



Sheep CRC Precision Sheep Management Information Sheets

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Sheep CRC – *Precision Sheep Management Introduction*



How precision pays

The Sheep CRC has a vision for integrated sheep production systems based on measurement, management and marketing of animals according to their individual merit. It is combining new and existing technologies that enable change from the current practice of managing the flock, to managing individual animals or selected groups of animals.

These technologies, and the decisions they inform, make up what is known as Precision Sheep Management.

Major gains in productivity and profitability can be made by measuring the variation within each and every flock.

The large differences that exist between the best and worst performing animals in fleece weight, fibre diameter, growth rate and reproduction can mean significant differences in dollar value.

Accurate data on individual animals is gathered through the practical application of radio frequency identification (RFID).

Reproduction drives profit

Gains in average reproductive performance can often be achieved with the implementation of basic, well tried and tested management activities.

Mating at the right time, with enough rams, at the correct ewe fat score, for 5 weeks is essential.

But in a wool flock, the changes in profit are not as large as in a lamb enterprise so be careful about spending too much money on improving reproduction. Often the optimum reproductive performance from a business perspective will be below possible maximum performance.

Careful management of reproductive performance:

- ✓ Increases the number of surplus animals.
- ✓ Increases the productivity of the breeding ewe unit.
- ✓ Increases the ability to manipulate age-structure and productivity.
- ✓ Allows more feed resources to be allocated to production.
- ✓ Enables greater selection pressure to be applied for a more rapid genetic gain.



John Symons 'Turkey Lane', Kangaroo Island

Wool growing operation running 5000 sheep including 1200-1300 weaners. 800 electronic tags recycled strategically.

"Prior to 2000, when we marked 65-70% each year, the flock was barely self-replacing. Virtually all ewe hoggets had to be kept as replacements and any genetic improvement was coming solely from the ram team.

"Since 2000, we have improved reproductive performance to 85-95% which means we have been able to cull a higher percentage of ewe hoggets each year (25-30%).

"This has meant a faster rate of genetic gain in the wool flock, which has been on a fast track of genetic improvement since 2000. This genetic gain now yields an extra \$60 of wool income per hectare each year.

"Increased reproduction has also meant more sheep to sell each year which is beneficial to cash flow, especially when off-shears prices for ewes and wethers are good."

Find out more

Visit the Sheep CRC website: www.sheepcrc.org.au

This site has links to industry and staff contacts, from suppliers and specialist manufacturers, to those working with Precision Sheep Management in the field.

Sheep CRC staff have been instrumental in identifying, evaluating and communicating to industry information on software, hardware and service providers for precision sheep production, as well as providing service support for contractors and consultants.

Specialist advisors and commercial service providers are being trained by the Sheep CRC through its MasterClass program in 2007-08.

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Local contacts

Reproductive performance



Precision Sheep Management

Increasing on-farm profitability by measuring, managing and marketing sheep on individual merit.



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Optimise reproductive performance

The reproductive potential of the flock is determined by genetics, and modified by flock management – namely ewe nutrition and selection.

Selection can improve reproductive performance both in the current flock and future generations.

Ewe nutrition

Nutrition impacts on reproduction in a number of ways:

Stage	Nutrition	Criteria	Consequence
Pre-joining	Feed quantity and quality	Liveweight of maidens	Age at first joining
	Flushing	Fat score Progesterone levels	Fertility Ovulation rate
Joining	Feed quantity and quality	Increasing liveweight	Ovulation rate
Pregnancy	Feed quantity and quality	Twin bearers	Pregnancy toxemia Birth weight Lamb survival Progeny fleece: Fibre diameter & Fleece weight Immune response
Late pregnancy	Diet quantity and quality	Hormonal status	Colostrum Milk production
	Energy	Fat score	Ewe survival: Pregnancy toxemia & Dystocia Lamb survival: Birth weight & Vigour
Lactation	Energy	Ewe weight loss	Lamb growth
Post-weaning/ pre-joining	Feed quantity and quality	Fat/condition score of ewes rearing lamb(s)	Carryover effects on fat/condition score

Source: G.J. Lee, Individual animal management in optimizing reproduction, New South Wales Department of Primary Industries, Sheep Conference 2008

Selection

Selection is likely to be cheaper than many of the other management options to improve reproductive rate in both current and future generations. A ewe's net reproductive performance is repeatable. Within any year, it is relatively easy to identify dry ewes, or those that failed to rear a lamb, and cull them to improve the net reproductive rate of the remaining ewes.

Ewes that are consistently dry early in their reproductive lives, or fail to rear their lambs, have a much lower net reproductive rate in later years than ewes that successfully rear lambs as young ewes.

The following table shows the relationship of weaning performance at two and three years of age with lambs weaned per 100 ewes joined at four–six years of age of 2105 Merino ewes from an experimental flock at Trangie. Lower culling weights and a greater improvement in reproductive performance are likely to be achieved by combining information from both years.

For example twice dry ewes later reared only 47 lambs per 100 ewes joined and represented 12% of the flock.

2 yo ewe performance	prop'n	Lambs Weaned/100 EJ at 4–6yo	3 yo ewe performance	prop'n	Lambs Weaned/100 EJ at 4–6yo
Dry ewes	33%	68.9	Dry ewes	26%	62.5
0 weaned	13%	80.4	0 weaned	12%	72.9
1 weaned	47%	87.0	1 weaned	50%	88.5
2+ weaned	6%	102.4	2+ weaned	12%	99.4

Early performance:	Fail twice		Fail once		Wean 1+ twice
	Dry twice	Other	Dry	Fail to rear	
Lambs weaned/100 ewes joined	47.4	67.8	81.5	85.6	94.3
Proportion	0.12	0.10	0.27	0.13	0.38

Management options

Reproductive performance of your flock can be improved through management aimed at either the flock or individuals.

Identifying which option to take requires information. Targeting the individual based on need can reduce feed costs and be more effective but requires information on each individual.

Criteria that can be used in managing the breeding flock include:

Stage	Data	Decision
Pre-joining	Fat score, liveweight	Feed management, culling
Joining	Ram harness raddle	Lamb group, culling
Pregnancy	Condition score, liveweight	Supplementation Lambing group
	Scanning (foetal number and age)	Feed management Twin management, culling
Late pregnancy	Condition score, liveweight	Feed management
Lactation	Condition score, liveweight	Supplementation Culling
	Wet/dry examination	Feed management
Post-weaning	Fat score, liveweight	Feed management

Source: G.J. Lee, 2008.

Managing the whole flock

Requires no individual identification

- Simple strategy
- Can not target those most in need
- Some animals will not receive sufficient supplement, others will more than they need
- Not cost-efficient

Managing groups within a flock

Requires no or temporary identification of individuals

- Groups can be removed from the flock for separate management based on real time observation
- Different groups can be managed according to need
- Management more targeted than above example
- Still some variation within groups unless mob sizes are very small

Individual animal management

Requires permanent visual or electronic identification of individuals

- Individuals can be removed from the flock based on more complex information, or information collected previously
- More information means individual animals can be targeted
- Management requires separate paddocks

Differential management

Requires electronic identification and auto-drafting equipment

- Individuals from within the flock are managed differently
- Inputs can be used more efficiently
- Additional equipment costs can be off-set by labour savings

The use of RFID gives long term identification and allows more reliable information to be gathered. This wider array of information can increase the effectiveness of management decisions.



Craig and Grant Dunn, Reedy Creek, Mandagery, NSW

Aim to RFID their entire Merino ewe flock by 2010. Electronic data is already being used for identification of sheep in key age groups with individual animal information being used in classing, mating, and management decisions.

"We are currently using fibre diameters, fleece and body weight data collected with the assistance of RFID in hogget selection. This has resulted in huge labour efficiencies as well as increased data accuracy.

"Our ewes are tested for pregnancy status. Electronic tagging has meant that we can keep all ewes together up until shearing and manage the wool from whole mob lines together. This gives us efficiencies in the management of our mobs and means that shearing is not unduly fragmented or complicated.

"Post shearing we draft the twin bearing, single bearing and dry sheep for separate management. Our next step is to use auto-drafting post shearing to create our management groups for lambing."

Implementation

Precision Sheep Management applications can begin at many points of the production process and at varying cost. You don't have to outlay vast sums of money to get started.

Your individual production goal and target market will determine where you begin.

In some instances it may be feasible to invest in all of the equipment at once. In others it will be easier to spread the cost over a few

years or to select only a specific group of livestock you wish to measure. RFID ear tags, a data capture device, or computer with appropriate software is enough to get you started.

Remember that most of this equipment can be used in several situations including with cattle.

- An (RFID) ear tag houses a computer chip which stores a permanent and unique identification number that cannot be changed.
- RFID ear tags are read by either a portable hand-held reader – a wand or stick – or a fixed panel reader that is built into a race, cradle or electronic scales.
- A good quality smart scale head/control box or data logger and load bars will be required for weighing and/or drafting. Electronic scales are often attached to drafting machines to capture weights on each individual animal.
- An auto-drafter and fixed tag reader may be a good investment at this point. Automatic drafting machines – available 'off the shelf' from commercial suppliers – can be linked with the RFID tags.
- A computer is essential to manage the data. A machine capable of running a Microsoft Windows 98 operating system or a later version will be sufficient for most on-farm data management. Your computer may be as simple as an existing desktop computer in your office. Or, you may decide to purchase a laptop computer, specifically designed for outdoor use, for the yards and shed.

Financial advantage

A key profit driver on all sheep enterprises is increased weaning rate. It means more surplus sheep to sell, and/or more weaners to shear. However, the advantages need to be balanced with the increased cost of running these additional sheep numbers.

Greater selection pressure increases the speed of genetic gain. A 10% increase in weaning percentage can lift profit per hectare by 13–21% in first-cross enterprises and 14–24% in Merino breeding operations.

Change in profit with weaning rate for the main sheep enterprises

Weaning %	2nd cross lamb production*		1st cross lamb production*		Merino breeding (wethers sold as weaners)	
	Profit \$/ha	%	Profit \$/ha	%	Profit \$/ha	% Change
60					74	
70			130		90	24
80			163	25	106	20
90	82		197	21	122	17
100	111	35	230	17	137	14
110	141	27	264	15		
120	170	21				
130	200	18				
140	229	15				

Source: Langford et al, 2007