THE WESTERN AUSTRALIAN LINKED WETHER TRIALS PROVIDE A USEFUL EXTENSION TOOL FOR COMMERCIAL SHEEP BREEDERS

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SUMMARY
The Western Australian linked wether trials have emerged as an effective and popular means of enthusing sheep producers to examine how they can most effectively improve their flock genetics. This benchmarking tool is one of the few genetic tools available to the commercial sheep breeder. As a follow up to their wether trial activities, many participants have benefited from attending extension activities, in particular Merino Breeding and Selection workshops, to assist them with the question “where to from here?”. Recently farmers have been interested in extending the information gained to include information on reproduction, lamb growth and carcass quality in addition to wool traits and liveweight. Ewe trials have been designed to provide this information. The latest data analysis incorporates 308 teams of Merino, and one team of Rambouillet, wethers born in the years 1997 to 1999 and participating in 23 linked wether trials in Western Australia. Team sizes varied from 10 to 50 animals per team. Each trial site was linked through the inclusion of a common link team. This method allows commercial wool growers to make comparisons both within and across wether trial sites, and also across years.

Keywords: Extension, genetic benchmarking, linked wether trials

INTRODUCTION
Benchmarking is an effective and well known agricultural business and extension tool used to identify changes that will make a difference to the business. It is no less so in sheep breeding. As clean fleece weight and fibre diameter are the two major factors affecting profit of wool enterprises, comparing teams of wethers under the same environmental conditions is one of the few means available to commercial sheep producers for assessing the genetic merit of their wool producing flocks (Clarke 2002). In addition it provides opportunities to demonstrate genetic principles to commercial breeders. In Western Australia, about 650 flocks, mainly commercial flocks from the agricultural area, have been benchmarked in over 50 wether trials (to the 2000 drop) since 1989. However, prior to 1995 wether trials in Western Australia were conducted completely independently by groups of producers. From 1997 the Department of Agriculture of WA put into place a structure whereby all WA wether trials were genetically linked across sites and years through inclusion of a common link team, giving participants a broader option of superior genotypes from where they can source breeding rams. This paper describes the extension benefits of wether trials and reports an analysis of the total dataset of the Western Australian linked wether trials involving the 1997 to 1999 born animals.
MATERIALS AND METHODS
As part of the activities associated with the Western Australian linked wether trials, participants are offered various extension workshops and expert speakers of their choice. The principal workshop offered has been the Merino Breeding and Selection workshop (Hatcher and Bayley 1999). The linked trials are conducted according to broad guidelines described by Clarke (2002). The majority of trials use the recommended 20 or more animals per team, but team size has ranged from 10 to 50 animals. The link team is provided by the Department of Agriculture Western Australia, usually sourced from a commercial flock. Clean fleece weight (CFW) and fibre diameter (FD), and in some trials live weight and/or staple strength, are measured at the hogget and first adult shearings.

Clean fleece weight and fibre diameter data from hogget and adult shearing of teams born in 1997 to 1999 have now been analysed. The data were derived from 9312 wethers in 308 Merino flocks, and one Rambouillet flock, which were involved in 23 linked wether trials. Apart from the link team, some other flocks were also entered in more than one trial and/or in more than one year, thus further strengthening the genetic links between sites and years. Additional data will be added to this database as trials are completed. The combined data were analysed using the GenStat® statistical package (Payne et al. 2002).

A univariate model was fitted that was based on the wether trial model described in the ASREML User Guide (Gilmour et al. 2002). Site, age of the animal and measurement year were fitted in the model as fixed effects, while team and animal were specified as random effects.

RESULTS AND DISCUSSION
The WA approach was to allow producers to benchmark themselves using wether trials, which therefore act as an entry point on an educational road to improve their flocks. They are now a popular activity which offers value as a sheep breeding extension vehicle to raise awareness of breeding principles. These principles include the variation between ram sources, environmental and other factors affecting wool production and profitability which can be managed on farm, and processes to improve those traits. At their post trial and other presentation days, participants have the opportunity to address issues on “where to from here”. At these days they can gather ram source information pertinent to their sheep breeding operation. By narrowing down the choice of ram sources, they may then consider conducting an on-farm ram comparison to prove the value of the potential sources in their environment and under their particular farm management. Many participants use the data to identify directions in which to concentrate improvements in production characters.

Wether trials have proved to be a very useful catalyst to enroll commercial breeders in the popular Merino Breeding and Selection Workshops (Hatcher and Bayley 1999). These Workshops are generally held on farm and include both theoretical presentations and, importantly, hands-on exercises. They have provided an opportunity to improve the knowledge and skills of these participants in the area of sheep breeding. These workshops focus on environmental factors that can affect the performance of sheep, and on basic genetics, including using measurement data effectively. Understanding these factors assist them to question ram breeders when buying rams, thereby increasing their accuracy in identifying superior
rams and ram sources. The results in Figure 1 make it possible for wether trial participants to identify superior flocks, and therefore potential superior ram sources, for the two major traits (clean fleece weight and fibre diameter) with a reasonable degree of confidence to improve their profitability and reach their breeding objective faster. Through common links the WA data is incorporated into the National Bloodline Analysis (Coelli et al. 1998) which aims to identify superior ram sources. This information will improve over time as the number of teams based on each ram source gradually increases, improving the accuracy of benchmarking the individual ram sources.

Figure 1. Clean fleece weight (kg) versus fibre diameter (µm) deviations from the overall mean for the 1997 to 1999 drop teams involved in the Western Australian wether trials. Numbers in the graph refer to team identification codes.
Non-participants are also able to use the data but with less confidence, since they will need to guess the position of their flock on the graph using anecdotal information on the history, and their knowledge, of the various flocks in question.

Figure 1 shows the relationship between mean fibre diameter and mean clean fleece weight for the individual teams comparable across site and year. Mean fibre diameter for the teams varied from about 2.6 microns below to 2.5 microns above the mean (a range of 5.1 microns), while clean fleece weight varied from about 1.0 kg below to 1.0 kg above the mean (a range of 2.0 kg). These differences are similar to those reported in previous analyses of portions of the dataset (Clarke and Windsor 1999; Schelfhorst 2002). In NSW Coelli et al. (1998) found similar differences between bloodlines. The results of this work reinforce the huge potential for productivity to be improved by identification of superior ram sources. Live weight, although not measured in all trials, varied from 5.2 kg below to 6.3 kg above the mean, a range of about 11 kg.

The mean standard errors averaged across all means for CFW and FD were 0.10 kg and 0.26 µm respectively. Approximate 95% confidence limits for any team can be calculated using a value of twice the standard error to give an indication of variability of the data and which teams differ significantly from each other.

Recently farmers have indicated interest in generating information on reproductive rate, lamb growth and carcass information in addition to wool traits. As a result, two ewe trials are nearing completion, with a third commencing in 2003. These trials involve a greater management and labour input than the simpler wether trials, but produce results more relevant to the industry.

REFERENCES