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Sheep Updates 2003 - Husbandry

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Setting up a successful, low input feedlot

Paul Barrett, 'Bimberdong' Jerramungup

KEY MESSAGES

Keeping a sheep feedlot as cost effective, simple as possible with minimal labour input is very important. Whether you are maintaining or finishing sheep for market, the economics and sheep selection are crucial for good growth rates and successful feedlotting.

INTRODUCTION

In 1994, we built a three pen feedlot to maintain our young ewe flock through a dry winter and to finish young wethers for the shipper market. Since then we have used it every year mainly to finish lambs ready for market but also to maintain sheep through tight feed periods. In the early years we made our own feed ration and fed into troughs but had problems with spoilage caused by weather and sheep. Feed loss was quite high and trough cleaning was time consuming. We now use pellets from where ever we can source them and auger them slowly into self feeders located as far away from the water as possible. The pellets have proved very successful with little or no wastage and we are very pleased with lamb growth rates.

REVIEW

There are a few important aspects to cover when starting out to build a feedlot including:

Water

Probably the most crucial input needed. Our water is gravity fed into troughs which are cleaned and brushed out daily. Water trough space is not an important issue as the sheep don't all drink at once. I found the sheep liked the colder water as compared to the water that had been in the trough all day.

Site selection

The proximity to the water was our determining factor to where we built our pens. A good solid ground surface to prevent erosion and some shelter from the wind and rain are also important to keep the sheep comfortable and settled.

Feed source

The economics was important when selecting our feed. Whether on a maintenance ration or finishing sheep, the cost per head was always worked out and reviewed on several occasions during the sheep's time in the feedlot. Distributing the feed to minimise wastage was overcome by using round self-feeders. The round feeders provided more trough space per head and I would prefer these over other shaped types. When maintaining older sheep the use of self-feeders may cause the sheep to gorge themselves therefore costing money. We have long troughs within the pens to feed a set ration for this purpose.

Economics

Following on from the feed source I have some basic costings on feed and some conversion rates for lamb's feedlotted in January 2003. We used lamb finishing pellets costing $300 per tonne (including freight) purchased before the price rise in early October 2002.

The sheep take approximately ten days to get fully used to the environment change and new diet and more importantly drinking out of a trough. These figures are based on lambs after day 14 in the feedlot.

Feed intake: 1.5 kg/head/day

Cost of pellets: 30cents/kg

Cost of ration: $3-$3.50/head/week

We worked on a conversion rate of 4.5 kg of pellets to every kg of live weight gain (weaners were first cross prime SAMMs), which I thought after close analysis was fairly conservative, i.e. finishing a 40 kg lamb up to 45 kg took approximately 22 kg of pellets which cost $6.60. The time in the feedlot varies from lamb to lamb but this weight gain would take approximately 15 to 20 days.

This costing is a basic one and I haven't factored in the following items:

1. Water costs
2. Labour
3. Infrastructure costs, e.g. windmill, tank, fencing, etc.
4. Self-feeders ($1800 each)

Depreciation on infrastructure would vary but the self-feeders would be the items most likely to be replaced because of the weather and wear and tear.

Sheep performance

All the lambs that were finished for slaughter have been weighed into the feedlot and generally we don't feed any lambs less than 37 kilograms. The main reason being that the lighter lambs take too long to finish and put more emphasis into growing than actually finishing. Getting the sheep into the pens and settled hasn't been too much of a problem, but mob size in each pen is an important factor. Too many in one pen encourages more shy feeders compared to smaller mobs. Every sheep is vaccinated and drenched going into the pens. We have experienced some eye problems from the fine dust but generally the health of the sheep when penned is very good with virtually no deaths.

Evaluation

Overall, our feedlot has been very successful and worthwhile in many ways. Not only to retain our young breeding ewes but to also finish sheep and to help in our management of erosion in the tight feed times. The construction of some shelters in the pens I thought was of great benefit to our lambs which are always looking for some shade during the day. They are very basic and strong to withstand the wind. They have a galvanised iron roof and are 8 m long by 4 m wide and 1.5 m high. The lambs used them all day and moved with the sun to be in the shade which overall added to their comfort and temperament in the feedlot.

CONCLUSION

Our theory was to keep the whole feedlot operation very simple and basic to save time and to get the best possible outcome for every sheep in the shortest amount of time. We are achieving this now just by straight forward management practices and good sheep selection. If considering feed lotting the plans should not be left to the last minute as good planning and doing the job properly from the start can save many problems and time over the following years.

KEY WORDS

cost effective, site selection, water quality, feed source

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Paper reviewed by: Sandy White, Department of Agriculture, Jerramungup

Effective mineral supplementation of sheep

Kevin Bell, Sheep Management and Production Consultants, Kojonup, WA

SUMMARY

At present nineteen of the naturally occurring mineral elements are known to be essential for normal sheep function. Mineral deficiencies may cause noticeable clinical disorders, but when marginal or transient are often associated with minor undetected but significant effects on production.

Deficiencies of minerals usually occur within specific localities, influenced by soil type and climate, principally rainfall. Other influential factors are time of year, composition and age of pasture, and fertiliser usage. The age, sex and reproductive status of sheep will also influence mineral requirements.

It is important to be aware of local mineral status, as ill-informed provision of supplements may be responsible for problems, either directly or indirectly by inducing a deficiency of other minerals.

Although mineral supplementation may be associated with a measurable effect on production, this may not be necessary or economic.

INTRODUCTION

Mineral deficiencies occur in all continents, and affect production of livestock. While severe deficiencies still do occur, they are becoming less frequent due to improvements in awareness, identification and treatment. Marginal or subclinical deficiencies are not so readily identified and can still cause losses in production. However local knowledge generally is responsible for preventive measures being instituted.

In any discussion on minerals it is necessary to deal with those which are not deficient, as much as those which may be deficient, and for which supplementation is prudent.

Factors leading to unnecessary or overuse of mineral supplements are many, and include:

1. Historical deficiencies during early land use. A time of excusable ignorance.
2. Seasonal nutritional fluctuation and deficiency throughout much of the state. Observed loss of production in livestock, attributed to minerals. Failure to acknowledge the overriding importance of energy and protein deficiencies.
3. Seemingly relatively cheap mineral supplements.
4. Marketing of commercial products. Purchasing such supplements gives people a sense of having done something in times of sometimes serious nutritional inadequacy.
5. Misleading, unsubstantiated theories of mineral activities and requirements.
6. The theory that ‘a little is good, more must be better’. Unnecessary provision of minerals is not just uneconomic and wasteful; it may be dangerous for sheep health. Excess of one mineral may induce a deficiency in others.

Minerals significant for animal production in WA

Calcium
Chlorine
Phosphorus
Magnesium

Potassium
Sodium
Sulphur
Cobalt
Copper
Iron
Iodine
Manganese
Selenium
Zinc
Molybdenum
Chromium
Silicon
Boron

FACTORS INFLUENCING MINERAL AVAILABILITY IN WA

Most Western Australian soils are extremely infertile due to their extensive weathering. Although historically major deficiencies existed, many of these have been rectified.

- Since clearing and sowing of improved leguminous pastures and a range of crops, the use of superphosphate has corrected in many instances three deficiencies - phosphorus, sulphur and nitrogen.
- Additionally on soils derived from laterite, it was identified some time ago that the trace elements copper, zinc and molybdenum were required for pasture legume persistence and for crop production. In more limited areas, manganese is required for optimum plant growth. These have generally been applied, to the extent that plant growth is not impeded. In most cases animal requirements are met by these adequate plant levels, although high-producing animals (dairy cattle, rapidly growing lambs) may require more.
- The ingestion of soil by sheep is a means by which minerals are acquired for significant periods of the year, even though plants may have levels which at the time are deficient for sheep.
- Soil pH affects availability; increasing pH (more alkaline soil) makes phosphorus and molybdenum more available, but decreases the availability of copper, zinc and manganese.
- The type of pasture species influences mineral supply to grazing sheep. Compared with grasses, clovers generally have higher concentrations of calcium, phosphorus, potassium, magnesium, iron, copper, zinc, molybdenum and cobalt. Grasses have higher selenium levels. Capeweed is a special case in that it accumulates many minerals.
- Time of year is a factor. The concentration of most minerals is lower in dry feed (calcium, iron and selenium are exceptions). However this lower concentration does not mean that deficiencies will result. With the associated lower energy and protein of these pastures, sheep growth and metabolism is less, and requirements for minerals are generally reduced. In spring the rapid pasture growth tends to dilute the concentrations of cobalt and selenium, and deficiencies can occur - more so with cobalt, as it is not stored, and required in the rumen for manufacture of Vitamin B12 by microbes.
- Supplementary feeds have an influence. Grains in particular have high phosphorus and low calcium levels. High levels of feeding, including feedlotting, for prolonged periods (more than six weeks) will result in calcium deficiency, as mobilisation from bones may not be rapid enough to maintain adequate blood levels.

EFFECTS AND SIGNS OF MINERAL DEFICIENCIES

Common features of many mineral deficiencies are:

- reduction in feed intake;
- reduction in the efficiency of digestion and utilisation of feed.

These effects, combined with impairment of specific metabolic functions, produce the classic signs of 'ill-thrift', so often associated with these mineral deficiencies.

Ill-thrift refers to those non-specific signs of reduced growth of body tissues and wool, and direct and indirect effects on reproductive performance.

DIAGNOSIS OF MINERAL DEFICIENCIES

It can be appreciated that diagnosis may be difficult, given the many complicating factors involved, and the sometimes obscure and non-specific signs in the sheep. Mineral levels may be defined as deficient or marginal.

Deficient - Depleted animal reserves, loss of production and/or overt disease, response to mineral supplementation expected.

Marginal - Reduced reserves, production response may be observed.

By far the most reliable indicators of mineral deficiencies are those to do with the sheep - clinical signs combined with direct sheep measurements. Levels in blood and other body tissues can be measured and compared with figures calibrated against production and clinical responses. The type of tissue and the number of sheep to sample are also well documented.

Perhaps the best sheep measurement is a response trial, where a mineral or minerals suspected of being deficient in supply is administered to a significant number of sheep, and their response in terms of health and production compared with at least a similar number of unsupplemented sheep.

Soil and **feed** measurements are not consistently useful. Soil indicators, particularly of trace minerals, have a generally poor correlation with sheep needs. Feed measurements are not necessarily good indicators. This is because sheep are very selective grazers, and frequently have unknown soil intakes in a range of field circumstances.

Transient, or even prolonged low levels in feed may not necessarily cause any problems to sheep; they naturally can accommodate feed source fluctuations by accumulating reserves at times of plenty, and mobilising these when feed levels are low. Liver and bone are examples of tissue which retains large reserves of many minerals and vitamins.

Mention must be made about published tables of sheep requirements, and tables of accepted sheep tissue levels. Confusion may be engendered by seeming differences between the various sources, all authoritative. Differences may arise for a number of reasons:

- Inclusion of a safety margin in some tables - the extra amount may not always result in production increases.
- Different sheep breeds may have different requirements.
- Different units may be used.
- Sheep can tolerate periods of low intakes for many trace minerals, as mentioned above.

MINERALS AND SHEEP STATUS IN WA - CURRENT AWARENESS

To present a summary of the major sheep/minerals interactions in WA, each mineral is referred to, and likely status discussed. For obscure situations and some obscure or small localities, it is strongly recommended that local expertise be consulted.

Some minerals in the list already documented earlier can be 'ticked off', as being in generally high or adequate levels. Deficiencies are consequently most unlikely. Reasons are advanced; if these do not apply further investigation may be warranted if signs indicate a problem.

Sodium

Chlorine

Iron

Silicon

- WA is replete with these! Sodium chloride (salt) is in overabundance, due to historically high soil levels. Similarly WA soils are high in silicon (sand) and iron (we supply the world!).

Phosphorus

Calcium

Sulphur

- Calcium is adequate in most soils, and is present in superphosphate (20%). Use of this fertiliser has provided plenty of these three minerals for plants and animals.
- Calcium deficiency may be induced by prolonged grain feeding (more than six weeks), due to a calcium:phosphorus imbalance (grains are high in P and low in Ca). Addition of fine limestone at 1% to the cereal grain will provide a satisfactory calcium level. Feedlotting is a situation where this applies.
- The ratio of potassium to (calcium + magnesium) is important; excess potassium can lead to a combined calcium/magnesium deficiency, with recumbency and death. Pregnant and lactating ewes are most susceptible.
- Theoretically sulphur levels are below what is necessary to provide an ideal nitrogen:sulphur ratio, but responses to sulphur supplementation have not been demonstrated in the field.

Potassium

- Animal deficiencies not reported.

Magnesium

- Seldom in deficient levels, but excess potassium as described leads to deficiency (see above); grass-dominant pastures are mostly involved, associated with superfluous and unnecessary potassium fertilisation.

Copper

Zinc

Molybdenum

Manganese

- These have nearly always been applied as fertiliser, and as plant and sheep requirements are similar, deficiencies are most unlikely. For sheep on typical pastures, a history of trace element application up to 20 years ago can be expected to provide adequate levels. Excessive lime application may lead to copper and zinc deficiency if levels are marginal.

Boron

Chromium

Iodine

- Deficiencies not reported. Generally thought to be in adequate levels in WA soils, although little is known about chromium. Boron can be excessive in some soils and cause toxicity in plants.

Selenium

- The trace mineral most likely to be deficient for sheep in WA. Areas where deficiency can be expected generally have an annual rainfall greater than 450 mm; west of the Great Southern highway seems to be quite a good indication of potentially selenium deficient areas in the south-west, as well as along the southern coast as delineated by rainfall.
- In the south lamb white muscle disease occurs, in the spring; throughout the whole region weaners are susceptible to the condition over the summer/autumn, on dry senesced pastures and stubbles. Ill-thrift and mortalities can occur.
- Diagnosis is by blood testing about 6 sheep; in cases of severe disease, the muscle pathology can be seen at autopsy.
- Provision of selenium is possible by a variety of means (see the table below).

Selenium source	Administered	Duration of effect	Approx. cost/head/year
Pellet	orally	3 years	11 cents
Long-acting inj'n	sub-cut.	2.5 years	11 cents
Fertiliser short act.	top-dressed	1 year	9 cents*
Fertiliser long act.	top dressed	2 years	15 cents*
Drench	orally	6 weeks	2 cents
With vaccines	sub-cut. inj'n	6 weeks	N/A
Lick/block	orally	transient	50-100 cents#

Note:

* With fertilised pastures and no other source of selenium, caution is necessary in cases where weaner sheep graze stubbles or crops not fertilised with selenium that season. If these sheep are on such untreated areas for more than one month, some form of selenium must be supplied. A drench can be given, or to avoid mustering the drench preparation can be appropriately diluted and mixed with any grain supplement being fed, such that each sheep receives the recommended dose.

\# Licks and blocks typically contain a range of other minerals and compounds, of doubtful or unknown effect. For selenium alone, they are an expensive and less reliable source.

Cobalt

- Deficiencies occasionally reported in the south-west about the time of maximum spring pasture growth. At this time of the season cobalt levels are temporarily reduced by dilution, and as animals require a cobalt source at no more than weekly intervals, symptoms may quickly develop. Cobalt deficiency is not common, however, and local knowledge is the best indicator of likely need. It is typically difficult to diagnose, being often transient in nature, and occurring in some seasons but not others in the same locality.
- Signs are often non-specific, but are characterised by loss of appetite, wasting and anaemia. Profuse watering of the eyes is a characteristic sign in extreme cases.
- Diagnosis is by blood testing about six sheep from affected mobs. Because the condition is complex, it is wise to test some clinically normal sheep from the mob as well, and the indicators of cobalt deficiency compared.
- Cobalt deficiency can be remedied in a numbers of ways:
    1. Weekly drench of cobalt sulphate.
    2. Cobalt pellet - expected to last for three to four years.
    3. Injection of Vitamin B12 - two months duration of effect.
    4. Cobalt sulphate topdressed onto pasture - 0.25 kg/ha has been reported to be adequate for at least one year, and possibly two. Very little definitive information about pasture application.

Vitamin E

- This is not a mineral, but is mentioned here because deficiencies are being increasingly reported throughout the same areas as are deficient in selenium, as well as lower rainfall areas. Deficiency mimics to a large degree the signs of selenium deficiency, and the two may need to be supplied at the same time. To a very minor degree vitamin E and selenium can replace the other, but severe disease caused by a deficiency of one often occurs at a stage of high levels of the other.
- Diagnosis is by blood testing about six sheep from affected mobs.
- The most economical treatment or prevention is by oral administration of a vitamin E preparation. Cost is 15 to 20 cents/head, and a dose of 2000 units can be expected to last for two months, if necessary.

Sheep Updates 2003

Genetic benchmarking for WA sheep producers

J. Greeff, L. Butler, S. Brown, K. Hart and A. Gray

Department of Agriculture Western Australia

KEY MESSAGES

Benchmarking is crucial for the genetic improvement of sheep. A range of benchmarking tools is available to WA sheep producers.

INTRODUCTION

Benchmarking flocks and individual sheep is crucial for genetic improvement. Individual sheep vary in their ability to produce meat and fibre under the same environmental conditions. Groups from different genetic sources also vary. Sheep producers can capitalise on these differences by participating in a benchmarking exercise to identify the best performing animals to breed from. Benchmarking directs flock improvement in the direction that improves producers' income and profit. To assist commercial sheep producers the Department of Agriculture Western Australia (DAWA) has developed a unique linked evaluation system. Sheep producers can use this system to benchmark their flock performance for economically important traits.

REVIEW

Benchmarking provides a fairer comparison between animals/flocks by removing management and environmental factors. The different benchmarking tools that are currently available in WA are wether trials, ewe productivity trials, on-farm ram comparisons, progeny testing at central test sire evaluation schemes and/or on-farm. These tools make it possible to compare animal performance by removing biasing non-genetic effects.

Wether trials

Different team performances are compared for growth and wool production traits from weaning until hogget shearing. It is a relatively cheap and easy comparison and is mainly focused at commercial wool producers. Teams with a minimum of 20 weaner wethers are randomly drafted from a flock and taken to a host site. The animals are even-up shorn after a 30 day adaptation period, then run together with other teams at the host site under the same conditions for two shearings. This provides information on fleece weight, fibre diameter, coefficient of variation of fibre diameter and fibre curvature. Additional traits such as staple strength, body composition via scanning, worm resistance through faecal worm egg counts, occurrence of dags and susceptibility to blowfly strikes, etc. can also be recorded depending on the groups interests. Larger teams are needed to provide more reliable bench marking performances for disease traits.

Traditional wether trials only allowed teams to be compared at one site in a specific year. In 1997 the Department initiated linked wether trials, where teams of animals that were born and raised in the same flock were entered in different wether trials. This allowed comparisons across sites and across years that added enormously to the accuracy of wether trials. Wool producers are now able to compare their team performance tested at one site to a large number of other teams that have been tested at other sites. As these link teams also link different years, this provides the opportunity for producers to benchmark their sheep again at a later date. This gives a rough guide to objectively determine whether introducing a new ram source has resulted in positive genetic changes in their flock over time.

Ewe productivity trials

In 1998 ewe productivity trials (EPT) were initiated by DAWA. Ewe trials were designed to allow producers to benchmark their total productivity, which includes growth, wool production and lamb production traits. Fifty ewe weaners are randomly selected from each participant's flock and taken to the host site. These teams of ewe weaners go through the same protocol as for the wether trials up to hogget shearing. Data collected at hogget shearing is combined with the linked wether trial data in a combined analysis to evaluate flock performance. After hogget shearing, the different ewe teams are mated to a common team of rams to allow every ewe an equal opportunity to be mated with every ram. This eliminates any differences between teams due to the servicing rams. Differences in fertility, litter size, survival rate and growth rate of the lambs, are then due to the ewes. The different groups are drafted into separate lambing paddocks prior to lambing. At marking the lambs of each team are uniquely identified and all the different teams combined into one group. This combined group is managed together until weaning to determine the kilogram of lamb weaned per ewe team. A minimum of two lambing cycles and three shearings is needed to give a fair indication of total team productivity. Wool production and all fibre diameter traits are again measured at the second and third shearing.

EPT's are also linked with common teams, allowing for team comparison across years and sites. This is the most complete benchmarking method available to commercial sheep producers. Collecting additional trait information will indicate which production traits each team may lag behind in, and it will assist producers in making better decisions on which traits to improve in their flocks.

On-farm ram comparisons

After a wether or a ewe trial has finished, producers are better positioned to decide whether to change their ram source. If so, then the data also provide information that identifies potentially genetically superior ram sources. However, other traits also need to be considered, so the next step should be to evaluate the performance of a few potential ram sources on participants' own properties. This will give the best indication of the general performance of the new ram source against the old ram source under the same environmental conditions.

Use a minimum of five rams. Allocate and mate a minimum of 100 randomly selected ewes with each ram source, thus 20 ewes per ram. Identify the ewes that were mated to each ram source with unique tag numbers, and manage the different ewe groups together in one group from after mating until prior to lambing. Draft ewes off in their original mating groups prior to lambing, and let each group lamb separately in different paddocks. Follow the ewe productivity trial protocol from marking. All progeny can be evaluated for growth and wool production traits, while the ewe progeny can also be evaluated for reproduction traits as in a ewe productivity trial.

Progeny testing

Progeny testing is similar to an on-farm ram comparison except that the progeny of individual rams are compared under the same environmental conditions. This was normally carried out at central test sire evaluation sites. With the advent of BLUP (Best Linear Unbiased Predictions) technology, rams can now be compared across flocks provided there are sufficient genetic links between flocks. This is the most accurate method available to identify genetically superior rams in other flocks. In addition, this technology provides a measure of the effectiveness of each breeder's breeding program. Merino Genetic Services and Merino Benchmark provide breeding values for animals for a range of traits. The Department assists producers to define their breeding objective and can assist in interpreting the data. By introducing rams/semen based on BLUP breeding values, producers will achieve significantly faster genetic improvement than what would otherwise have been possible.

CONCLUSION

Very sophisticated genetic evaluation methods are available to WA ram breeders to benchmark their sheep. These tools provide the opportunity for each producer, from the most basic to the most advanced user to reliably identify superior genetic sources.

KEY WORDS

wether trials, benchmarking, progeny testing, breeding

Paper reviewed by: Andrew Peterson, Department of Agriculture Western Australia

Does selecting sheep for low WEC reduce scouring?

John Karlsson, Johan Greeff and **Paula Coombe**, Department of Agriculture Western Australia

KEY MESSAGES

Selecting sheep for resistance to worms in the winter rainfall areas of Australia should be based on both low WEC (faecal worm egg count) and low DS (dag score).

INTRODUCTION

In 2001, internal parasites were conservatively estimated to cost the Australian sheep industry $220 million per year. This cost is predicted to rapidly increase to an estimated $700 million a year as the problem of anthelmintic resistance increases to a crisis point[1]. The cost of internal parasites in sheep is due to production losses and/or deaths, cost of control and associated costs such as flystrike and crutching.

REVIEW

Until the 1980s worm-induced scouring was thought to be due to damage by the worms present in the intestine. In this case an elevated faecal worm egg count (WEC) would be expected as an indirect measure of an increased adult worm population. In the late ‘80s and early ‘90s when WEC monitoring was more widely used, it became apparent that not all cases of scouring are accompanied by a high WEC. In most of the Australian sheep grazing environments scouring is caused by sheep nematodes inhabiting the intestinal tract, which includes species such as *Trichostrongylus* (black scour worm). Research in Victoria on the causes of low WEC scouring found that this syndrome was due to an allergic or hypersensitivity reaction by the host to the ingestion of the third stage infective worm larvae[2]. The hypersensitivity-scouring syndrome is more prevalent in young adults from their second winter onwards. In the early stages of breeding sheep for resistance to worms the expectation was that by selecting for resistance, based on low WEC, there would be a correlated response in reduced scouring. However, in the Rylington Merino selection line no correlated reduction in scouring was demonstrated[3]. Subsequently, a research project was undertaken to establish if any genotype by environment interaction existed for worm induced scouring[4].

SELECTED RESULTS

The trial was conducted at two sites where the main sheep flocks dedicated to breeding for worm resistance are located. These are the Rylington Merino flock managed by the Department of Agriculture Western Australia at Mt Barker in WA (winter rainfall) and the Haemonchus Selection Lines, managed by CSIRO at Armidale, NSW (summer rainfall). This paper reports the results from the Mt Barker site. Trials on the Rylington flock have shown that the WEC can be halved over a period of 10 years by selecting sheep on WEC. Each trial site used 400 ewes typical of their respective regions. The ewes were evenly allocated at random to four sire groups: 1) WA resistant group; 2) WA control group; 3) Armidale resistant group; and 4) Armidale control group. The four traits analysed to date are WEC, dag scores (DS), faecal consistency scores (FS) and bodyweight. The seasonal pattern in scouring for the four genotypes is given in Figure 1.

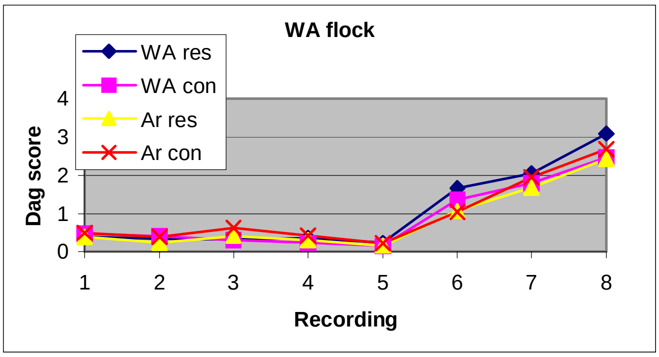

Figure 1. Dag scores (DS) at MBRS for the eight recordings.

Between weaning and hogget age, on average eight measurements were done each year. These are referred to as recording periods. Recording period one is at weaning, recording periods six, seven and eight covers the following winter spring period when the sheep reached hogget age. The trial was replicated over two years.

There was a significant difference in DS at the two sites for seven out of the eight recording periods. In the summer rainfall environment the DSs remained at a relatively low level throughout the whole year. In the winter rainfall environment DS showed a highly seasonal pattern with a rapid rise in DS during the winter and spring periods when the animals reached hogget age. This shows that dags are a serious problem in the winter rainfall regions.

The WA resistant line in the winter rainfall environment had significantly higher DS compared to the CSIRO resistant genotype for recording periods six, seven and eight. The difference between the two resistant genotypes in this environment may be partly due to the higher resistance of the WA resistant genotype as indicated by their lower WEC. In addition, it could also be a result of selection in different environments. Within the WA derived genotypes, the selected line had significantly higher DS for recording periods six and eight. Given the problem of high DS in the winter rainfall environment this trait should be included in breeding programs.

CONCLUSION

- There is a strong argument in favour of treating scouring as a separate trait to worm resistance.
- Breeders in the winter rainfall environment should select for both reduced WEC and reduced DS.

KEY WORDS

sheep, selection, worm resistance, scouring

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Paper reviewed by: Di Evans

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Summer quarters for sheep - stubbles

Ron McTaggart, Department of Agriculture Western Australia, Albany

KEY MESSAGES

Unharvested grain is the most valuable component of stubbles. Grain poisoning can occur if sheep are suddenly placed on stubbles that have a lot of spilt grain. Efficient harvesting and weed control may leave stubbles with low nutrient value. Monitoring sheep body condition during summer and autumn will help you decide when grain supplementation is needed.

INTRODUCTION

The area of land cropped on WA sheep farms can range from nil to 70% of the arable land. Stubble from these crops form a valuable feed resource but young sheep in particular can only use a small percentage of the feed available. Crop residues that are available include cereals, lupins, canola and peas. The majority of this paper refers to cereals.

The risk of soil erosion on pea stubbles is very high and if they are to be grazed at all it should be only for a short time until the pea seed is consumed. Lupin grain is an excellent feed for sheep but the stubbles carry the risk of lupinosis to grazing animals - made more risky with summer rain. Canola stubbles can be a useful summer home for sheep as they are usually swathed before harvest and canola seed and pod material is high quality sheep feed.

Crop to pasture ratios swung towards more cropping in the high rainfall areas during the ’90s when wool prices were low, but farmers have made the shift to growing sheep rather than wool and are looking hard at the costs and risks associated with cropping. Cropping trends have shown a drop in area sown to lupins and a big increase in the area sown to canola. More wheat is being grown in areas previously dominated by oats and barley. The Great Southern Midas model shows whole farm profitability to be at a maximum at between 0-25% of farm in crop (John Young, pers. comm.). The current prices for sheep meat and wool may lead to a lower level of crop area in the wool belt. Sheep are back!

REVIEW

Cereals form the bulk of the stubble feed available for sheep in summer and autumn. With farmers now using more weed control chemicals, stubbles are becoming weed free but there may still be valuable early summer sheep feed in the unsown parts of the paddock - fence lines, watercourses and remnant bush. The quality of ungrazed pasture declines very rapidly after senescence and sheep should have access to this feed before summer rain further spoils it.

Quantities of stubble available can range from three ton to six ton, but only a small fraction will be eaten by sheep. Cereal stems have a digestibility under 30% and the leaves and chaff are 60% digestible. Sheep will have a reduced intake of low energy rations[1]. Energy levels of straws and stubbles in W.A average 6.5 MJ/kg while energy levels in material collected in chaff carts is 7.5 MJ/kg. Energy levels in cereal grain varies across the crops and the seasons but would be expected to be between 10.5 and 13 MJ/kg. Grain and chaff are the valuable fractions of stubbles.

The more efficient the harvesting - the lower the feed value of the stubble. Conversely your stubbles could have some value as sheep feed if; army worms lop off the heads; heads are lost near harvest in hail storms; the crop lodges and grain is below the header knives and remains in the paddock. While any or all of these events will lower your harvested yields, the grain can still be harvested by your sheep. Care needs to be taken if there is a big amount of grain still in the paddock and sheep should be acclimatised to grain feeding before being given open access to the whole area. Many farmers swath barley and the swathing will accumulate grain, chaff and stubble and it will be easy to check the risks to sheep from barley grain in the swath. Oat stubbles are usually very safe for sheep. Sheep will selectively graze the paddock so sampling and testing stubbles is not going to tell you what they are eating - only the menu of what is present.

To find out how the sheep are performing on the stubbles you need to get them yarded to find out!! As this is an extra job and a hot dusty one at that, very few mobs of sheep are ever monitored for their condition score during our annual drought. A quick check of the dam and a stir up by the red dog is often as much management as they get. If we know that's all we are likely to do to a mob perhaps we should start with the drafting gate to at least draft off the tail and give them a better chance of deluxe treatment before we let a large group of mixed weight/mixed condition score sheep in to survive the summer. The rewards for a bit of drafting and selective feeding will be more profit. It is suggested that we have a notion of what performance to expect from a mob of sheep during the period on stubbles. The target should be to minimise stock losses and might be - improve body condition; maintain body condition or have some control over weight and condition loss over the dry feed period.

Sheep owners have a moral and legal responsibility to manage animals humanely and at current high prices for sheep there should be plenty of profit incentives to look after sheep. Sheep welfare issues are more likely when prices are low and there is a drought or a very quick finish to the season. In all seasons farmers should be assessing season and sheep numbers by early spring and deciding how many sheep to keep through the dry. The decision will be driven by a mix of business reasons but must include feed and water supplies.

It is easy to overestimate the value of stubbles in a dry year - crops are usually thin and stubble feed does not last long and there is the risk of soil erosion. There is an excellent Farmnote showing pictures of how much stubble cover needs to be left in a paddock to reduce erosion risk[2]. The Farmnote includes a chart showing the estimate of stubble yield using grain yield as an indicator. For example a two ton wheat crop (state average) will have a stubble of 3.7 ton which could be grazed for 148 days at a grazing pressure of 10 DSE/ha. This calculation presumes even grazing and does not describe sheep performance. Grazing is seldom even and areas around water points may be at risk well before the 148 day period is over.

CONCLUSION

Don't keep more sheep than you can feed properly over summer. Do try to monitor the sheep when they are on stubble. Water quality and quantity is often overlooked.

KEY WORDS

stubbles, sheep, risks, monitoring

Paper reviewed by: Sue-Ellen Shaw, Department of Agriculture Western Australia

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Thinking about breeding Easy Care Sheep?

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KEY MESSAGES

To breed a sheep that is polled, with no wool on the head, legs, belly or backside and a genetically short tail is easy, but time consuming. For producers to accept these changes will be difficult.

INTRODUCTION

In 1997 we set out to show that it would be possible to breed a sheep that was not only easy care but could produce benefits for the consumer, the processor and the producer. This task has been a little slow but there seem to be no negatively correlated relationships among the traits. The most difficult facet of the project is attempting to get sheep breeders to accept that this package will be to their advantage in the future. This paper investigates some of the component genetic traits that would make sheep more (or less) 'easy care' and the different routes those traits either have taken through history or might face on the way to acceptance and incorporation into a breed.

REVIEW

Polled Merinos

To breed a sheep with no horns is simple. Polled sheep have been available in Australia since the 1830s and they exhibit less fighting, less flystrike and better survival[1]. The horns gene in Merinos is a sex-linked recessive, so it is difficult to eliminate completely but since it is a single gene it is possible to make very rapid progress. However it was the 1980s before polled sheep were taken seriously, and even then constituted less than a quarter of rams sold[1]. Producers resisted using Polled Merinos for many reasons, but perhaps the most important of these was the mistaken belief that they are less productive. One hundred and fifty years cannot be considered rapid uptake of technology!

Wrinkled Merinos

Since the 1930s science has shown that skin wrinkles are bad for almost every facet of sheep production. Wrinkles reduce fertility, fecundity, growth rate, clean wool yield, the value of skins, and wrinkles increase wool yellowing, susceptibility to flystrike, death rate at all ages and the variability of both fibre diameter and length[2]. Clearly then, wrinkles are a bad thing BUT unlike Polled Merinos, wrinkled Merinos became very fashionable from the 1880s until they had influenced an estimated 90% of Australian flocks and declined again by the 1900s[1]. Wrinkles left their mark and producers still believe that wrinkly skins produce more wool, and have continued to breed sheep that have some wrinkles over the last 70 years. Wrinkles are probably caused by a number of genes, but it is possible to select against them at any time during the life of the sheep and it is possible to make rapid progress towards smooth skins. Yet, despite the scientific evidence and the visible genetic marker, wrinkly sheep remain.

Bare breech

A large genetically-determined area of bare skin around the breech reduces the incidence of flystrike[6]. Mulesing and crutching reduce flystrike by the same mechanism, so a bare backside is a trait for which producers can estimate a financial gain. The reduced cost of monitoring for and treating flystrike, reduced production losses of flystruck sheep, reduced cost of crutching and no set-back in growth following mulesing can all be estimated. These benefits may not be realised while breeding towards an animal with a large bare area because it is likely that crutching and possibly mulesing will still need to be used as flystrike preventatives. Alas, these facts were known by science as early as the 1980s[7] yet the

Wiltshire Horn breed used in those experiments has had limited use throughout the sheep population. Once again, the technology has been there for sufficient time for sheep breeders to have already made the change and yet this has not happened.

Other doomed traits?

We have shown that reducing tail length by cross breeding and selection is a very simple process[3]. We estimated a heritability of 0.8 for tail length in various crosses of Finnish Landrace and Cheviot sheep. Progress is visible at docking as are the appearance of wrinkles or the disappearance of horns, so it is possible to make rapid changes. Merino breeders may not want to cross breed, but the few variants that have been identified within Merinos should not be used, because they are likely to have lethal genes[4]. Another stumbling block is that throughout the grading-up process to short tails there will be animals that have long tails and as for bare breeches tradition will dictate that they will need to be docked. Indeed, producers may never accept that the short tail is short enough!

Sheep with no wool around the head, legs, belly or breech yield 80% of the fleeceweight while only requiring half the time to shear[5]. This will speed up the shearing process considerably, with the result that shearers might earn more per day, but other staff in the shearing team might need to work faster and earn less money per year. The change would be analogous to the introduction of wide combs for shearing, but the change will happen more gradually, so union unrest is likely to be less intense. The change would also lead to a loss of up to one kilogram of belly and oddment wools, so unless producers can negotiate a reduced shearing cost, there will be no financial incentive to breed sheep without wool on these areas.

Perhaps the ultimate sheep will be those that do not grow wool at all and Western Australians have certainly been at the forefront of the introduction and dissemination of these breeds. Indeed, New Zealanders obtained their Dorpers and Damaras from Western Australian sources and last year alone nearly 20,000 ewes were mated to sheep that do not grow wool. We have had rams available for sale over the last five years from our breeding programs developing sheep that resemble our breeding goal, yet producers would rather introduce an untried breed than use one that had been developed from acclimatised genotypes. Western Australia has the opportunity to develop their own Easy Care sheep from the genes at their disposal, but then they are just as likely to buy them from New Zealand!

CONCLUSION

Producers have either ignored or dismissed genes that have been available in the sheep gene pool for up to and over 70 years, and these are genes that have been shown to be worthwhile by science for a similar length of time. Perhaps scientists should shoulder the blame for not stating the case in an appropriate fashion?

KEY WORDS

wrinkles, tail docking, mulesing, flystrike

ACKNOWLEDGMENTS

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Paper reviewed by: Stuart Young, AgResearch

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Increasing lambing percentages and lamb survival

Sandy White, Department of Agriculture Western Australia, Jerramungup

KEY MESSAGES

There is a need to revisit basic management practices on ewes and rams and adopt the latest strategies developed from research to increase lambing percentages and lamb survival. This is a critical first step to rebuilding the sheep flock in Western Australia, which is essential for the maintenance and development of markets. However, the use of new strategies needs careful evaluation on farms to ensure that the results from their use are profitable.

INTRODUCTION

Low numbers of sheep in Australia, good prices and an optimistic long-term outlook for sheep meat highlights a need to increase lamb production. Although reproductive rates vary between individual properties, the lamb marking percentage in Western Australia still averages around 75 per cent. This paper briefly summarises management practices that can be adopted at different stages of the sheep reproductive cycle to improve lambing percentages and subsequent lamb survival.

REVIEW

1. Rams

Selection - Selection of superior rams will give fast genetic gains in the traits that are chosen. Using tools such as Lambplan and Merino Genetic Services will ensure selection of rams whose daughters have improved reproductive performance[1]. When buying rams check the genitals for defects. This is often a neglected aspect of ram selection at sales. Buy rams from a source accredited as brucellosis free.

Management - Preparation of rams should begin at least two months prior to joining as rams need eight weeks to produce healthy sperm. Inspect rams and cull those with abnormal genitals, feet or teeth. Check and treat horns for flystrike. Rams to be used in late summer/autumn should be fed 500 g/h/d of lupins for the eight weeks before they are joined with the ewes to increase sperm production. Rams should be in body condition score three to four at joining and joined with ewes at a minimum 1.5 per cent with at least five rams per flock[2]. A higher proportion (up to 4 per cent) of young rams should be used[3].

2. Ewes

Selection - To increase the performance of ewe flocks, barren ewes should be culled. Maiden ewes failing to lamb should be given a second chance. Cull sheep with obvious physical faults such as poor feet or teeth. Any poor reproductive performance of the ewe flock should be investigated to identify causes such as disease or clover infertility.

Teasers - If joining ewes before mid January, one per cent of teasers should be put with ewes 14 days before joining the entire rams to induce cycling in the ewes which aren't coming into oestrus. Teasers can be vasectomised rams or hormone treated wethers[3]. Teased ewes only need to be joined for five weeks, but rams should be left with unteased ewes for eight weeks if they are put with ewes before mid January and for five weeks for later joinings. Maidens should be joined for eight weeks.

Ovastim® - VIRBAC now manufacture Ovastim® injectable, a vaccine that can give a reliable increase in ovulation rate when ewes are treated at the recommended intervals. Only four-tooth and older ewes should be treated[3].

Pregnancy testing - Identifying and separating dry, single and twin bearing ewes is a means of achieving optimum nutrition for the ewe flock during pregnancy. Twin and single bearing ewes can be fed different rations to maintain their condition. As the main factor associated with lamb mortality is lamb birthweight - very small or very large lambs are likely to die, different feeding strategies increases the likelihood of twin lambs surviving whilst minimising the risk of getting oversized single lambs[3]. Feeding ewes at the appropriate rates decreases the risk of pregnancy toxaemia and ewe deaths.

Vaccination - Vaccinate ewes four to six weeks before lambing to protect them and their lambs against pulpy kidney, Caseous lymphadenitis (CLA or 'cheesy gland') and tetanus.

Nutrition - Bodyweight and condition score at joining has a major impact on fertility. Research has shown that a 40 kg ewe gave 87 per cent lambing while a 50 kg ewe gave 105 per cent [1]. Very low bodyweight ewes are unlikely to cycle. Research assessing the feeding lupins beginning just prior to joining and continuing for 12 days into joining has shown to increase ovulation rates, however results on farm may be variable[1,5].

Maintaining the ewe in score three condition during joining, pregnancy and lactation is the key to maximising reproductive performance. Extremes of nutrition, (both under and over nutrition) will have a negative impact on lamb survival and/or growth[3]. Feed requirements of a lactating ewe are two to three times that of a dry ewe, as a large increase in the energy intake is needed to meet increased demands of milk production. Research using lupins and more recently corn and cereal grains to boost colostrum production is showing promising results[6] and field evaluation will determine it's on-farm application.

3. Lambs

Marking - Marking (mulesing), tailing and vaccinating (for pulpy kidney, tetanus and CLA) should be done at the end of lambing. Mulesed lambs should remain undisturbed for at least three to four weeks to allow wounds to heal[7].

Time of weaning - Early weaning before 10 weeks of age can be considered in dry seasons, but weaning at 12 to 14 weeks after the start of lambing in all pasture conditions has advantages, particularly in flocks with a six week lambing period. Lambs are able to maximise growth during the green period to achieve a target minimum liveweight of 30 kg at the start of the dry feed period and attain liveweights and condition scores for sale as prime lambs. At 12 weeks the rumen is well developed to cope with a complete pasture diet and weaning at this time does not penalise growth in comparison with weaning at 16 to 20 weeks[7]. For vitamin and mineral supplements see[8].

Lambs may have a significant worm burden by 12 weeks of age, and weaning at this time is an opportunity to give them an effective drench and move into a clean paddock. It is also timely to give a second vaccination at weaning, four to six weeks after the first given at lamb marking.

Nutrition - Legume dominant pastures will maximise lamb growth. If lambs are to be weaned onto dry pastures, train them to eat grain by feeding a small amount to ewes and lambs for two weeks prior to weaning. Lupins are an ideal supplement due to their high energy and protein levels and the low risk of acidosis occurring. Alternatively, a standing fodder of oats and legume mix could be grown exclusively for weaners or perennial pastures such as lucerne utilised. Graze lupin stubbles carefully with weaners to minimise the chances of lupinosis developing.

CONCLUSION

The management practices discussed here will help achieve increased lambing percentages in ewe flocks and improve the subsequent survival of the lambs. This will increase the number of lambs produced either for replacement or meat production to help maintain and develop markets.

KEY WORDS

nutrition, bodyweight, condition score, management

Paper reviewed by: Keith Croker, Department of Agriculture, South Perth

REFERENCES

(See extended paper on CD.)