

## **BENCHMARKING MERINO STUDS - THE MERINOS TO MATCH PROJECT**

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### **SUMMARY**

In Victoria, increasing the amount of reliable information on the genetic merit of Merino studs is important in reducing the risk faced by wool producers when they introduce new sources of genetic material into their flocks. The Merinos to Match project is a set of linked stud comparisons across Victoria designed to quickly lift the availability of reliable genetic information on Merino studs commonly used in the state. Details of the objectives, background, design, implementation and stakeholder involvement in the project are outlined in the paper. To date, 4 sites have been established in different wool growing areas of Victoria, evaluating 29 studs from 4 states.

*Keywords:* benchmarking, genetics, Merinos, studs, wool

### **INTRODUCTION**

Two of the key steps in conducting a successful breeding program are the identification and use of the best genetic material to achieve the chosen breeding goal. In the wool industry, there are substantial genetic differences in productivity between sources, or studs (Coelli *et al.* 1996; Clarke and Windsor 1999; Pollard *et al.* 2002). Many wool producers may, therefore, be able to improve their flocks by changing studs, provided decisions are based on reliable data.

No systematic genetic benchmarking of studs has been conducted within Victoria. To date, wool producers have relied on personal experience, stud reputation, sales information, and results from wether trials and privately run comparisons to help decide where to buy rams. Previous wether trials run in the state have not generally been designed as stud comparisons. Exceptions include a trial conducted at Hamilton between 1982 and 1985 (Wilson *et al.* 1986) and another near Horsham conducted by the Horsham Agricultural Society and Longerenong College Merino Bloodline Comparison 2000-2003 (G. Hallam, *pers. comm.*).

To better target projects on sheep breeding, the Department of Primary Industries (DPI) in Victoria, in collaboration with the University of New England, recently conducted market research on the breeding decisions of wool producers in Victoria. From this work, Kaine *et al.* (2002) found that 78% of Victorian wool producers believe that if the environment is changed, then the ranking of studs for fibre diameter and fleece weight can change, perceptions which are clearly at odds with the limited evidence available from research trials (Dunlop 1962). For these wool producers, introducing genetic material from a new stud onto their property that has been bred in a different environment is perceived as high risk. They believe that the relative rankings of sheep bred in different environments are not relevant to how the same sheep would rank on their own properties, hence the perceived risk of introducing unsuitable sheep that can be costly in time and money to remedy.

Based on this market research, the DPI has initiated a project to dramatically increase the availability of reliable genetic information on Merino studs commonly used in Victoria, designed to address the key issue of perceived risk for wool producers from testing new genetic material on their properties. Part of the project design is also to assist wool producers make breeding decisions within the context of their existing beliefs and strategies rather than attempt to change their beliefs in the short term. Further, to achieve a high level of industry support from the outset, the Victorian Stud Merino Sheep Breeders Association has been actively involved in the planning and development of the project (called Merinos to Match), and is also part of its ongoing management and implementation. Local

committees have been very active in establishing and managing sites. This paper describes the background, design and implementation of the Merinos to Match project.

## **MATERIALS AND METHODS**

The Merinos to Match project will help wool producers evaluate studs in their environment so that they can buy rams with confidence. It will do this by genetically evaluating Merino studs in up to 6 sites around Victoria, under local environments that are similar to environmental conditions on local farms. The trial protocol has been developed to ensure that the comparisons are credible and will fairly evaluate the studs represented.

### *Trial Protocol*

**Management.** A site committee (SC) consists of 4 industry representatives (including the property owner/manager) and 1 DPI staff member, and assumes all responsibility for the conduct of the trial (within the limits set by the other provisions of the trial protocol). A management committee (MC) has been established to resolve disputes and to have jurisdiction over results, measurements and pricing across all sites. Sheep enter the trial at least 2 months prior to an even-up shearing and remain there for a minimum of 2 full shearings. The trial commences at the even-up shearing. All sheep are run together under management and nutritional regimes as recommended by the SC.

**Sheep Selection.** Teams consist of a minimum of 24 wethers, and must be sampled from 3 separate flocks (as a minimum, there would be 8 sheep from each of 3 flocks). The number of teams at each site, and the studs to be evaluated, is determined by the SC. Wethers must only have their lamb's teeth and be a minimum of 6 months of age on acceptance to the trial site. Within a site, groups of wethers entered are born in the same calendar year, with no age difference between groups greater than 5 months.

All wethers entered in the trial are bred from commercial ewes not owned by any person/s with a financial interest in a registered Merino stud. The flock of origin must have been bred using rams predominantly from the same stud for at least 5 years. The stud owner should also agree the flock adequately represents the stud and is encouraged to sign the entry form. The wethers entered are bred from a syndicate mating or selected equally from 2 or more single sire groups.

A minimum of 120 wethers must be available for selection for a flock to be eligible to enter. The selection process is performed by dividing the total by 24 and drafting off at regular counts. (e.g.  $240/24=10$ , therefore every 10th wether is drafted off). All wethers from that age group must be presented (no previous culling). The owner/manager, without the aid of any measurements, immediately culls 4 of the selected 24. The remaining 20 are drafted alternately into groups of 10 and 1 of these groups is chosen at random as the trial group. The owner then identifies 2 spares from the trial group. The 8 sheep to enter the trial, plus the 2 spares, are immediately permanently identified using a system approved by the MC. The selection and identification of sheep is supervised by a DPI staff member and/or their appointed representative.

The number of animals per stud team was determined based on the following assumptions, 1) the studs chosen at evaluation sites are assumed to be random samples from a population of studs; 2) the variance due to the stud is assumed to vary from 25% to 45% of the total variance; 3) the heritability of traits to be measured or assessed is in the moderate to high range, 0.3 to 0.5, and 4) a minimum accuracy of 0.75 to 0.80 is achieved in evaluations.

**Linkage.** All trial sites are linked by wethers from a common flock being distributed across sites to enable across site and across year comparisons of studs. Each link team at each site consists of 24 wethers, and each site has at least 1 stud team in common with another site.

**Measurements and Results.** Details and procedures concerning results and measurements for all sites will be determined by the MC. Team results will only be published where a minimum of 20 sheep exist at the first shearing and 15 at subsequent shearings.

### *Sites*

Currently, there are 4 established sites (Hamilton, Stawell, Dookie and Elmore). The site committees all conformed to the trial protocol, but have considerable autonomy and reflect differences in community networks. For example, the Hamilton SC was formed from a number of individual wool producers and a local consultant, the Stawell SC is based around a local BESTWOOL 2010 group and the Dookie SC, in addition to wool producers, has strong involvement from the Dookie Campus of the University of Melbourne. The Elmore SC is a sub-committee of the Elmore Field Days committee.

### *Studs*

The stud teams entered at the 4 sites are shown in Table 1.

**Table 1. Stud teams entered at the 4 current sites of the Merinos to Match Project. With the exception of the common link, some teams are represented at more than one site.**

Sites			
Hamilton	Stawell	Dookie	Elmore
Common Link <sup>A</sup>	Common Link	Common Link	Common Link
	East Loddon	East Loddon	
Eilan Donan		Eilan Donan	
	Gowandale		Gowandale
Glendonald	Glendonald		Glendonald
Hazeldean		Hazeldean	Hazeldean
Kilfeera Park		Kilfeera Park	
Kurra Wirra		Kurra Wirra	
Mountain Dam		Mountain Dam	
Nareeb Nareeb	Nareeb Nareeb		
Toland		Toland	
Billandri	Akeringa	Cottage Park	Charinga
Blackford	Belbourie	Pooginook	One Oak
Cressbrook	Wallaloo Park	Snowy Plain	Panorama Poll
Glanna			Salt Creek
Gringegalgonna			Wanganella
Kerrsville			Woodpark
Middle View			

<sup>A</sup> All trial sites are linked by wethers from a common flock being distributed across all sites to enable across site comparisons of studs

### *Analysis*

The emphasis in data analysis will be the use of the random regression approach, also known as the reaction norm model. This will enable fair comparisons among studs and can also produce a ranking of the studs across a range of environments. Furthermore, it can provide information about the significance of possible genotype by environment interactions, previously ignored in similar experiments.

### *Traits to be evaluated*

**Core Traits.** The measurements and assessments proposed as core (mandatory) traits, to be taken on individual animals, include:

- Mean fibre diameter, coefficient of variation of fibre diameter, standard deviation of fibre diameter, the proportion of fibres above 30 micrometres and fibre curvature (all measured by Laserscan)
- Yield (washing yield procedure), staple strength and staple length
- Fleece weight (greasy and clean) annually. Fleece weight includes the belly and the unskirted fleece.
- AWEX ID, fleece rot score, fly strike incidence, greasy colour grade and cast fleeces
- Meat traits (fat and muscle depth) and body weight (measured at least twice annually).

Conformation traits will be assessed once only, when the animals are 2 years and older.

**Results.** Results will be posted on a website: [www.dpi.vic.gov.au/farming/wool/merinostomatch](http://www.dpi.vic.gov.au/farming/wool/merinostomatch), and will also be made available in the mass media, fact sheets, technical notes, scientific journals and at field days.

## **DISCUSSION**

The high level of involvement of industry stakeholders and their diversity of positions in the wool industry places Merinos to Match in an excellent position to provide wool producers with an effective tool to genetically benchmark their choice of studs. This wide industry involvement has not only helped drive the establishment of the project, but will also ensure that the information generated will be of use to the whole Victorian wool industry.

The use of multiple sites in the Merinos to Match project allows woolgrowers to assess the results more readily in terms of an environment similar to that on their own properties, which is important to the adoption of the results. Remembering that 78% of woolgrowers responding to the survey of Kaine *et al.* (2002) believed that changing the environment can alter the ranking of sheep for fleece weight and fibre diameter, they are unlikely to accept results obtained in environments different to their own.

With 24 wethers per stud team, accuracy of ranking studs is estimated at 0.75 to 0.80, which is adequate for the purpose of ranking studs. Where studs are evaluated at more than 1 site, by use of linkage analysis, accuracies of ranking will be higher. By sampling wethers from 3 commercial flocks rather than 1 flock per stud team, the chances of randomly selecting wethers from only 1 or 2 sires per stud is drastically reduced. Sampling from more than 3 commercial flocks per stud team was dismissed as being impractical. For traits of lower heritability such as faecal egg counts, an indicator of resistance to worms, the current project design will not achieve sufficient accuracy (0.75 to 0.80), so have not been included.

Finally, the Merinos to Match project will integrate the beliefs underlying sheep breeding decisions by many wool producers in Victoria with information generated from well-designed trials. This should lead to a significant improvement in the genetic merit and profitability of the state's wool flock.

## **ACKNOWLEDGMENTS**

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