



NATIONAL  
MERINO CHALLENGE

# TRAIN-THE-TRAINER WORKSHOP MANUAL





NATIONAL  
MERINO CHALLENGE

**NMC303A**  
**IDENTIFY & SELECT ANIMALS FOR BREEDING**  
**BREEDING**





# NMC303A Identify & Select Animals for Breeding

## Unit Descriptor

This unit covers the process of identifying and selecting animals for breeding or for other enterprise requirements and defines the standard required to identify criteria for animal selection, control and sort livestock, appraise and grade animals and provide due care in the handling of livestock.

## Application of the Unit

This unit applies to livestock students who operate under directions from others with checking only related to overall progress.



# Elements and Performance Criteria

1. Identify animals.
  - 1.1. Criteria for animal selection are identified and clarified from breeding and production information and supervisor or management instructions.
  - 1.2. Procedures to control and sort livestock are conducted with due care in accordance with Work Health & Safety (WHS) and animal welfare requirements.
  - 1.3. Animals are identified and separated according to unit selection criteria.
  - 1.4. WHS hazards in the workplace are recognised, risks are assessed and controls implemented.
  
2. Assess and select animals.
  - 2.1. Animals are accurately assessed according to industry/enterprise criteria and guidelines.
  - 2.2. Procedures to control and sort livestock are conducted with due care in accordance with WHS and animal welfare requirements.
  - 2.3. Animals are correctly ranked and selected using performance records, weight, grade or other specified criteria.
  - 2.4. Selection is reliably and accurately recorded and reported.
  - 2.5. Records and documentation required by the facilitator are completed clearly, accurately and promptly.



# Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

## Required skills

- identify WHS hazards and implement safe work practices
- provide due care in the handling of livestock
- identify animals using visual selection
- identify animals incorporating breeding values
- select animals according to criteria
- draft livestock
- write basic statements and maintain livestock handling records
- read and interpret breeding objective sheets, production information, target statistics, quantities of feed and other inputs
- prepare and present production and other information in a manner that is readily accessible
- estimate, calculate and record routine workplace measures



## Required knowledge

- livestock handling techniques
- animal movement and drafting
- livestock characteristics relevant to drafting
- selection criteria for breeding stock
- livestock identification systems and devices
- livestock behavior
- enterprise and industry grading/selection animal identification procedures
- WHS and animal welfare legislative and enterprise requirements



# Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

## Overview of assessment

### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy holistically all of the requirements of the performance criteria and required skills and knowledge and include achievement of the following:

- identify criteria for animal selection
- control and sort livestock
- appraise and grade animals
- use breeding values as a tool in selection systems
- rank animals based on their breeding value
- provide due care in the handling of livestock



# Range Statement



The range statement relates to the unit of competency as a whole.

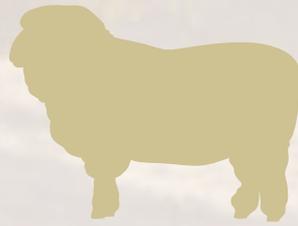
**Livestock may include:**

- sheep for the purpose of sorting of animals for sale, breeding or for other enterprise requirements

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Australian Wool Innovation Ltd gratefully acknowledges the funds provided by the Australian Government to support the research, development and innovation detailed in this publication.



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NMC303A  
IDENTIFY AND SELECT  
ANIMALS FOR BREEDING  
BREEDING NOTES





# NMC303A Identify and select animals for breeding

## Breeding Notes

The following notes step participants through the fundamentals of identifying production traits in sheep and selection methods. These skills can be used to select animals for a breeding program against an identified breeding objective.

## Introduction

As opportunities to improve the efficiency of sheep production continue to evolve, it is important that a foundation understanding of breeding and selection principles is at the core of selection and breeding to gain the most from the stock with which you work.

The basic fundamentals presented within these notes underpins the ongoing development of productive and profitable Merino sheep in Australia.

Be it in a superfine enterprise, a multipurpose enterprise, or the many in between, it is a strong understanding of breeding and selection principles and the interaction of genetics with the environment that allows producers to capitalise on the opportunity that breeding more productive sheep offers.



**The four keys to effective and efficient breeding programs which underpin a successful sheep business are:**

1. Developing a breeding objective
2. Selecting rams to meet your breeding objective
3. Selecting ewes to best fit your breeding objective
4. Monitoring progress



Map showing distribution of sheep accross Australia



## Key points for developing a breeding objective

### What is a breeding objective?

A breeding objective is a long term statement that sets the target at which the breeder is aiming their breeding program to further improve returns. It provides a description to guide your choice of a source of genetics and for selecting rams and replacement ewes.

### What should be included in a breeding objective?

- The traits that are to be changed or maintained (traits are physical characteristics of the sheep)
- The desired level of performance in each trait
- The time frame in which the change is to be made

### Why is a breeding objective important?

- Sets long term production goals
- Helps make faster progress towards your goal
- Sets a consistent breeding direction for your flock
- Provides the basis against which you can measure the improvement of your breeding program

### What should a breeding objective focus on?

Traits on which you focus your breeding objective should be heritable, economically important and measurable over the chosen timeline.



## **Economically important traits**

Profitability of an enterprise is driven by the income from wool and surplus sheep, and cost of production.

### **Effective selection can improve:**

- wool income (fleece weight, fibre diameter)
- fertility (number of lambs produced per ewe)
- growth rate (faster turnoff)
- increased disease resistance to worms, lice and flies (can increase productivity and reduce animal health costs)
- labour costs (poll sheep, reduced drenching and jetting)
- Improving all of these can lead to increased profitability and productivity.

## **Which traits are important and how best to assess them?**

To be able to improve economically important traits we need to be able to visually class or objectively measure which animals perform best for these traits. Traits can be split into two groups, those that are best assessed objectively and those that need to be assessed subjectively.

Visual classing – which by its definition is limited to those traits you can see – should match up with objective assessments because they are simply different ways of assessing the same thing. The protocols, ages and wool length at classing need to be followed so visual classing and objective assessments match up well.

### **Traits which are normally most cost effective to visually class (subjectively assess) are:**

- Jaw, pigmented fibre and skin, open face, horn set
- Shoulders, length of body, spring of rib, wrinkle
- Pasterns, hocks, udder, testicles
- Wool handle, style, colour, dust penetration



The Visual Sheep Scores Guide can assist in improving consistency in classing and recording of these traits.

Visual classing has the benefit of being relatively quick and cost effective. This method can have good accuracy when an experienced classer is selecting for a few core, highly heritable traits, and the right management protocols have been adhered to. Stud sheep are invariably visually classed on an annual basis.

**Traits that are normally cost effective to objectively measure can include:**

- Fleece weight, fibre diameter
- Body weight, fat depth, eye muscle depth
- Worm resistance
- Fertility

Where there are a large number of traits chosen in the breeding objective and some of those traits are lowly heritable or have negative correlations with other traits, there are added benefits in the use of objective assessments and indexes again when the right management protocols have been adhered to. There can often be considerable advantages in objectively measuring animals at least twice – once as a young animal and again as an adult.

**Heritable traits**

Heritability explains how much of an animal's appearance or performance for a trait is due to the genes that it carries and can therefore be passed on to its offspring.

Where a trait has a high heritability, a large proportion of an animal's performance for that trait is due to the genes that it carries and a higher proportion of that animal's superiority or inferiority for that trait will be passed on to its progeny.

Where a trait has a low heritability, a lower proportion of an animal's performance for that trait is due to the genes that it carries and a higher percentage is due to environmental factors.



High Heritability	Medium Heritability	Low Heritability
0.3 or above	0.1 - 0.3	0 - 0.1
30% or above	10 - 30%	0 - 10%
Examples		
Fleece weight Fibre diameter Staple length Live weight	Staple strength Weaning weight Internal parasite resistance	Number lambs weaned

## Correlation

Many traits are related to one another. You may set out to change a single trait in your breeding program, but at the same time this can cause changes in other traits without directly selecting for them. These traits are 'correlated', which means that some of the same genes influence both traits.

This relationship between two traits can be a positive or negative one. A positive correlation means that as one trait increases, so does the other e.g. greasy fleece weight and clean fleece weight. A negative correlation means that as one trait increases, the other decreases e.g. greasy fleece weight and number of lambs weaned.

As correlations can lead to unintended changes, which can be unfavourable, you need to pay attention to all economically important traits in your breeding program. This is often referred to as balance.



## How much progress can you make towards this breeding objective?

### Genetic variation

There is large genetic variation in the Merino flock for most traits and therefore a good opportunity to improve most traits.

### The value in performance data

Phenotype = Genotype x Environment ( $P = G \times E$ ).

Phenotype (the overall appearance and actual performance of an animal) results from the interaction of its genes and its lifetime environment. Under low nutrition, animals tend to have lower body wrinkle than they would have under high nutrition. Variations in nutrition can be caused within a drop of lambs by the age and experience of the mother, and between drops by yearly seasonal variations. Variations between wool growing regions can be caused by perennial, annual and native pastures, soil type and long term rainfall.

Genotype refers to the animal's genetic makeup. Until the advent of genomics we had not been able to measure genes directly and have to indirectly use the animal's phenotype to estimate the genetic merit.

Environment includes both known environmental causes of phenotypic variation (maiden or mature aged dam, whether reared as a twin or single) and unknown environmental causes of phenotypic variation (impacts on individuals that cannot be accounted for, dam's milk, individual responses to disease (lice, footrot, grass seed), temperament etc).

To best estimate the genotype, the known causes of environmental variation are used to adjust the phenotypic measurements, and the typical causes of the unknown environmental variation are minimised.

A desirable environment is required for good genes to be expressed well in the phenotype. Genetics set the potential and the environment controls which



genes will be expressed and determines whether the animal can achieve its potential. The importance of understanding the difference between phenotype and genotype is critical to understanding the whole topic; ie that any individual advantage or disadvantage an animal has gained from the environment is not passed onto their offspring – parents can only pass on their genetic make-up to their progeny, they cannot pass on their lifetime environment.

### **Australian Sheep Breeding Values**

Australian Sheep Breeding Values (ASBVs) provide a way of ranking animals based on their predicted genetic merit for a particular trait. The MERINOSELECT analysis calculates ASBVs by accounting for the known environmental factors that have caused variation and thus become a more accurate estimation of genetic merit/variation. Using ASBVs to select rams or ewes, especially at young ages, allows us to better predict the relative performance of their offspring.

### **Activity**

With your facilitator, complete the ‘Commercial Ram Buying Merino Sires’ breeding objective sheet from your breeding pack. Pencil your answers in as you work through the 6 steps across the top of the page.

This demonstrates how we reach a defined breeding objective in relation to a specific breeding operation. Furthermore, this gives benchmarks for the ASBV figures required in the selection of animals to meet your specified trait requirements.



## Key points for selecting where you source your rams

First a ram buyer needs to determine what the most profitable wool growing production enterprise is for their country:

- Fibre production (superfine wool emphasis), self-replacing ewe flock
- Merino production (balanced between fine wool and lambs), self-replacing ewe flock
- Dual purpose (medium wool and prime lamb emphasis), self-replacing ewe flock
- Wether flock (superfine, fine, or dual purpose)

The wool growing enterprise you select determines which breeding objective and index (a single ranking of a basket of traits based on overall economic value) is best to use.

### **Why is selecting a stud important?**

Selecting a stud is the most important decision for commercial breeders. The genetic progress in the commercial flock is largely set by the breeding program of the ram source. Commercial breeders should choose a stud that has a similar objective.

### **Does the stud's breeding objective align with my breeding objective?**

Your progress is likely to be faster if you choose a ram sources with similar objectives to your own. If your breeding objective does not align well with a stud, and you need a reasonable number of rams, you may need to make considerable effort in selecting animals suitable to progress your flock and or consider use of AI.



If you are purchasing rams from a source with a different direction to your breeding objective, you may need to reassess your ram source.

### **How do I find studs that have similar breeding objective to me?**

- Visit their website
- Contact the owner or classer
- Talk to existing clients

### **How does the stud and its rams compare with other ram sources?**

Obtain benchmarking information on studs and rams to make comparisons such as:

- Sheep shows and production classes – animals are prepared to demonstrate their full genetic potential in a favourable environment.
- Wether and ewe trials – consist of teams of wethers or ewes selected at random from participants' flocks and run at a central site. Teams are run together for the entire trial and their production is measured.
- Bloodline comparisons – where sufficient numbers of wether teams from a ram source can be linked, a comparison across ram sources for a wether production enterprise can be conducted.
- On-farm trials – trial matings of various studs' rams to the ewes on your farm.
- Central test sire evaluation (CTSE) – a series of linked sites where sires are progeny tested. <http://mss.csiro.au>
- Professional advice – talk with consultants, classers, stud stock advisors and visit other commercial operations in your area.
- MERINOSELECT – the national system for supplying genetic information to Merinos and other wool breeds. [www.sheepgenetics.org.au/merinoselect/](http://www.sheepgenetics.org.au/merinoselect/)
- Performance of the stud's own commercial flock – examination should cover a minimum of five years of production information to reduce the chance the results are due to a good or bad year.
- Performance of a stud's clients flocks run under similar conditions to the commercial breeder – considered in conjunction with other information.



## How much progress is a stud making?

### How are rams selected for use in the stud?

- Do they monitor their progress and how are they progressing? Effective use of objective measurement by studs when selecting rams can lead to more genetic gain and have flow on effects, particularly when there are a range of traits, traits with low heritability or traits that are difficult to assess visually.

### Do they select for the traits that are important to you?

- For traits such as fertility, gathering scanning and lamb marking data from the stud or their commercial flock and clients can provide information on how the genetics might perform in a commercial environment in your area.

### Which information should I use to select rams?

- Set your visual classing requirements and don't compromise them
- The rams with the highest selection index of your choice have the genetic potential to produce the most profitable progeny for your breeding objective, providing they meet your visual classing standards
- You may wish to set independent culling levels for individual traits to create a better balance in your chosen sheep. This can be done in association with your index or independently of an index
- Relevant raw data
- Production information (only useful if the group averages are known)
- Rams can be shortlisted using two methods: visual assessment first and objective assessment second, or objective assessment first and visual assessment second – both methods are equally valid and are a personal preference
- Make a wide selection in your first shortlist, as you need to ensure you will have enough range in your second selection method to pick the most suitable rams to your objective and environment.



### **Accuracy of ram selection**

Raw data that is not adjusted for the known environmental effects is less accurate in predicting genetic merit at young ages than breeding values.

Ask the following questions to ensure that your ram selections are as accurate as possible:

- Is the spread of age between the oldest and youngest sheep in the mob six weeks or less?
- Have all rams been run together as one mob and received the same management?
- Were all of the rams shorn prior to the start of measured wool assessment period to even them up?
- Did the rams have six months or more wool growth at the time of measured assessment?
- Were the rams 10 months or older when objectively assessed?
- Has environmental factors such as birth type, age of dam or age effects been accounted for in the breeding values?
- How much pedigree performance data does the ram have?
- Were there sufficiently strong link sires used between years and between other sites?

These apply equally for visual classing as they do for objective measurements.

### **Activity – Ram Selection**



## Key points for selecting ewes

### Replacement ewes

#### Number of replacement ewes

In self-replacing merino breeding flocks, normally between 60 and 90 per cent of the hogget ewes are needed as replacements to maintain the size of the flock. The number of surplus ewes available to cull depends on the lamb weaning percentage and annual mortalities.

The number of hogget ewes required as replacements in the commercial flock will depend upon:

- Number of hogget ewes available at classing
- Number of adult ewes in flock
- Number of ewes culled
- Survival rate of ewes

#### Criteria to select ewes on

It is important to select ewes that meet the breeding objective so that the overall quality of the commercial flock improves.

- Sway back
- Devil's grip
- Feet
- Jaws
- Ability to rear a lamb
- Size for age
- Fleece rot
- Body strike
- Harsh handling
- Hair
- Excessive colour
- Doing ability
- Face cover
- Body wrinkle
- Pigmented fibres
- Black wool
- Dag
- Fly strike
- Urine stain



Conformation, visual wool and carcase traits (effecting profitability):

Whilst completing other management tasks, assess ewes on other traits related to the commercial breeding objective:

- Health, teeth wear and udder abnormalities
- Pregnancy scanning, failure to rear a lamb
- Age

### **Annual classing of ewes**

Hogget ewes are normally selected for the breeding flock before first joining when they are 12 to 18 months old.

In order to make a fair assessment, hogget ewes should be run together as one mob or under similar grazing conditions from weaning through to classing. You also need to consider factors such as age, mother's age and birth type (as per ram selection).

### **Using measurements**

Measurement may be cost effective and beneficial for use when selecting commercial ewes, if:

- There is the ability to class out 35 per cent or more of maiden ewes
- Traits can be measured cost efficiently
- Product prices are high and variable
- Collecting measurements can be integrated into existing management tasks to minimise time
- Measurements are highly repeatable across a sheep's lifetime, therefore retesting is not necessary



In a commercial ewe flock there are a range of measurements that are possible to combine with existing management practices to reduce the labour cost associated with collecting these measurements. These include:

- Body weight
- Fleece weight
- Fibre diameter
- Pregnancy scanning results (dry, single, multiple)

## Activity – Ewe Selection



## Visual scores

Using the Visual Sheep Scores guide allows individuals to use a common terminology and grading system to visually score a range of traits.

In the NMC participants will be required to assess and score animals as set out in the activity sheet attached.

### **About the Visual Scores Guide**

The guide provides the Australian sheep industry with a common language for the visual description, recording and classing of all breeds of sheep according to important visual traits.

Visually assessed traits are included in the breeding objective of all stud and commercial sheep breeders, regardless of their target market or environment.

Following extensive industry consultation, Australian Wool Innovation (AWI) and Meat and Livestock Australia (MLA) developed the Visual Sheep Scores to:

- Provide the Australian sheep industry with a standardised set of visual assessment scores for the consistent description of important phenotypic traits of all breeds of sheep
- Develop a quick and simple scoring system to help sheep classers and breeders select sheep on visually-assessed traits to accelerate genetic gain
- Enable sheep breeders and classers to record and submit visual score data and genetic information to Sheep Genetics to progress development of across-flock Australian Sheep Breeding Values (ASBVs) for visually-assessed traits
- Enable researchers to validate the heritability of visually-assessed sheep traits, and to measure their relationships, if any, on important production traits such as fleece weight, fibre diameter, growth rate and body weight



Profitable selection is based on identifying traits that have significant commercial value. When selecting traits for your breeding objective, ensure the selection balance is maintained. Be mindful of all traits that determine the commercial profitability and quality of the flock.

Visual Sheep Scores are designed for sheep breeders that choose to class and select animals on one or any number of visually assessed traits as part of their overall breeding objective.

Designed for use on both male and female sheep equally, the Visual Sheep Scores provided in the guide have been divided into four sections:

1. Wool Quality traits
2. Conformation traits
3. Breech traits
4. Classer's Grade

A set of illustrative standards and simple instructions on 'how' and 'when' to visually score animals are provided for each trait, however, unless otherwise stated:

- A single score of 1, 2, 3, 4 or 5 is recorded for each trait
- Score 1 depicts LEAST expression of the trait and Score 5 depicts MOST expression



## Using Wool Quality Scores

Visual Wool Quality Scores provide visual standards for the description of physical fleece and fibre traits that contribute to the economic value of wool.

These scores are designed for ram breeders and commercial woolgrowers who choose to class and select animals on one or more of these visual traits as part of their overall breeding objective.

The guide contains a set of Wool Quality Scores for 10 traits. Visual scores of 1 to 5 are provided for eight traits, and scores of 1 and 5 only for the two binary traits (recessive black lamb and random spot).

With the exception of wool character, Score 1 depicts LEAST expression of the trait and Score 5 depicts MOST expression (i.e. rule of thumb is Score 1 is LESS and Score 5 is MORE of each trait).

In most cases, a single score is recorded for each trait. The exceptions are fibre pigmentation and non-fibre pigmentation, where scores at five and three sites, respectively, are recorded for these traits.

In addition, it is essential that the two pigmentation traits random spot (Australian piebald) and recessive black lamb (Agouti gene) are scored and recorded separately from fibre pigmentation.

Data gathered on individual sheep may also be submitted to Sheep Genetics with other pedigree and performance information to assist the sheep industry with the development of across-flock ASBVs for various wool quality traits.

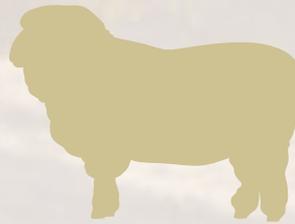
Visual Wool Quality Scores can be taken on sheep at various ages. It is essential to record the age of the animal when scores are taken, with the optimal age recommended in the table.



Wool Trait	Age	When
Fleece rot	Over 9 months	Classing or shearing, provided a minimum of 6 months (or 40mm) of wool growth
Wool colour	Over 9 months	Classing or shearing, provided a minimum of 6 months (or 40mm) of wool growth
Wool character	Over 9 months	Classing or shearing, provided a minimum of 6 months (or 40mm) of wool growth
Dust penetration	Over 9 months	Classing or shearing, provided a minimum of 6 months (or 40mm) of wool growth
Staple Weathering	Over 9 months	Classing or shearing, provided a minimum of 6 months (or 40mm) of wool growth
Staple structure	Over 9 months	Classing or shearing, provided a minimum of 6 months (or 40mm) of wool growth
Fibre pigmentation	6 to 10 weeks	Lamb marking*
Non-fibre pigmentation	6 to 10 weeks	Lamb marking
Recessive black	6 to 10 weeks	Lamb marking
Random spot	6 to 10 weeks	Lamb marking*

\* Score data can be submitted to Sheep Genetics if pigmentation is identified after lamb marking, such as at classing or shearing.





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Australian Wool Innovation Ltd gratefully acknowledges the funds provided by the Australian Government to support the research, development and innovation detailed in this publication.

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# NMC303A

## IDENTIFY & SELECT ANIMALS FOR BREEDING

# RESOURCES

A Pocket Guide to ASBVs  
Visual Sheep Scores booklet  
Visual Classing Merino Sheep  
Bredwell Fedwell workbook  
Bredwell Fedwell Commercial Ram Buying - Merino,  
Maternal & Prime Lamb Sires

Digital Resources:

Parts of a Sheep - Head & Body, Legs, Skin, Back & Shoulders, Overall Conformation  
Staple Structure, Wool Colour & Character

Resources provided by Australian Wool Innovation,  
Meat & Livestock Australia & Sheep Genetics





# Visual Classing Merino Sheep





## 1. Objectives of sheep classing

Visual sheep classing is practised by all breeders and is essential to the quality of a woolgrower's flock and enterprise profitability.

Visual classing is quick, efficient, and cost effective for a large number of traits. It can be done at lamb marking, weaning, shearing, replacement selections and joining, although the major classing events usually take place with the annual selection of replacement ewes and rams.

The objective of sheep classing is to identify and retain those sheep in a flock that will improve flock returns both now and in the future through more productive progeny.

Improving productivity comes by increasing income and also reducing costs. Constant improvement is needed to overcome annual inflation increases to farm costs and competition from other enterprises. While productivity increases are the key, they should not make the animal more susceptible to disease, nor adversely affect doing ability, which leads to higher costs.

## 2. Issues to consider prior to visually classing sheep

There are several issues to address prior to classing sheep. They include:

- Reassess the overall environment in which the sheep are to run, the country, enterprise mix, flock structure, potential markets and management skills, then either create or review the breeding objective for that flock. Having a clear, well defined, targeted breeding objective for the flock is the first step to higher profitability. Neighbours and other breeders in a local region, climate or state will have very different legitimate breeding objectives. Correctly assessing the overall environment and particularly the country and management skills is a vital step.
- In developing your breeding objective be mindful of the compromises involved and the balance rather than extremes required. This involves setting both minimum and maximum targets for characters such as body weight, fleece weight, wool quality, fat and face cover. These targets will vary according to country, enterprise and assessment of future markets.
- Once the enterprise type (or production system), breeding objective and targets have been established, avoid chasing fads unless there are fundamental shifts in markets, skills set or enterprise mix. Surplus sheep sales are often the difference between being profitable or not, so having an established true to type and predictable, well regarded product is a valuable commodity.
- Classing should take place at the time when the sheep will best express or reflect its potential. For example:
  - Birth coat is best at lambing rounds or marking.
  - Fleece rot or dags when the trait is best seen, e.g. after the spring break or after summer rain.
  - Ewe hogget classing should be done when the ewes are a) as old as possible (so the confounding maternal effects of birth type, date of birth, dam type, rearing type are least expressed) and b) just pre joining and in as much wool as possible and when surplus sheep sales can be optimised. The longer the wool, the greater the variation in fleece weight is expressed and thus easier to assess differences.
  - Classing on reproductive performance needs to be carried out at several times throughout the year - after mating, lambing and weaning.

- Sheep that are to be classed as a mob should be run as a mob. Boxing mobs reduces the accuracy of classing or objective assessments. If the numbers of animals are too large to run in one mob it is important to class the mobs separately as paddock differences may need to be taken into account when classing.
- Sheep should be managed so they are given a good commercial opportunity to express their genetic potential. A mob of well grown sheep will exhibit greater variation and facilitate better classing decisions compared to a mob that has been held back either through health problems or lack of nutrition.
- Before classing commences look at the mob as a whole to get an idea of the 'type' and variation, as well as any faults that may need to be focused on. It is a good practice to assess a number of sheep, prior to making any classing decisions so as to best 'set the standard' and establish the range.
- Assess the history of the mob, their recent management, mob size and the number needed to be retained.
- Sheep should be classed in a handling race or classing box so that the entire sheep can be seen as well as handled.
- Depending on the animals being classed, factors such as birth type (single or twin), dam type (maiden or mixed aged), spread of lambing date and number of lambs raised, all have a significant impact on what you see in the classing race. The younger the sheep, the greater the impact these factors can have. Coloured ear tags can be useful to assist in identifying these factors without having to have detailed records to look up for every sheep.

### 3. Individual traits to consider

Whilst a sheep ends up in a single grade, such as tops, retained for flock, commercial sale or cull, the individual traits that need to be considered in a short time in order to come to that conclusion are numerous.

In essence, it is the wool features of the Merino that sets it apart from other breeds. In particular, the Australian Merino is unique in possessing a skin that produces an exceptional number of fine secondary wool fibres.

A list of traits, the characteristics to look for, and the economic importance of each, is included in the following table.

Merino flocks vary greatly between neighbours and regions. Some flocks earn 80% income from wool and 20% from sheep sales (e.g. superfine wools in high altitude, high rainfall, low VM country) while others can earn 30% from wool and 70% from sheep sales.

No sheep can be perfect for all traits so there need to be tolerances around each standard. The emphasis on traits and what is selected for and against vary between flocks. The table below should be seen as a guide and not be rigidly prescriptive for all flocks or environments.

There can be diverging opinions as to the importance of a trait, between traits, what they reflect, the clues to productivity they provide or the degree to which the trait is acceptable. Fit for purpose is an important concept. A trait may be essential in one area, preferred in another and of little impact in another.

## 4. Primary Reference Documents

The following references were reviewed in preparing this document. This document is largely a summary of these previous sheep classer and sheep breeder references

- Andersen L. **Visual Appraisal (Sheep Classing)**. Cassette recording. 1987
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## 5. Combining Visual and Objective Assessments

Overwhelmingly ram breeders use both visual classing and objective assessments in sheep selection. Objective assessments include:

- Raw data assessments (raw on-farm data) e.g. kilograms fleece weight and body weight, microns for fibre diameter, mms for staple length, N/Kt for staple strength, pregnancy scanning lambing and weaning data, and visual scores (such as wrinkle from 1 to 5 score).
- Within flock variations to the mean (Rampower) % variations; e.g. 105% fleece weight and -0.5 microns
- Within flock breeding values (within Site Breeding Values, Australian Merino Sire Evaluation Association) Raw data adjusted for impacts of sex, dam age, rearing type influences etc
- Across flock breeding values (Australian Sheep Breeding Values, Sheep Genetics) Raw data adjusted for impacts of sex, dam age, rearing type, pedigree (performance of relatives) and linked to the across flock data base via the between year and across flock link sires

These assessments can be based on the animal's actual performance and also on how their progeny and other relatives have performed.

The most "measurement orientated breeders" place approximately a 50:50 emphasis on visual and objective classing. This estimate is based on the

difference between the theoretical rates of gain using measurement only and actual rates of gain by these "measurement orientated" breeders. At the other end of the spectrum it is estimated that some breeders place a 90:10 emphasis on visual and objective classing and something like a 60:40 to 70:30 emphasis is the norm.

There is a wide variation of views regarding how best to combine visual and objective assessments in sheep selection and the approach required changes in different circumstances between flock classing, stud classing, sheep judging, stud ram auction, on-property sales, internet catalogued sales and grade ram selections.

Sources of information include;

- Sheep Judging results see Stud Breeder Associations [www.merinos.com.au](http://www.merinos.com.au)
- Merino Bloodline Performance [www.dpi.nsw.gov.au/agriculture/merino-bloodline-performance](http://www.dpi.nsw.gov.au/agriculture/merino-bloodline-performance)
- Rampower within flock data
- Contact Service Provider
- Australian Merino Sire Evaluation Association [www.merinosuperiorsires.com.au](http://www.merinosuperiorsires.com.au)
- Sheep Genetics [www.sheepgenetics.org.au](http://www.sheepgenetics.org.au)

## CLASSING TRAITS

TRAIT NAME	PREFERRED CHARACTERISTIC	ECONOMIC IMPORTANCE
<b>Muzzle</b>	The muzzle should be soft, thick and large with wide nostrils.	The muzzle structure is an indication of overall bone and body size. Large muzzles indicate good bone through the sheep. Wide nostrils indicate good constitution and strength.
	The muzzle should be free of wool, coarse fibres and brown or black spots or smut.	Coarse fibres on the muzzle (or 'frosty-faced') is an indication of coarse wool and hairiness in the breech area, leading to high fibre diameter variation.  Coloured spots or smut have been shown to be associated with pigmented wool fibres.
<b>Face Cover</b>	There should be sufficient bare wool growing areas around the eyes to enable good vision.	'Muffy-faced' sheep get wool-blind making management more difficult. Grass seed can be a significant health issue and production cost. Very 'bare-headed' sheep generally produce lesser fleece weights. Ewes with lower face cover generally have high reproduction rates.
<b>Jaw</b>	The jaw should be sound and the teeth on the lower jaw should align squarely with the pad on the upper jaw.	Undershot or overshot jaws lead to sheep having difficulties eating particularly when feed is short.
<b>Eyes</b>	Skin around the eyes should be free of coloured spots and eye lashes should not be ginger.	Ginger eyelashes have been shown to be associated with pigmented wool fibres. Black spots may be associated with pigmented wool fibres, however, this association is not thought to be as strong as with pigmented hair such as eyelashes.
<b>Ears</b>	Ears should be thick, soft and free of coloured spots or ginger tips.	Coloured spots or ginger tips on the ears have been shown to be associated with pigmented wool fibres. However this association is not as strong as with coloured spots or smut on the skin.
<b>Poll</b>	The poll recess should be free of heavy grease (yolk).	Wool grease in the poll area predisposes the sheep to poll strike. This problem has reduced significantly over the last 30 years.
	The poll should be free from coloured fibres.	Coloured fibres on the poll has been shown to be associated with pigmented wool fibres.

TRAIT NAME	PREFERRED CHARACTERISTIC	ECONOMIC IMPORTANCE
<b>Horns</b>	Horns should be thick at the base and not too tight against the head or too wide.	Thickness of the horn is an indication of bone and size. Growing away from the head reduces the possibility of restricting jaw movement, flystrike and makes shearing easier. Very wide horns make drafting more difficult and require more frequent horn trimming.
	Each horn site should be set well apart.	As a ram matures and the horns thicken in diameter, if the horns are too close, a skin wrinkle can form which is prone to flystrike.
	Horns should be free of black streaks.	Black streaks may be associated with pigmented wool fibres. However, this association is thought to be not as strong as with pigmented hair.
	Scurs should be short and not attached to the skull.	There is a preference for no scurs or horns for live boat wethers to avoid damage in the grating. Poll sheep generally have lower risk of poll strike. Poll sheep don't need horn trimming, reduce labour and injury risk to labour.
<b>Feet and Legs</b>	Feet and legs should be straight and sound. Legs should show no sign of closeness (hocky). Feet should not splay sideways and pasterns should not be laid back or too straight. Front legs should be wide set to house a roomy chest.	Sound feet and legs are important for effective grazing. This will affect their production when seasons are poor. Sheep with hind leg faults are more susceptible to urine and dag stain and therefore higher risk to flystrike. Poor feet and legs can impact on a ram's dexterity during joining. Narrow chested animals are to be avoided.
	Hind legs should be well covered down to the pastern and front legs covered to the knee.	Sheep that are not well covered down the legs are generally lighter fleece cutters. In high grass seed country barer legs can be an advantage.
<b>Hooves</b>	The hooves should be straight and not splayed outwards, crossed, or rolled over.	Poor hoof conformation leads to poor mobility and an inability to adequately graze over large areas. This will affect their production when seasons are poor.
	The hooves should not have black streaks.	Black streaks may be associated with pigmented wool fibres. However this association is thought to be not as strong as with pigmented hair.

TRAIT NAME	PREFERRED CHARACTERISTIC	ECONOMIC IMPORTANCE
<b>Neck</b>	The neck should extend from the withers. The neck folds should be balanced and free flowing.	A well balanced and set neck is an indication of balance and length throughout the sheep. A long neck often points to a long body. Tight neck folds can increase shearing costs and second cuts.
<b>Withers</b>	The withers should be level with the back. The withers should avoid being raised and pointed (peaked wither) but should also avoid being set too wide and causing a hollow dip between the shoulders or too narrow which can lead to hollowness ('devils grip').	High withers can cause a hollow behind the wither that can predispose the wool to fleece rot and flystrike. If the shoulders are set too wide apart a hollow between the shoulder blades can also increase the risk of fleece rot and flystrike.
	The wool on the withers should show no signs of dryness and the staples should be dense.	Dry wool in the wither area will increase the risk of fleece rot and flystrike and a fleece that lacks density in this area will be exposed to dust penetration and weather damage.
<b>Shoulders</b>	Shoulders should be set wide apart and be broad but not too wide as that can also lead to structural problems. Toes, legs and shoulders should be well vertically aligned.	A sheep that is narrow through the shoulders will be generally narrow throughout. Good width of body increases wool cutting area and carcass weight.
<b>Backline</b>	The backline, or topline, should be long, level and square.	Good length of body increases wool cutting area and carcass weight.
	As one on of the main wool producing areas of the sheep, the wool should be well nourished with good character. The staples should be dense and not falling open.	Sheep with loose stapled backlines will be exposed to dust penetration and weather damage.

TRAIT NAME	PREFERRED CHARACTERISTIC	ECONOMIC IMPORTANCE
<b>Ribs</b>	The ribs should be well sprung, round (not slab sided) and deep.	Well sprung ribs indicate good constitution and a sheep that has depth through the rib area maximises wool growing area.
<b>Hips and Rump</b>	The hips should be square and the rump should extend from the pin bone to the tail without drooping.	Drooping rumps can impact on back leg conformation.
<b>Belly</b>	The belly should be well covered with wool that is of good quality and denseness. It should not be coarse or show signs of hair.	Wool coverage and quality on the belly is an indication of overall coverage (fleece weight) and quality.
<b>Testicles</b>	Testicles should be large and firm.	Large testicles indicate higher daughter fertility, reproductive performance and firmness a sign of testicle health.
	The scrotum should have some wool coverage but not be excessively woolly.	Rams with bare scrotums tend to lack wool coverage over the body however woolly scrotums can increase adverse impacts of grass seed, shearing cuts and clean shearing.
<b>Teats and Udder</b>	The udder and teats should be functional, symmetrical, free from structural defects and abnormalities.	Any damage or abnormality of the udder or teats will reduce lamb milk supply. Such damage could occur from crutching or previous mastitis etc.
	The udders should not be excessively woolly.	Excessively woolly udders make it difficult for lambs to find the teats, particularly in high dag country.
<b>Trueness to Type</b>	Regardless of how good a sheep is, true to the type or evenness can be important.	Having a line of sheep that are consistent or evenly good for highly preferred traits can add value to both production and resale value.
<b>Fibre Diameter</b>	Fibre diameter can be visually selected through crimp frequency and handle. Softness and higher crimp frequency is associated with lower fibre diameter.  Visually selecting for fibre diameter can be unreliable.	Fibre diameter should be selected in balance with other traits, particularly fleece weight.

TRAIT NAME	PREFERRED CHARACTERISTIC	ECONOMIC IMPORTANCE
<b>Staple Strength</b>	Staple strength is best visually assessed post shearing on the fleece itself, ensuring to test several sites over the fleece. Visually selecting for staple strength can be unreliable.	Staple strength can be a major determinate of wool value. It needs to be selected in balance with other traits.
<b>Wool Style</b>	Wool style is a combination of evenness of crimp formation (evenness of crimp along staples, between staples, and over the whole fleece) handle and colour. A consistent and pronounced crimp throughout the fleece is desired and it is this character that helps define an Australian Merino.	The style of the wool should be as good as is required for the environment. Whilst many types of wool do not attract premium for style in the wool market, better style wools are less prone to fleece rot and flystrike thus delivering more wool into the main fleece lines and can attract less discounts in a poor market.
<b>Wool Density</b>	Fibre density in the fleece should be high, but also be in balance with good staple length and free growing wools. Sufficient density reduces wool faults and contamination, and aids yield.	Sheep with a dense fleece will cut more wool than sheep with a thin or open fleece. Dense fleeces are better at keeping out dust and reducing staple weathering. Beware of sheep that have very dense, short, tight wool. These sheep are often the first to suffer in poor seasons.
<b>Fleece Length</b>	Length – the staple length should be consistent with the type or strain of Merino selected. Typically, annual growths of over 100mm for ‘strong wool Merinos’ and over 75mm for ‘fine wool Merinos’ should be aimed for. Short wools should be avoided.	Staple length makes a big difference to the overall cut of the fleece and selection should aim for sheep with long free growing wools.
<b>Handle</b>	Softness of wool (handle) is a preferred attribute for a range of wool style and quality issues.  Handle refers to the feel of the wool. It has two components - ‘smoothness’ and ‘compression’. Different wool end uses have different handle requirements.	Harsh handling wools should be avoided as they tend to indicate broad fibre diameter for the crimp frequency. Handle is associated with fibre diameter, crimp or fibre curvature, and the scale structure of the fibres.

TRAIT NAME	PREFERRED CHARACTERISTIC	ECONOMIC IMPORTANCE
<b>Condition</b>	Skin secretions of wax and suint on the wool, often referred to as nourishment. Nourishment protects the fibre from sun and water damage.	(i) Wax: wool fibres should have an adequate coating of wax for protection against weathering, sunlight and excessive rain. Wax is also important for fibre lubrication and hence handle. Insufficient wax results in dry wool and excessive wax results in low yielding wool. (ii) Suint: high levels of suint attract moisture, produce unfavourable odour and cause colouration of wool fibres, making the sheep more susceptible to fleece rot and flystrike.
<b>Tip</b>	The tip of the fleece should not be dry or overly nourished. Opinions vary between blocky and pencil tips.	Dry tips can increase wastage and noil, and reduce yield during processing. Heavy tipped sheep produce low yielding wool and can lack tip formation which allows dust penetration and weathering to occur.
<b>Staple Formation</b>	Staple formation can vary from well-formed blocks to pencil like staples.	There are varying views on what is most sought after as far as staple formation is concerned.
<b>Wool Coverage</b>	A good covering of wool of good length and density should extend around the body.	A balance is required between heavily covered points and very bare points, head, legs, brisket and belly.
<b>Wool Colour</b>	Wool colour should be white, bright and not yellow or dull.	Bright wools have a better ability to withstand excessive moisture and are more likely to be included in the main fleece lines at shearing. Sheep with yellow wool are more susceptible to fleece rot and flystrike and produce lower value wool. Yellow colour could also be an indication of suint. (see condition)
	In medium and strong wool sheep, a degree of creaminess in hoggets is acceptable.	Medium and strong wool type sheep with some level of creaminess in the wool as hoggets are acceptable as they tend to have more nourishment in the wool and maintain a higher level of grease as the sheep get older. This is often associated with high fleece weights.
<b>Skin</b>	Skin should be loose and soft and have good blood supply which is indicated by a deep red colour.	Soft skinned sheep produce soft handling, free growing wools.
<b>Fleece Rot</b>	Fleece rot is the presence of a band of stain and/or crusting in the wool that results from fleece rot bacteria multiplying under humid conditions.	Sheep susceptible to fleece rot are susceptible to flystrike. Wool can be permanently stained by the bacteria and is of very low value.

TRAIT NAME	PREFERRED CHARACTERISTIC	ECONOMIC IMPORTANCE
<b>Dermatitis (Lumpy Wool)</b>	Dermatitis is a disease caused by bacteria that infects the skin and causes scab formation. Hard scab masses lift from the skin with the fleece as it grows, causing the characteristic 'lumpy wool'.	Dermatitis causes loss of condition and deaths in affected mobs, reduced skin values, reduced wool value and additional handling and treatment costs. Dermatitis infection also attracts flies, making flystrike more likely.
<b>Pigmented Wool</b>	Any sheep with pigmented wool, either 'random spots' or 'black lambs' should be culled.	'Black lambs' are caused by a recessive gene meaning that for one to exist, both parents need to carry the gene. Rams throwing 'black lambs' should also be culled. The genetic association of 'random spots', which can be black, brown or grey are not clear. It is known they are not related to the recessive 'black lamb' gene. Random spots within the flock pose significant risk to contaminating the wool clip.
<b>Urine and Dag Stain</b>	Sheep carrying excessive urine or dag stain should be culled.	Sheep displaying excessive urine or dag stain are susceptible to flystrike. Urine stain may be caused by an injury to the vulva. Even small amounts of stain contamination can impact on wool prices.
<b>Wrinkles</b>	Excessive wrinkles, in particular those on the jowl, neck and breech can increase costs and affect returns.	A large amount of jowl and neck wrinkle predisposes the sheep to grass seed contamination. Breech wrinkle predisposes sheep to breech flystrike. Sheep with more wrinkle tend to have higher fleece weight, so achieving the right balance between degree of wrinkle and fleece weight varies depending upon the breeders objective. Lower wrinkle is associated with higher fertility. The amount of wrinkle on the neck, body and breech tend to be related.
<b>Reproduction</b>	The most cost effective way to select for reproduction is through classing ewes on whether they became pregnant, and if so, whether they raised a lamb. This can be done firstly through pregnancy scanning and then wet and drying at weaning.	An increase in reproduction leads to higher surplus sheep sales but needs to be balanced against the need for higher levels of ewe nutrition.
	Selecting larger ewes will increase reproduction rates.	Heavier sheep tend to have more lambs but they also require more feed for maintenance.
	Selecting ewes with above average fat cover, or 'good-doers', will aid in increasing reproduction rates, surplus sheep sales and management flexibility.	Good doing ewes will get in lamb earlier and raise a lamb more easily than a ewe that is a poor doer. The ability to put down fat cover that can be drawn on as energy reserves when the season is poor is critical to being a good doer.







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Australian Wool Innovation Limited gratefully acknowledges the funds provided by the Australian Government to support the research, development, innovation and marketing detailed in this publication.

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