagram on page 18).

Management of annual grasses will differ from that of perennial grasses due to their individual seasonal flowering and seeding patterns. But for both annual and perennial grasses, the underlying management principles and profit drivers are the same.

Carefully assess the cost, risks and benefits of the available management strategies and consider their positive and negative implications on the production system and overall business.

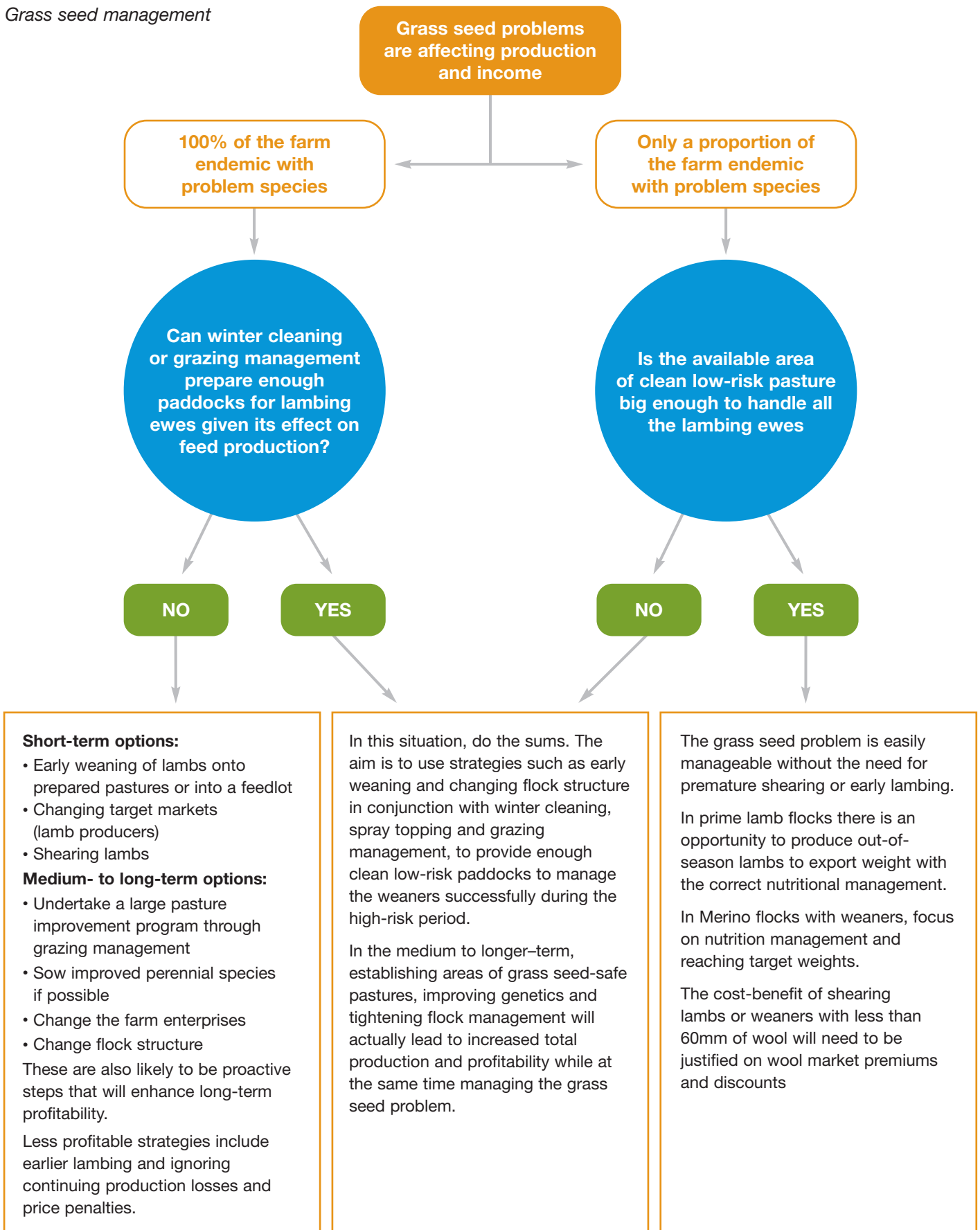
The key to managing grass seed contamination is to establish a production system that manages grass seeds while maximising profit per hectare. Grass seeds can be controlled without compromising productivity or reducing product quality.

Karl Behrendt, Agrorum Consulting

Four-point plan to manage grass seeds:

- 1 Develop an awareness of the grass seed issue and its impact on the sheep industry.
 - Understand the potential scope of the problem throughout the supply chain from the farm to the end product.
 - Identify problem plant species and their risk period.
- 2 Determine the impact and cost of grass seeds to your business.
 - Monitor stock for seed infestation.
 - Obtain feedback through a trial seed kill.
 - Identify losses in production and profit as a result of grass seeds.
- 3 Develop and implement a grass seed management strategy.
 - Explore all management options available for seed reduction and seed avoidance.
 - Determine the most effective and profitable strategies for your business.
- 4 Obtain feedback, monitor and review your management strategy and make changes where required.
 - Keep accurate records on key indicators so you can measure your performance (success).

Grass seed management



Livestock and grazing management

Managing grass seeds by grazing

Use grazing management to manipulate pasture composition and reduce the total number or height of seed heads to minimise their impact on young sheep. Manipulating pasture composition in conjunction with improving soil fertility effectively controls and reduces the impact of grasses such as wire grass, spear grass and silver grass.

Heavy grazing or slashing during emergence of seed heads will reduce seed set. With appropriate rest periods, other more desirable species can then out-compete grass seed species and improve pasture productivity.

Grazing management to control seeds from annual grasses is most effective where pastures maintain a strong perennial base. The perennials supply feed to maintain weaners even after heavy spring grazing has removed problem seed heads.

To achieve this, lock up paddocks for 30 days after heavy late winter and early spring grazing to synchronise seed head development in annual grasses.

After the annual grasses have reached the jointing stage – when nearly all tillers have noded but before they have produced seed heads – graze the paddocks down to 800–1,000kg dry matter/ha with at least 200 dry sheep equivalents/ha over four to five days. This is preferably carried out with cattle, worm-free wethers or dry ewes. Re-stock the paddock with weaner lambs or lactating ewes when pastures reach target levels of 1,500kg of high-quality green dry matter/ha.

During spring, with pasture growth rates of 40–80kg dry matter/ha/day, it will only take two weeks to reach this target, after which it could be stocked with either 20–40 weaners/ha or 11–22 lactating ewes/ha. Rotational grazing will be required on lucerne pastures.

Making silage, which is similar to heavy grazing during the stem elongation phase, can be used to prepare high-quality grass seed-free pastures for weaner sheep. But it will be less effective in long-flowering grasses (such as silver grass).

In extensively grazed lower rainfall areas, where chemical control may be limited to sheep camps and the only pasture improvement option may be lucerne at 20–30 plants/m², grazing management can reduce the average height of problem grasses such as barley grass.

Heavy grazing during late winter and early spring will lengthen the vegetative stage of the grasses and improve their summer nutritive value. This reduces the impact of grass seeds on the eyes of young sheep, although barley grass production and seed head numbers will increase.

In northern New South Wales and southern Queensland, expanding the area of improved perennial pastures or manipulating wire grass-dominant pastures to more favourable *Danthonia*- or *Microleana*-dominant pastures will significantly reduce the impact of problem grasses on farm profit and production.

Karl Behrendt
Agrorum Consulting

Maintaining grass seed-safe pastures in South Australia

Correct timing when managing grass seeds is critical and will only come with experience. Taking pastures down to 800kg dry matter/ha during spring can be risky in South Australia, especially during a dry season, but these risks are minimised if you have an improved pasture base.

Consider the following options to manage grass seeds with grazing:

- Increase lucerne use, particularly in cropping rotations. A dense (at least 20 plants/m²) winter-cleaned stand of lucerne will provide a clean grass seed-free pasture for lambs during early summer, as well as nutritional and disease benefits for subsequent crops.
- Sow late maturing grasses. These will respond to late spring rainfall and soil moisture. Use New Zealand perennial rye grasses where traditionally Victorian varieties have been used, or Italian rye grasses in paddocks considered too dry for perennial grasses. New phalaris or tall fescue varieties would also be worth considering.
- Consider late maturing annual legumes such as Persian clover or new, late season subterranean clovers such as Leura or Denmark.

Late maturing legumes and grasses may not be persistent, but can provide short-term, high performance and highly profitable pastures for finishing lambs.

Tim Prance, Rural Solutions SA



Heavy grazing pressure at critical times is essential

The benefits of high performance genetics in grass seed management

High performance genetics are an essential input for every sheep business. The increasing use of estimated breeding values (EBVs) by seedstock breeders enables commercial breeders to predict the genetic performance of sires more precisely.

Using EBVs, terminal sire ram breeders are averaging 5% genetic gain each year. Maternal and Merino ram breeders are also improving their rates of genetic gain.

By increasing animal growth rates genetically, livestock can be turned off at a younger age and before grass seeds become a problem. Alternatively, if seed set allows, animals can be grown on to heavier weights at the traditional turn-off time.

Lambs with a high growth rate also make better feeder lambs and will be of benefit in areas where grass seeds force producers to sell lambs on to a specialised lamb finisher.

Where alternate finishing systems such as lucerne, fodder crops or lotfeeding are available, high growth-rate lambs minimise the time required on the more expensive feed base. Lambs that grow faster also tend to have better feed conversion rates.

While growth rate is the key trait influencing profit when selecting prime lamb sires, it needs to be balanced in relation to fat and muscle. Similarly, a sire's overall genetic package needs to be assessed in relation to the ewe flock.

When considering prime lamb dam selection, consider weaning weight and maternal weaning weight (milk) EBVs. Ewes with superior EBVs for these traits will wean lambs heavier at the same age enabling earlier finishing before weed seeds become a problem.

For more information, visit the MLA LAMBPLAN website at www.mla.com.au/lambplan

**Richard Apps, LAMBPLAN
and Merino Genetic Services
Meat & Livestock Australia**



Flock structure and lambing time

Changing flock structure in a wool enterprise to increase the proportion of wethers can minimise the amount of grass seed-free country required for lambing ewes or weaners. Subsequently, total wool production and profit per hectare will increase.

In a prime lamb enterprise, flock structure can only be adjusted marginally by increasing ewe fertility. Higher fertility rates will mean fewer ewes need to be run to produce the same number of lambs. If this is carried out at the same time as increasing the lambs' genetic growth rates and improving ewe maternal production, the same amount of lamb meat can be produced per hectare with fewer ewes. This means lambs can be weaned earlier and run on prepared grass seed-free high-quality pastures.

A compact lambing of five to six weeks also reduces the potential scope of the grass seed problem. Compact lambing will enable all operations to be completed (and stock movements minimised) before the danger grass seed period. For example, mulesing, marking and allowing time for wounds to heal so lambs can be handled, will enable lambs to be weaned early onto clean pastures if necessary.

Lambs weighing as little as 12–15kg can be weaned onto high-quality improved pastures free of grass seeds without adversely affecting growth rates or lifetime production.

Large pasture areas are not necessary. Considering that spring pasture growth rates can be more than 40–60kg dry matter/ha/day, these paddocks can stock 30–40 weaners/ha without impacting on growth rates or pasture quality and quantity.

Bringing lambing forward to avoid problems is an expensive way to control grass seeds. An autumn or early winter lambing always incurs a stocking rate penalty, higher supplementary feeding costs, lower fertility rates in ewes and lower lamb growth rates. Lambing at this time also tends to generate the lowest levels of profitability in prime lamb and wool producing flocks.

Avoid mustering or handling during high-risk periods and ensure all lane ways and holding areas are free of grass seeds. This also ties in with the need for a compact lambing period, not only to minimise labour requirements but also to allow early weaning if necessary.

Another way to reduce the amount of grass seed pick-up is to provide access to watering points via pathways radiating across paddocks. The pathways can be cleaned chemically or mowed to reduce the amount or height of seed heads. This can reduce, but not eliminate some grass seed pick-up, as long as sheep are mustered slowly and not disturbed by dogs during the high-risk period. Similarly, moving lambs on cool, damp mornings will reduce pick-up.

Karl Behrendt
Agrorum Consulting



Higher supplementary feeding requirements and costs associated with autumn lambing can make earlier lambing an expensive way to manage grass seeds

The feeder lamb option

Producing feeder lambs offers a solution for properties that cannot avoid seed contamination of finished lambs. Under this system, a smaller lamb is turned off and the late pregnancy and lactation needs of the ewe are better matched to the length of the spring.

Before changing to a feeder lamb system it is important to do some market analysis and production planning to determine if the change will be profitable.

Market analysis

Compare the average price received for the lambs you have been producing against your expected prices under the feeder lamb system. If you expect to receive no more than a 10% discount for the feeder lambs compared to your current lambs, you will probably be better off with a feeder lamb production system.

To be successful, you will require a feeder lamb market that will not collapse when the price differential between grain and lamb makes it unprofitable to lotfeed lambs.

An opportunistic finishing industry will be no good to you in the long-term because it requires a trading margin between the price paid per kilogram and the price received per kilogram. Grainfed lamb does not attract a premium so if the finisher requires a trading margin it has to come from a reduction in price paid to you.

Production planning

Feeder production enables a later lambing which, in turn, means you do not have to support pregnant and lactating ewes during the annual period of least pasture availability. While this will enable you to run more ewes, it will also require more attention to the flock's nutritional needs during late summer and autumn, leading up to joining.

It is important to determine how you will fund the purchase of additional ewes or, alternatively, how you will use the additional area that is created if the ewe flock is kept at the same size.

Changing production systems alters the key performance benchmarks of the livestock enterprise. To illustrate this, the table on the next page provides an example of a gross margin analysis where all things are held equal other than the time of joining, the liveweight at sale and the price received for lambs.

A 10% discount for feeder lambs is budgeted for because this is the average discount over the past five years for feeder lambs against 18–20kg carcass weight lambs.

The gross margin per ewe falls from \$45 to \$20 because there is less sheepmeat produced per ewe and it is of a lower value (\$2.05 versus \$1.79). However, the gross margin per hectare is maintained because more ewes are being run per hectare. Running more ewes also increases the cost of production per kilogram of sheepmeat as the maintenance cost of the ewe is high and there are fewer kilograms of sheepmeat per ewe.



A 'feeder lamb' is a lamb specifically bred from rams and ewes of known desirable meat characteristics such as growth, muscle and leanness; the lambs are grown fast on available green feed, weaned at 12–18 weeks and moved/on-sold to a specialised finishing system or background operation in preparation for finishing

The average price received per kilogram of sheepmeat falls because there are more ewes in the system and therefore a higher percentage of lower-value mutton as a proportion of total sales.

In effect, changing to a feeder lamb system has created a lower margin business where profits are even more dependent on productivity. Gross margins per hectare are maintained because the amount of sheepmeat produced per hectare rises from 148kg to 234kg, but if your productivity lapses then your profits will be under substantial pressure.

The potential to lift profitability will depend on getting the same or perhaps a better price than for the current production system.

Gross margin analysis of sucker and feeder lamb systems

	Sucker	Feeder
Time of lambing	Winter	Spring
Mid-winter stocking rate (DSE/Ha)	15	15
Weaning %	130%	130%
Replacement ewe cost	\$100	\$100
5-year av. \$/kg of lamb	\$2.35	\$2.35
Feeder lamb discount		10%
Discount for tail	30%	30%
Gross margin per ewe	\$45	\$20
Gross margin per ha	\$211	\$208
Price received per kg	\$2.05	\$1.79
Kg sheepmeat per ha	148	234
Marginal cost per kg	\$0.97	\$1.13

Sandy McEachern
Holmes, Sackett and Associates

Shearing lambs and weaners

Shearing before grass seeds become a problem reduces grass seed pick-up and seed penetration of the skin. It is important however to weigh up the cost-benefit of shearing lambs, especially Merinos, against other approaches that avoid the need for premature shearing.

Shearing prime lambs for market preference is questionable as premiums or discounts often do not absorb the extra cost of shearing and the loss of future skin value.

Many trials have shown shearing does not increase growth rates of young sheep when compared with leaving them woolly.

For this reason, the only justification for shearing lambs with a wool length of less than 65–75mm is to remove the potential production and income losses resulting from grass seed contamination. Even so, it would be worth comparing premature shearing on a cost-benefit basis with other available grass seed management strategies.

Karl Behrendt
Agrorum Consulting



Confinement crops

Confinement crops enable lambs to be removed from pasture with potential grass seed problems onto clean fodder.

Confinement crops are usually sown between winter and early spring. Staggered sowings enable lambs to be fed on one area for a set period and then moved into a fresh paddock.

Late-season grazing in dryland areas is predominantly on mature grain crops rather than green herbage but animals do not suffer acidosis problems as they acclimatise to the grain as it matures.

Along with animal production benefits, confinement crops improve the nitrogen and organic matter content of the soil and certain crops can assist in root disease control.

Confinement crops include:

- Oats or a combination of oats and vetch. Using herbicides to manage grass weeds in this mix can be difficult, other than hay freezing at the optimum time. If involved in cropping, this fodder crop is best sown into a clean paddock from the previous season where Simazine® and Verdict® have been used to reduce silver grass and geranium (*Erodium* species).
- Barley and vetch. Chemical control of grass weeds is easier with this mix but take care with barley during grain fill. Hay freezing is also an option for weed control.
- Pulses such as peas, beans and vetch allow easy control of grass weeds but some broadleaf weeds can be an issue, making it best to sow pulse crops later. While this can reduce herbage quality, if the crop is allowed to mature before grazing, animals will benefit from the high seed protein content.

Ensure sheep are introduced to grain before they are moved into confinement crops and that grass seed set is controlled in all non-arable areas.

Confinement crops allow higher stocking rates of at least 10–20 lambs/ha, depending on whether backgrounding or growth is required.

While a number of options exist for the use of confinement crops, it is best to seek advice to avoid some of the potential pitfalls in growing and feeding them.

Michael Camac
Landmark SA



An oat and vetch crop can be utilised as a confinement crop for direct grazing or for hay production

Finishing systems on seed-prone properties

Irrigation

Moving lambs from grass seed areas, before seed set, to an irrigated pasture system is another option to minimise the risk of grass seed contamination

However, to ensure this is a profitable alternative, do a budget before establishing an irrigation system. Requirements for irrigation depend on pasture type, climate and soils and it will be important to determine the optimal irrigation schedule for each region and production system.

Managing perennial pastures and lucerne in New South Wales and Victoria

Irrigating perennial pastures extends the time green feed is on offer. Carry out a soil test to determine nutrient requirements and apply phosphorous and nitrogen to increase pasture production. Perennial pastures respond best to rotational grazing.

Only irrigate pastures with good plant composition. Irrigating poor pastures is highly inefficient.

South Australian irrigation areas

Apply adequate stocking rates to maximise pasture production and maintain perennial pastures in their productive vegetative phase through late spring to early summer. Growth of irrigated pastures (excluding lucerne) will peak during October–December.

A well balanced pasture with little weed infestation can be stocked at 16–25 DSE/ha throughout late spring and early summer, and will provide enough feed to finish two to three lots of feeder lambs to trade specifications.

This information was sourced from 'Lamb production on irrigation', a regional supplement to *The Lamb Guide*, published by Meat & Livestock Australia



Irrigated lucerne

Forage crops

Forage crops can be used to manage grass seeds by:

- Providing an alternate feed source during grass seed set
- Providing feed to carry lambs through until stubbles or other feed become available
- Reducing grass seed set before re-establishing a productive pasture

There are many forage crop options enabling a choice that is best suited to the environment and production system.

Lambs being taken to heavier weights (>22kg) can be finished on forage crops with additional grain. Alternatively, forage crops can be used to run higher stocking rates to ensure maximum crop use with animals, later finished on grain. While high stocking rates can lower flock growth rate, this is offset by an increase in total liveweight gain per hectare.

If fodder crops are grazed incorrectly there can be potential stock losses. Many fodder plants develop some form of toxicity during specific stages of their growth and stock losses can be avoided by keeping stock out of the fodder crop during this toxic stage. It will be important to gain information about potential health issues relating to specific fodder crops before grazing.

Factors to consider when grazing fodder crops include:

- Yield and use
- Potential liveweight gain and the ability to meet the target weight – supplements could be required
- Levels of metabolisable energy and crude protein and their ability to meet nutritional requirements of stock
- Plant toxins
- Palatability and digestibility
- Cost of production versus returns – do a budget to determine viability
- Duration of forage/pasture phase
- Conservation of surplus production (hay and silage)
- Additional benefits to soil and following crops

Information sourced from 'Forage crops for finishing lambs', a finishing system supplement to *The Lamb Guide*, published by Meat & Livestock Australia

Feedlots

The risk of grass seed infestation of sheep and lamb carcasses, skin and wool is often a transitory event, for which short-term confinement in a feedlot or small paddock can be a viable management option.

The most important aspect in regards to using feedlots as a management tool is to ensure lambs are free of grass seeds prior to entering the feedlot. Grass seed management must be addressed before this stage.

While an elaborate establishment is not required, the area needs to be clean, sloping and well drained. Shade and shelter can be beneficial but are not a necessity.

It is important to determine the nutritional requirements of different classes of sheep during the confinement period. Dry ewes, rams and wethers will maintain condition on lower quality feeds while weaner lambs and replacement ewe lambs have higher nutritional requirements for maintenance and growth. Ideally, seek professional advice about the most cost-effective ration to feed until paddock feed once again becomes an option.

Key management factors include:

- Slowly introducing lambs to grain before placing them in the feedlot to prevent grain poisoning (acidosis)
- Vaccination with 5:1 before entering the feedlot
- If the diet is cereal-based, providing calcium and salt in the form of a loose lick
- Providing a constant supply of fresh water and clean troughs regularly to maximise water intake

San Jolly

Productive Nutrition P/L



A feedlot can be a viable option to carry lambs through the grass seed risk period until clean paddock feed becomes available (stubbles)

Agronomic management - pasture manipulation

Spray grazing

Spray grazing reduces broadleaf weeds, enabling more productive pasture species to dominate. It can be done in conjunction with a red legged earth mite and lucerne flea control program.

Spray grazing uses sub-lethal rates of selective herbicide to increase the palatability of broadleaf weeds. After a one-week withholding period, sheep are placed in the sprayed paddock at high stocking rates to graze out the broadleaf weeds over the following two weeks. The higher the stocking rate, the lower the rate of herbicide required. After two weeks, the palatability of broadleaf weeds declines.

While spray grazing can be relatively inexpensive, the use of sub-lethal herbicides requires an effective strategy to be successful. For example, if conditions are not suitable for chemical uptake, the impact of spray grazing can be less effective. Developing an understanding of medic and/or subterranean clover and weed growth stages will aid the success of spray grazing. Subterranean clover is more tolerant to hormone-based herbicides than are medics.

Having a good plant nutrition program in place can enhance the effects of spray grazing, as the desired pasture species are able to grow away from the chemically suppressed and heavily grazed weeds.

Winter cleaning

In lucerne and annual pastures the winter cleaning approach conducted under good conditions can result in virtually grass-free paddocks, and the control of many broadleaf weeds.

In addition to providing grass seed-free areas for lambs, winter cleaning also has the added benefit of increased pasture growth.

The removal of grasses from the pasture results in the pasture becoming legume dominant. This can lead to potential stock losses due to redgut if fibre is not provided in the diet. Contact a veterinarian for local recommendations.

Annual pastures

Winter cleaning of annual pastures can be done relatively early in the season. For removal of grasses (except silver grass) from a medic pasture, various grass herbicides can be used. Broadleaf weeds can also be targeted relatively early, conserving moisture and nutrition for more desired pasture plants.

Contact your local agronomist to determine specific herbicide and management options.

Lucerne

Mature lucerne stands can be cleaned of grass and broadleaf weeds using high rates of products like Sprayseed®, Simazine® and Diuron®.

Raptor can be used when it is not desirable to temporarily burn lucerne stands for weed control. This chemical is very soft on lucerne and when applied early, controls silver grass and a number of other grasses effectively.

Winter-cleaned lucerne pasture



Spray topping

Spray topping involves spraying pastures during spring with low levels of knockdown herbicide to prevent viable seed set. Ideal conditions and timing are critical to the success of this technique. Although cheap, success is often low and too much seed ‘escapes’, therefore this approach is increasingly not the answer for managing grass seeds.

Spray topping works best when pastures have an even seed head emergence, but this is often not easily achieved over large areas or with low stock numbers. Heavy grazing before spray topping will encourage synchronised flowering of weeds after which low rates of either Glyphosate® or Paraquat® can be used to thwart seed set.

In paddocks where seed head emergence is not uniform, higher herbicide rates will be required which will effectively hay-freeze the pasture.

Spray topping is most effective on weeds with a short flowering period as this increases the likelihood of the weeds flowering at the same time. Where a mixed sward is present, it is best to target the most damaging weed species and time the chemical application to coincide with seed head emergence. Attempting to control multiple weed species with a single application will compromise the control of all species.



Spray topping

Some producers spray early with a lower chemical rate to pick up earlier maturing grasses and then re-spray 3–4 weeks later to target other weeds. Provided soil moisture is adequate, this will also extend the life of the pasture.

It is not necessary to spray top all the pasture paddocks, just enough paddocks to provide stock with an adequate grass seed-free area to meet feed requirements. It is also worth considering spring insect control, which will reduce insect burdens significantly at the opening of the next season.

Fodder conservation

Fodder conservation can assist in seed control by removing grass seed heads from a paddock and creating a grass seed-free environment for grazing stock.



Hay making

When conserving fodder as hay or silage, plan early, apply adequate fertiliser, use timely insect and unwanted weed control and remove stones and sticks. After harvest, follow-up with glyphosate to stop re-growth from developing seed heads.

Conserving fodder provides a source of quality feed that can be used to finish lambs in a seed-free environment such as a feedlot.

Pasture improvement

Pasture improvement uses management practices to promote healthy soils and plants. It is important that pastures receive the best possible start and are maintained to ensure they can out-compete undesirable species in the stand.

When done properly, pasture improvement assists in grass seed management, and delivers the added benefits of being able to carry more stock that are healthier, grow faster and are more fertile. In addition, pasture improvement offers fodder conservation opportunities and the ability to set up paddocks to regenerate year after year.

Before embarking on pasture improvement, ensure the correct grazing management can be applied to maintain persistence and competitiveness of the sown pasture plants.

Critical steps in sowing a new pasture include:

- Determining why the old pasture has run down (grazing strategy, nutrition, seasonal) and ensuring these problems are rectified
- Preparing the new pasture the year before by reducing seed set of unwanted species
- Undertaking soil tests to determine nutritional needs
- Allowing run-down pasture and weeds to germinate and spraying with knockdown herbicide and insecticide
- Inoculating legume seed and sowing into moist seedbed with adequate fertiliser
- Monitoring emergence, insects and slugs
- Considering broadleaf weed control
- Grazing to promote tillering, seed set in the first season and long-term persistence



Prior to sowing a new pasture it is important to identify why the old pasture has run down, and ensure these problems are rectified

Harrows

Grass seeds can be knocked to the ground by dragging harrows or implements such as old tyres across a grassy pasture late on a hot day. While this reduces the seed contamination risk, there is still potential for some seed pick-up because the grass seeds have not been removed from the system. To reduce seed pick-up, use shorn sheep to graze these paddocks.

This practice is best used as an interim approach while long-term strategies are put in place or where adequately clean areas can not be achieved through other means.

Sale-stock grazing harrowed pastures need to be monitored carefully for seed pick-up and removed from the paddock immediately if seed contamination becomes evident.

Machinery and equipment used for harrowing needs to be inspected for weed seeds thoroughly and cleaned before removing it from infested paddocks. This is especially necessary for paddocks containing Chilean needle grass (*Nassella neesiana*) as it is readily spread by attachment to machinery.

Michael Camac
Landmark

Lucerne – a big hit on weeds

With effective management, dryland lucerne will restrict seed production from annual grasses and broadleaf weeds. Lucerne can out-compete annual weeds, especially during the spring-summer-autumn period, due to its ability to grab soil water and turn it into top quality feed.

Before lucerne establishment

Spray topping the pasture or pulse crop in spring before lucerne establishment will provide lucerne with a competitive edge by reducing weed seeds. Cultivation and knockdown in combination with pre-emergent and in-crop herbicides will also help the establishment process.

On sandy soils, spreading and incorporating clay will aid lucerne germination and growth and increase its ability to out-compete weeds.

Seedling lucerne

Seedling lucerne is not a great competitor and delaying seeding to get a good kill is a smart move with grassy weeds, especially silver grass/sand fescue. But do not forget to guard against wind and insects.

Traditional knockdown sprays can be used during seedling establishment but take care to check plant-back periods. Seek advice on pre- and post-emergent herbicides to use with first-year lucerne. Silver grass is difficult to control at this stage.



Courtesy of SARDI Entomology Unit

Red legged earth mite infestation can severely limit the competitive ability of a pasture

Established lucerne

Herbicide options increase for silver grass and other annual weeds in established lucerne. Winter cleaning and spray topping can also be used during this phase.

Companion pasture and fodder species can be sown into lucerne to compete with grassy weeds and provide a balanced ration throughout the year. While some species can be sown with lucerne, most are best drilled into the stand in the year following establishment. Prepare the seedbed by grazing the lucerne after the break and apply Sprayseed® or a Paraquat® spray for early weed control.

Seek advice on the most appropriate species for your rainfall and situation. Seedling lucerne struggles when it has to compete for soil water so if sowing companion species, use perennial species only in high rainfall areas (>500mm) and use annuals in the lower rainfall areas. Perennial species include chicory and the perennial grasses. Annual species include cereals, annual rye grass, annual medics and the annual clovers.

Effective grazing management is vital for both profitable lucerne production and weed control. New stands are particularly vulnerable to grazing over the first summer. Grazing the top growth at this stage impacts on the establishment of a strong crown and root system.

Grazing before the first season rains should only occur when flowering starts, new growth buds show at the base of the plant or when plants begin to wilt and drop older leaves. Plants need to be well anchored so monitor stock to ensure they are removed before lucerne crowns are grazed.

Rotational grazing will provide a long-lasting lucerne stand. Ideally, lucerne should be grazed for 3-7 days when a flush of secondary growth (2-5cms) appears from the crown. The appearance of this growth indicates the plant has replenished crown reserves and will have produced a crop of good quality primary stems and leaves for grazing or cutting.

Stocking rate, stock type and class, rotational period, seasonal conditions and weed growth all interact to influence grazing management. Large numbers of smaller paddocks result in better lucerne growth and better animal performance and make it easier to control weedy grasses and broadleaf weeds.

While rotational grazing is not critical at low stocking rates, the pasture will be grossly under-used. High stocking rates make rotational grazing important as prolonged grazing, especially under harsh growth conditions, will inhibit plants from replenishing their crown and root reserves and reduce the long-term viability of the stand.

Ross Britton
Rural Solutions SA



Lucerne

Managing grass seeds in serradella pastures

Pasture weeds are best controlled early in the season when sheep feed intake is limited. Once feed is abundant, sheep will become selective about what they eat, leaving barley, brome and silver grass behind. These weeds can be controlled using a combination of grazing and grass-selective herbicides or spray topping.

Grazing

Aim to decrease the weed component and increase legume dominance early in the season. Crash graze at three to four times the normal stocking rate for short periods or use high stocking rates for extended periods.

Reduce grazing pressure on serradella during flowering and seed set to minimise seed loss. This is particularly important when feed on offer is less than 2,000kg DM/ha. Serradella and grassy weeds set their seed around the same time so stock will not only be reducing weed seed set but pasture seed set as well. Each serradella flower pod eaten by sheep represents potentially 15–20 lost seeds.

When feed on offer is greater than 2,000kg DM/ha, there is less need to remove stock as they will be needed to limit grass seed set.

Grass selective herbicides

In serradella pastures free of herbicide-resistant rye grass, grass-selective herbicides can remove barley grass, brome grass, annual rye grass and wild oats (eg Select®, Fusion®, Verdict®, Targa®, Correct®, Sertin Plus®, Fusilade®).

Verdict® has the added bonus of controlling corkscrew and geranium (*Erodium* species).

Unfortunately these herbicides do not control silver grass. Pasture competition, heavy grazing and spray topping will reduce silver grass but it is also vitally important for additional control to be used during cropping years.

Spray topping

There is a fine balance between weed control and pasture seed set. For example, while spray topping can reduce weedy grass seed set it can also compromise pasture seed yield, particularly from Cadiz French serradella during a dry finish.

Use Paraquat (eg gramoxone) and not Glyphosate on Cadiz.

Cadiz is sensitive to spray topping because it flowers late in the season and aborts its flowers when spray topped, even with paraquat. It then has to re-flower and set seed. This process requires good soil moisture and takes three to four weeks.

Yellow serradella, medics and clovers are better spray topped later, after their seed set has almost finished.

Keith Devenish

Department of Agriculture, Western Australia

Grass seed management on saline land

Managing grass seeds on saline land is the same as in other pasture systems. The name of the game is competition.

The annual sea barley grass is common on degraded saline land and is the main grass seed of concern for livestock in these areas.

Silver grass is less of a problem on saline land as it is not salt tolerant. However, it is starting to reappear in saltland pastures in the upper south-east of South Australia and areas of Western Australia due to several dry years and lower water tables.

To establish saltland pastures, spray the sites in the year preceding pasture renovation. Weeds such as sea barley grass and curly rye grass are specialists at surviving in saline environments and compete well with desirable pastures.

Saline land conditions in the upper south-east of South Australia provide a number of challenges to plants. As well as being saline these areas are subject to periodic water logging and high pH levels (>pH 8 CaCl).

The following are salt tolerant pasture plants that are successfully grown in the upper south-east and elsewhere in South Australia.

Puccinellia

Puccinellia is a perennial grass forming tussocks up to 40cm high with growing points embedded in the base of the plant, which are compact and resistant to grazing. Feed quality during winter and early spring is 10–18% protein and 60–78% digestibility.

Puccinellia grows on alkaline, waterlogged and saline soils with electrical conductivity values far greater than 10 dS/m. While puccinellia can grow on less saline land, it tends to be out-competed by other species such as annual rye grass.



Puccinellia

Puccinellia usually matures and dries off during December, remaining dormant over summer and re-shooting following the opening rains. It makes an effective standing feed carried over until autumn. Leaving the feed standing over summer provides ground cover, which reduces evaporation and salt concentration at the soil surface.

Puccinellia sown at 4–10kg/ha will thicken in subsequent years if allowed to set seed. It is highly responsive to nitrogen applications.

Tall wheat grass

Tall wheat grass will grow successfully on soils of low to moderate salinity (electrical conductivity values 10–30 dS/m) which are often dominated by sea barley grass. Tall wheat grass is a tussock-forming perennial up to one metre tall or more. There are two cultivars available in Australia, Tyrell and a new cultivar, Dundas, which was developed by Agriculture Victoria.

Tall wheat grass is adapted to alkaline and moderately saline waterlogged soils but is less tolerant of waterlogging than puccinellia. When mixed with puccinellia and legumes, tall wheat grass will colonise a niche area of slightly higher ground, often displacing silver grass.

Tall wheat grass is summer active, with most growth occurring from late spring onwards. Optimum production occurs when subsoil moisture is available over summer.

Sow tall wheat grass at 10–15kg/ha if sowing alone or at 4–5kg/ha in a mixture. Tall wheat grass requires constant attention and heavy crash grazing to ensure it does not grow too tall, rank and tussocky. It will produce the best feed when kept short (10–15cm).

Do not allow tall wheat grass to set seed, as it can become a weed if it spreads. Balansa clover complements tall wheat grass, as both species require hard grazing during late spring after the balansa clover has set seed.

Legumes for saline land

Balansa and strawberry clover are the best known legumes for saline land. The Pasture Legume Team at the South Australian Research and Development Institute has several evaluation nurseries across the south-east of the state to identify other suitable species for waterlogged and saline land. The early-maturing Frontier balansa clover is proving the most productive and persistent legume of these trials. This is likely to be related to Frontier's ability to mature and set viable seed before the annual rise in soil salinity during late spring and early summer.

Other species showing promise include sweet clovers (*Melilotus* species), Moroccan clover and Scimitar burr medic. Scimitar burr medic is due for release by 2005.

Other options

Annual rye grass, phalaris and tall fescue are other grasses with low to moderate salt tolerance. Crops such as barley and canola are relatively tolerant of salinity and high pH levels, but are not tolerant of waterlogging.

Tracey Strugnell

Combined South-East Soil Conservation Boards



Source: H.D Longbottom

Sea barley grass is the main grass seed of concern for livestock on degraded saline land

Testimonials

In the war against grass seed contamination, learning from those who are battling successfully against problem weed species can be invaluable. Below are the experiences of four producers who have used a range of strategies to control invasive weeds on their properties.

A common thread weaves through all the stories – winning the war against weeds requires an integrated approach and an all-year focus to control weedy grasses and broadleaf weeds before they become a problem during spring and summer.



Paul Bartlett has taken a hard and proactive approach to managing silver grass



Clay spreading is a key management tool in Paul Bartlett's program to control silvergrass; clay improves the competitive ability of desirable pasture species enabling them to out-compete silver grass



Winning against silver grass

Paul Bartlett, Keith, South Australia has taken a proactive approach to silver grass management on his 7,209ha mixed enterprise property. Paul first experienced silver grass during 1980 when he lost a significant number of his prime lambs post-dipping on a silver grass-infested paddock. “The losses were incurred out of ignorance”, explains Paul. “I didn’t know the plant existed and was totally unaware of the problems it could cause.”

Silver grass costs Paul money by reducing fertility rates and carcase and wool value in seed-contaminated sheep. Fly strike is also a problem when grass seeds penetrate eyes.

Clay is the key to Paul’s silver grass management. Soils on his property are mainly sand over clay and of low fertility. This makes controlling silver grass difficult as it thrives on soils with little competition from other plants. But spreading and incorporating clay lifts the germination and competitive ability of desirable pasture species, enabling them to out-compete silver grass.

Other control strategies Paul uses to control silver grass include knocking seeds to the ground by dragging old tyres across the paddock, grazing stubbles, hay freezing and heavy grazing with cattle.

Winning against geranium

While barley and brome grasses are present on Craig Hage's South Australian property at Tanunda, geranium is the weed that most limits production from his prime lamb flock.

Craig uses a five-pronged approach to control geranium ranging from grazing management through to chemical control, fodder conservation and pasture manipulation and renovation.

Pastures are rotationally grazed until spring when excess dry matter is removed for fodder conservation. This enables Craig to maintain grazing pressure of geranium with just 2,000–3,000kg DM/ha on offer going into summer. At the end of summer, about 5–800kg DM/ha remains, enabling a dense germination at the break. Minimising bare ground at the break is critical as geranium can get away with little competition.

Soils and plants are monitored for nutritional status to lift productivity and maintain competitive pressure against broadleaf weeds. Craig also uses chemicals to control weeds with Tigrex®, Jaguar® and increasingly Raptor® – key strings in his weed control bow.

With his increasing focus on grazing management and pasture manipulation, the need to improve his pastures is decreasing, but when required, Craig uses spray topping in the previous year to prepare a paddock for renovation.



Fodder conservation is part of Craig Hage's five-pronged approach to controlling geranium; round bale silage has the biggest effect on broadleaf and annual grass control, but in later seasons with dry conditions hay making is also an option

Winning against barley grass

Barley grass is an annual problem on Daryle and Kaye Kopke's prime lamb property near Ballarat, Victoria.

Significant numbers of lambs and ewes pick up seeds in their eyes and skin causing the affected stock to lose weight rapidly. Further losses occur if barley seed heads are present over summer as grazing stock avoid grazing to the base of the pasture where nutritious clover burr are present.

"With barley grass, timing is critical", explains Daryle. "The grass produces seed heads over a prolonged period, making it difficult to pinpoint the best time to spray."

Daryle uses rotational grazing to keep barley grass under control. "Rotational grazing gives you better control over what the stock are grazing," explains Daryle. Barley grass occurs in paddocks with high fertility and set stocking seems to make the problem worse because perennial rye grass doesn't survive, leaving bare patches for barley grass and other weed to colonise.

A key to Daryle's barley grass control is to monitor pastures at the break of season for signs of the weed so he can assess how much there is and decide on a management strategy early.

The challenge with Chilean needle grass

The invasiveness of Chilean needle grass has forced Brett Kissell, Victoria, to move out of sheep and into bull beef production. “The weed got to the stage where it was impossible to manage effectively with sheep”, Brett explains.

Sheep and machinery pick up Chilean needle grass and spread it throughout the property. The seed contaminates fleeces and causes abscesses in livestock.

Chilean needle grass produces three types of seeds that make it very difficult to eradicate. Along with seed heads, the weed produces seed at or below ground level, enclosed within the stem. Unless the entire plant is killed or removed, these seeds replenish the seed bank, enabling the weed to persist.

Brett manages Chilean needle grass using rotational grazing, with typically 10 bulls allocated per 0.9-hectare cell for a two-day period. Grazing pressure is increased when the weed is producing seed. Rotational grazing has lifted beef production over set stocked animals. The grazing system has also reduced the amount of Chilean needle grass through its impact on the weed’s seed production.

Once Chilean needle grass infestation reaches a high level, the weed is very difficult to manage due to its large and persistent seedbank. Learning how to identify the weed and take immediate action when infestations are first discovered is therefore critical to controlling Chilean needle grass.

Some tips to minimise the risk of Chilean needle grass:

- Ensure sourced fodder and grain is not contaminated with Chilean needle grass
- Avoid introducing stock from properties with Chilean needle grass infestations
- Remove stock from infested paddocks before seed set
- Kill or remove the entire plant to prevent the spread of cleistogenes seeds of Chilean needle grass; where infestations are small, remove the whole plant by hand
- Ensure all machinery, equipment and materials are cleaned when moving from infested to clean areas
- Check and clean machinery and equipment coming onto your property, including inside vehicles, boots and clothing
- To minimise weed spread, restrict the movement of stock infested with seed



Chilean needle grass has three seed types: (top) Stem cleistogenes, (middle) three panicle seeds with awns, (bottom) basal cleistogene

Lamb assessment

Assessing sheep or lambs for seed contamination

While it is not possible to predict whether grass seeds have penetrated the skins and carcasses of live animals, a reasonable indication can be achieved by assessing grass seed levels in the wool.

Wool on lambs or sheep

Closely inspect the animal on the brisket, neck, shoulders, belly, legs and lower ribs as these are the most likely areas to retain seeds.

While some grass seeds will fall out of the wool over time, many will move through the wool to penetrate the skin and carcasse.

Shorn lambs or sheep

Shorn lambs or sheep can appear clean, even when grass seeds have penetrated the skin or muscle before shearing. Shorn animals should therefore be considered in relation to their grazing history. If the sheep have been on pastures containing problem weed species that have set seed during the grazing period, the animals are likely to have some seed penetration.

Industry standards to describe the level of seed contamination of the fleece were developed for computer-aided livestock marketing during the early 1990s.

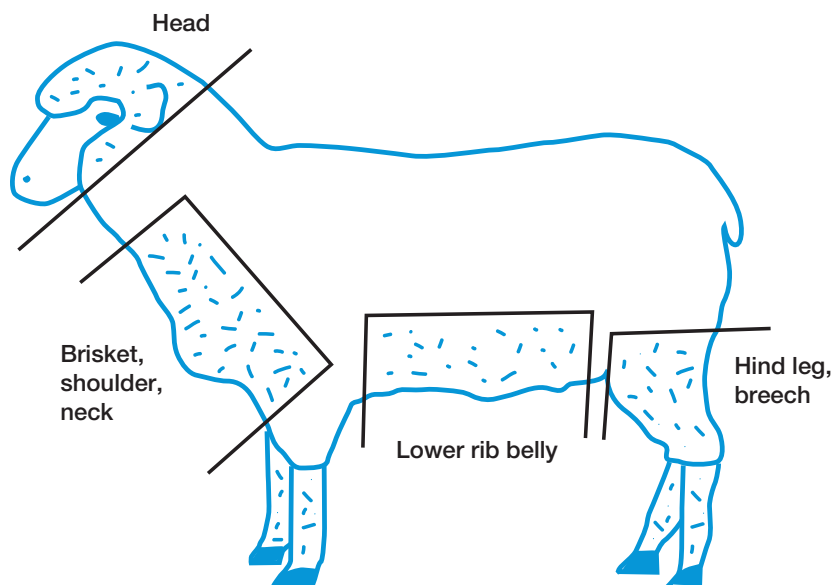
Using these standards, the quantity of contaminated seed observed can be described as:

- None observed
- Light (very few seeds on belly, lower points and brisket)
- Medium (moderate numbers of seeds on belly, brisket and flanks)
- Heavy (obvious large number of seeds over most of the body)

When describing levels of seed contamination, identifying the type of seed present can also be useful.

These assessment standards provide a useful guide when purchasing stock from an unknown seed background and for unforeseen scenarios such as stock escaping from a clean paddock.

Bill O'Halloran and Chris Shands
NSW Department of Primary Industries



Identification points for assessing the level of seed contamination of lambs

Lamb marketing

The role of the stock agent

The stock agent's role in grass seed management is to:

- Ensure the product supplied to processors/finishers is free of seed and able to meet specifications
- Create an awareness of the problem in their area and educate their vendors in management procedures
- Keep a database of those clients who have supplied seeded lambs to assist in future marketing
- Speak to abattoirs about the problem and discuss how big the issue is for them
- Test-kill a percentage of lambs on-farm or at the local abattoir
- Involve a Lamb Product Development Officer or local livestock consultants in regional producer meetings or workshops (explore the interest of a spray company to partner and co-sponsor)
- Gather as much background information as possible when buying lambs off-farm and make an assessment of their seed risk as well as determining the animals' general health and genetics – ultimately, put strategies in place to develop a long-term breeder-feeder alliance

AVOID BUYING FEEDER LAMBS FROM SALEYARDS

- Do not knowingly market lambs with seeds – declare the lambs as seeded and accept the penalty (this is an industry problem). Only by accepting the penalty will vendors learn to accept responsibility for management.

GRASS SEEDS ARE COSTLY TO OUR INDUSTRY – DO YOUR BIT TO MINIMISE THEIR IMPACT

**Noel Evans
Keith, SA**

Marketing tips:

- Adopt marketing options as part of a full 'on-farm' management practice
- Inform buyers of your grass seed status
- Place a greater emphasis on marketing time
- Sell over-the-hooks to receive feedback on meat and skins
- Sell lambs to lamb finishers – maximise production per hectare through stocking rate, weaning percentage and lamb growth rate
- Sell lambs before seeds become a problem – this could mean targeting a new market or developing a new production system
- Alter your time of lambing to avoid the seed threat
- Feedlot lambs intensively – free of seed to market specifications
- Shear twice if required, as this will have added benefits
- Agist lambs in areas that mature later
- Supplementary feed to hit target weights earlier
- Use improved genetics to turn lambs off at target weight earlier

Winning against seeds at the saleyard

Sale yards and livestock exchanges can play a major role in ensuring they are not used as a 'dumping ground' for secondary stock and seed-infested lambs.

Many sale yards have invested in 'flexible capacity' to manage the large numbers of prime lambs requiring marketing before grass seed infestation becomes a problem on-farm.

All South Australian processors offer trial kills to test for grass seeds, and lambs that are rejected could eventually find their way into a sale yard somewhere. This is unfortunate, as some buyers have been caught out unknowingly purchasing seedy lambs they have previously rejected.

To minimise the risk of buying seedy lambs, buyers need to study vendor declarations and refrain from buying lambs from certain areas. Verbal placarding operates in some sale yards. Producers who continue to try and beat the system will eventually be caught out and buyers will refuse to buy their stock.

When buyers are forced to refrain from buying from a whole region, some producers are unduly penalised. Their only recourse is to confirm seed status and make a point of difference at time of sale.

The National Livestock Identification System for sheep will enhance traceability to property of origin. This will be of great benefit to all purchases of both prime and store lambs.

Whether lambs are sold through the sale yards or over-the-hooks, penalties are being incurred for seedy lambs. To obtain optimum prices for lamb, producers need to take ownership of the problem and engage in better farm management practices to minimise the risk of seed infestation and produce a product free of grass seeds.

Just as producers follow simple presentation guidelines to attract the best possible price, such as minimum time off feed, bung-hole crutch and head marking, it is equally important to minimise grass seed contamination of the skin and meat.

Richard James

Livestock Saleyards Association of South Australia



Pen of grass seed-free lambs

Trial seed kills

Processors offer a service of trial seed kills where a portion of a consignment or mob are randomly selected and sent to the processors. These animals are monitored closely through the slaughter process and assessed for grass seed contamination. Feedback is then provided to the producer about the grass seed status of their stock.

The basic steps involved in a trial seed kill include:

- Contacting the processor to organise a trial kill (this can be done personally or through an agent)
- Randomly selecting up to 10% of lambs from the mob by running the lambs through a race and drafting off every tenth animal – check with your processor on specific numbers and remember groups of lambs form bonds and hang around together, so running a few lambs off into a side pen will not give a true representation of the entire mob
- Organising transportation to the processor – this could be in a ute or trailer or in the back of a semi (to fill a gap)
- Receiving feedback – generally within 24 hours

Feedback on grass seeds

During 2003, the grass seeds working group of the South Australian Lamb Development Team (SALDT), in association with the major SA export processors, developed an industry standard feedback sheet for grass seed contamination in the carcase. This is known as the grass seed report (see the following example) which indicates the number and location of seeds in the carcase and the proportion of affected lambs.

The report can be sent to producers to explain the tolerance or rejection of trial seed-kill lots, or explain the reason for a grass seed penalty given on a consignment of lambs.

It is hoped that widespread use of the grass seed report within industry will assist producers to identify the type and extent of their grass seed problem so that management strategies can be put in place to prevent contamination of future consignments.

Elke Hocking
Rural Solutions SA

GRASS SEED REPORT				
LOT NO:		KILL DATE:		NO. KILLED:
Level of grass seed infestation in carcase				
Carcase location to be checked for seed infestation	NIL	LIGHT (1-5 grass seeds)	MEDIUM (5-10 grass seeds)	HEAVY (greater than 11 grass seeds)
Loin				
Hindleg				
Flank				
Belly and brisket				
Other				
SEED TYPE (Please circle)	S = Silver Grass BR = Broome Grass	B = Barley Grass W = Wire grass	G = Geranium (Erodium) C = Chilean Needle Grass	SP = Spear Grass
WAS SEED INFECTED		YES / NO		
% AFFECTED				
TRIAL RESULT: CONSIGNMENT		ACCEPTED / REJECTED		
Comments:				
Skins assessment / comment:				

Conclusion

Although grass seeds threaten livestock for only a few months of the year, controlling them needs to be a year-round focus. There is always something to consider in relation to grass seed management in a sheep enterprise, regardless of the time of year. Thinking about grass seeds only during the risk period will not control the problem in the long-term.

The key to winning against grass seeds is to take ownership of the problem and take action.

Below is a four-point plan to manage grass seeds:

1. Develop an awareness of the grass seed issue and its impact on the sheep industry
 - Understand the potential scope of the problem throughout the supply chain from the farm to the end product
 - Identify problem plant species and their risk period
2. Determine the impact and cost of grass seeds to your business
 - Monitor stock for seed infestation
 - Obtain feedback through a trial seed kill
 - Identify losses in production and profit as a result of grass seeds
3. Develop and implement a grass seed management strategy
 - Explore all management options available for seed reduction and seed avoidance
 - Determine the most effective and profitable strategies for your business
4. Obtain feedback, monitor and review your management strategy and make changes where required
 - Keep accurate records on key indicators so you can measure your performance (success)

There is no single management strategy that can be applied to all situations. Every situation is different, and it is important to look at all the management options available. Develop an integrated approach to tackle grass seeds that is suited to your property and business goals.

Remember, you are not alone in the battle against grass seeds. There are a number of activities that you can participate in to help you through the process:

- Grass seed workshops
- Farm walks – see how other producers are managing grass seeds
- Trials – determine best practices for managing grass seeds
- Abattoir/skin tour
- Trial seed kills

Assistance abounds. All you have to do is ask.

Heidi Schuster and Bruce Hancock
Rural Solutions SA

Appendix

Further reading

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Websites

Chilean needle grass; www.dpi.vic.gov.au (click on Agriculture and food, on A-Z Index, then Chilean needle grass)

CRC weed management; www.crc.org.au

SA Lamb website; www.pir.sa.gov.au/salamb

MLA website; www.mla.com.au

Training

The following MLA EDGENetwork® workshops are relevant to sheep production!

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