USING NATIONAL SIRE EVALUATION RESULTS IN MERINO BREEDING PROGRAMS

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SUMMARY
Central progeny test sire evaluation schemes are run in a number of different environments in Australia. A wide range of measured and visually appraised traits are recorded on the progeny of entered sires. Results from analyses combining data from sire evaluations provide the only objective assessment of rams from different flocks and by using these results, ram breeders are able to make informed choices when buying rams or semen from other sources. If well designed on-farm progeny tests are also conducted, breeders are able to compare the performance of outside elite rams with that of their home-bred sires. In addition, as genetic links between flocks increase a great number of sires from many different flocks are able to be directly compared. With breeders selecting from a larger number of potentially superior sires, selection differentials are increased, resulting in increased rates of genetic change in the Australian wool industry.

Keywords: Sire evaluation, Merino, breeding program.

INTRODUCTION
Until the advent of central test sire evaluation schemes there were few objective comparisons between rams from different sources. Ram breeders sourcing rams from outside their own flock had no objective information on the relative merit of outside rams. Although many studs now have measured information available on sale rams, this information is not directly comparable between flocks, and also generally not comparable between years in the same flock. All comparisons of rams from different flocks made using available measurements and visual appraisal are biased by regional environment, seasonal and management factors. However, central test sire evaluation schemes provide valid objective comparisons of many rams from a wide range of studs. This enables ram breeders to confidently select superior sires from outside their own flock. Sire evaluation schemes have also facilitated the initiation of many on farm progeny testing schemes that are linked to central test schemes. On farm schemes have the potential to greatly increase the number of sires that can be objectively compared. This allows breeders to compare the relative merit of their own home-bred sires with centrally tested sires and create strong genetic links between flocks that will eventually allow the relative merit of a huge number of rams from many different flocks to be objectively assessed. This will increase rates of genetic change in the industry. However, to maximise the benefits to the industry, ram breeders need to understand how to use the information that has become available through sire evaluation.

National sire evaluation schemes. The first national sire evaluation scheme was initiated at Hay (NSW) in 1987. Since then central test schemes have been initiated in three other states and in other regions of NSW. There are currently seven central test progeny schemes in operation,
covering two major wool types. The fine wool schemes include New England (NSW), Balmoral (VIC) and Geelong (VIC). The medium wool schemes include Riverina (NSW), Macquarie (NSW), Yardstick (WA) and Rosebank (SA). Recently a superfine site has also been established in the New England scheme. Each site must adhere to an established set of sire evaluation accreditation guidelines to be included in the national sire evaluation system. This ensures the integrity of the data collected at each site.

Each site generally evaluates between 10 and 16 rams per year. Two rams that have been evaluated in another year or at another site (link rams) are used to provide genetic links between years within each site and between sites. Each site chooses its link rams based on a combination of superior past performance in central test sire evaluation schemes and the rams ability to facilitate strong linkages with other central test schemes. Each site measures and records a wide variety of objective characteristics including greasy fleece weight, clean scoured yield, clean fleece weight, fibre diameter, body weight and coefficient of variation of fibre diameter. Most sites also measure staple length, staple strength, percentage of fibres greater than 30 microns and faecal egg count. Two independent classifiers are also employed by each site to assess visual characteristics on individual progeny and on the sire progeny groups. Classifiers’ visual assessment is often presented at four different levels.

i) Classers’ Grade: All progeny are classed individually for overall visual performance into one of three grades: Top, Second and Cull.

ii) Group Traits: Individual visual trait performance is also summarised into three group traits; Conformation (size, structural and type traits), Quality (wool quality traits) and Markings (pigmented areas on the wool and skin). When an animal has one or more traits in a trait group classed as Positive (or Negative), the animal is considered Positive (or Negative) for that trait group.

iii) Individual Trait scores: The individual trait scores that compose the above described group traits (Conformation, Quality and Markings) are also presented. All progeny for each trait are classed as being either positive, average or negative with the percentage of a sires’ progeny scored as either positive or negative presented. Progeny are also assessed for fleece rot with each animal scored according to the photo standards in NSW Agfact A3.3.4.1.

iv) Sire Group Classing: Each progeny group is assessed by two classifiers and comments are made regarding the general appearance and evenness of the group across a range of traits such as conformation and wool quality.

The national sire evaluation accreditation guidelines also describe minimum ages of assessment for central test sites to ensure the results are representative of the adult performance of the rams. The guidelines outline that each site has to evaluate animals at least once at greater than 17 months of age and preferably twice. Most sites evaluate animals twice with the first assessment between 10 and 16 months of age and the second assessment between 22 and 28 months of age.

Each site presents the results for each drop of progeny in a yearly site report. The use of link rams at each site then enables a large number of rams evaluated in different years and at different sites.
to be accurately and directly compared. This is done by an across year and site evaluation with the results published each year in the “Merino Superior Sires” publication. Only the major measured traits and an overall summary of visual characteristics of each sire are reported in this publication. “Estimated Progeny Values” are the units used to describe the measured performance. These units take into account the number of progeny each sire has and the heritability of the trait in question. Each year slight improvements are made to the procedure used to estimate the progeny value. At present an IWS sponsored project is using all data collected at central test sites and data made available from linked on-farm progeny tests which are looking at issues such as genetic groups and sire by environment interactions. Results from this project will be used to further fine-tune the analyses procedures.

Using National sire evaluation results to select sires. Although, national sire evaluation results can be used to identify superior sires in the industry, it can be quite daunting for ram breeders to select a ram (or rams) from the mass of figures contained within the “Merino Superior Sires” report and the numerous site reports. Ram breeders need an understanding of the workings of sire evaluation and how to use the results of sire evaluation. However, with some assistance the published results can be easily used provided a simple procedure is followed.

To begin with it is recommended that ram breeders study the combined linked national sire evaluation analyses (ie. The current “Merino Superior Sires” publication). Breeders can then choose elite rams from a large number of rams that have been evaluated in all the central test schemes around Australia. The “Merino Superior Sires” publication contains estimated progeny values for the major measured traits for each ram and summary visual information. However, it can be quite difficult to identify superior rams from this vast array of information. Thus, the top 20 rams ranked in terms of four different breeding objectives using a selection index are also presented along with summary visual information and it is logical that breeders consult this table first. The four breeding objectives presented differ in terms of the amount of emphasis placed on fibre diameter in the breeding objective, with emphasis ranging from maintaining fibre diameter levels in the flock to reducing fibre diameter at the fastest possible rate without reducing clean fleece weight. Breeders can then identify the best rams based on the breeding objective that is closest to their own objective. Breeders are also encouraged to evaluate and rank rams in terms of their own personalised breeding objective. In this way rams are ranked in terms of their value to that breeder. Other traits not already included in the selection index can also be included if the breeders so desire. For information on ranking the central test rams using a personalised selection index and in terms of a personalised breeding objective, breeders should contact the Australian Association of Stud Merino Breeders.

After breeders have identified rams with superior index values and summary visual values, or if they are interested in trait leaders for particular traits they should consult the tables in the “Merino Superior Sires” publication containing the estimated progeny values for the individual traits. Breeders should study the estimated progeny values for each trait of the rams they are interested in and ensure the performance in each of the individual traits is to their satisfaction, or if they are interested in trait leaders they should identify rams with shaded values for the trait of interest. The
number of progeny of the sire in central test sire evaluation programs may also be of interest to breeders. Although, only results for sires with a reasonable degree of accuracy are published, as the number of progeny born to a sire increases so does the accuracy of his evaluation.

Having identified several rams, with superior objective measured performance and summary visual performance, breeders may then be interested in obtaining more detail on the rams visual trait performance. To do this, breeders should note the sites at which the rams they have identified were evaluated and send away to the Australian Association of Stud Merino Breeders for copies of the relevant site reports. The full details of the ram's visual performance is available in these site reports as well as information on traits such as fleece rot, staple length, staple strength and faecal egg count. By using all this information breeders are then able to make an informed decision as to which sire is likely to provide the greatest improvement in their flock.

**Linking on-farm tests to central tests.** Ram breeders can also directly compare the performance of their own home-bred rams with central tested sires by using central test sires in a well designed on-farm sire evaluation program. The use of centrally tested sires in the home flock provides the genetic links required to compare the home flock sires with the centrally tested sires. Thus, in choosing sires for the next generation of rams, breeders can compare the relative merit of home-bred sires with sires from many other flocks in the industry, and can also identify rams that will perform well if entered in central test schemes. This process can also be taken further as the genetic links are then available between all flocks that have used centrally tested sires in home progeny testing programs. Thus, direct comparisons can be made between sires in all participating flocks if owners agree to have their flock included in large across flock evaluations. In the future, the genetic links may also become strong enough between participating flocks to enable the performance of the different flocks to be objectively compared and this information could be used by commercial breeders to identify superior ram sources.

**CONCLUSION**
National sire evaluation results are becoming an increasingly important resource for ram breeders to select outside rams for use in their own flock. National sire evaluation results provide the only objective assessment of rams from different flocks and enable ram breeders to make informed choices when buying rams or semen from other sources. If well designed on-farm progeny tests are also conducted, breeders are able to compare the performance of outside elite rams with that of their home-bred sires. Also as genetic links between flocks increase a great number of sires from many different flocks are able to be directly compared. With breeders selecting from a larger number of potentially superior sires, selection differentials are increased resulting in increased rates of genetic change in the Australian wool industry.