ACROSS SITE ANALYSIS OF PERFORMANCE DATA FROM WESTERN AUSTRALIAN WETHER TRIALS

B. E. Clarke[1] and D. P. Windsor[2]

[1]Agriculture Western Australia, Gingin Community Agricultural Centre, Gingin WA 6503
[2]Agriculture Western Australia, Great Southern Agricultural Research Institute, Katanning WA 6317

SUMMARY

Wether teams from a common source were used to provide genetic links between five Western Australian wether trial sites. BLUP analyses were used to compare teams (n=75) across sites and provide environmentally corrected team means for clean fleece weight (CFW) and fibre diameter (FD). Team means varied by up to six microns for FD and 1.5 kg for CFW. Few significant differences from the overall means were found for teams with small numbers of animals (n<20). These data provide a flock benchmarking tool for participating woolgrowers.

Keywords: Wether trial, Merino, benchmarking, flock comparison

INTRODUCTION

The level of performance recording within the Australian wool industry's commercial flocks is generally low. This, and large environmental differences between wool growing properties, limit the opportunities for comparing the genetic merit of commercial Merino flocks. Comparisons between ram breeding flocks are restricted by the small scale of current across flock genetic comparisons. Lack of objective performance information is therefore a major problem facing woolgrowers wishing to compare their performance to others or considering a change of ram source. A recent survey (Pope 1996) indicated that 42 % of commercial Merino breeders had changed ram sources within the previous 5 years while a further 25 % perceived a need to change ram source to achieve their breeding objective.

Bloodline comparisons based on wether trial data (Coelli *et al.* 1996) provide a valuable source of performance information to woolgrowers in New South Wales, Victoria and South Australia. These data allow commercial breeders to benchmark their current bloodline against industry and to compare the merits of alternative bloodlines. The small number of wether trials completed in Western Australia to date means that bloodline information is unavailable for almost all the state's 500 to 600 ram breeding flocks. The clients of these flocks are unable to benchmark their performance using bloodline analyses. Western Australian woolgrowers may prefer to evaluate local ram sources rather than buying interstate bloodlines to reduce the risk of importing disease or because of perceived environmental differences.

This paper reports on the establishment of genetic links between wether trials in Western Australia. This has allowed comparisons between commercial flocks to be made on a wider basis than was previously possible at any single site and will hasten the incorporation of Western Australian ram breeding flocks into the national bloodline analysis.

MATERIALS AND METHODS

Genetic links between trial sites were established by the entry of teams of wethers from a single commercial flock. In 1995 link wethers were randomly selected as weaners before distribution to five wether trials sites in Western Australia. The trials were conducted at Condingup, Esperance, Katanning, Mingenew and Newdegate. The number of wethers entered per team varied between sites (see Table 1). Participants at all trial sites selected wethers at random for entry into the trials. The sheep at all trials except Condingup were entered as weaners (at Condingup they went into the trial as hoggets). Two additional teams entered the Katanning trial as hoggets.

Data were collected from the sites at both hogget (1996/97) and four tooth shearing (1997/98). Measurements recorded at all sites included: greasy fleece weight, yield, clean fleece weight (CFW), fibre diameter (FD), staple strength and staple length. Body weight at shearing was measured at three of the five sites. A total of 75 teams were available for the four tooth analysis over the five trials, with 899 individual records.

A univariate BLUP analysis of combined trial results was carried out for all of the above traits using ASREML (Gilmour *et al.* 1997). Wether trial "site" was fitted as a fixed effect and "team" as a random factor. This gave predictions of team values and standard errors. A Student's t-test was used to test for significant differences between the team predictions for CFW and FD and the overall trait means.

RESULTS

The combined CFW and FD results for four tooth wether teams (shorn 1997/98) across all five trial sites after correction for site effects are shown in Figure 1. Each point represents the BLUP values for an individual team. Horizontal and vertical lines show the overall means (± se) for CFW (3.72 ± 0.085) and FD (23.46 ± 0.22) respectively. Fibre diameter varied from approximately 20 to 26 microns. Clean fleece weight ranged from 2.8 to 4.3 kg.

Seventeen teams differed ($P<0.05$) from the overall mean for FD while 18 teams were above or below average for CFW ($P<0.05$). A total of 26 of the 75 teams (35 %) varied from the mean for at least one trait. Table 1 shows how teams that differed from the mean were distributed between trial sites with different team sizes. No significant differences were observed at Esperance (n=6) while more than half the teams at Mingenew (n=20) differed from the average for CFW (60 %) and FD (55 %).

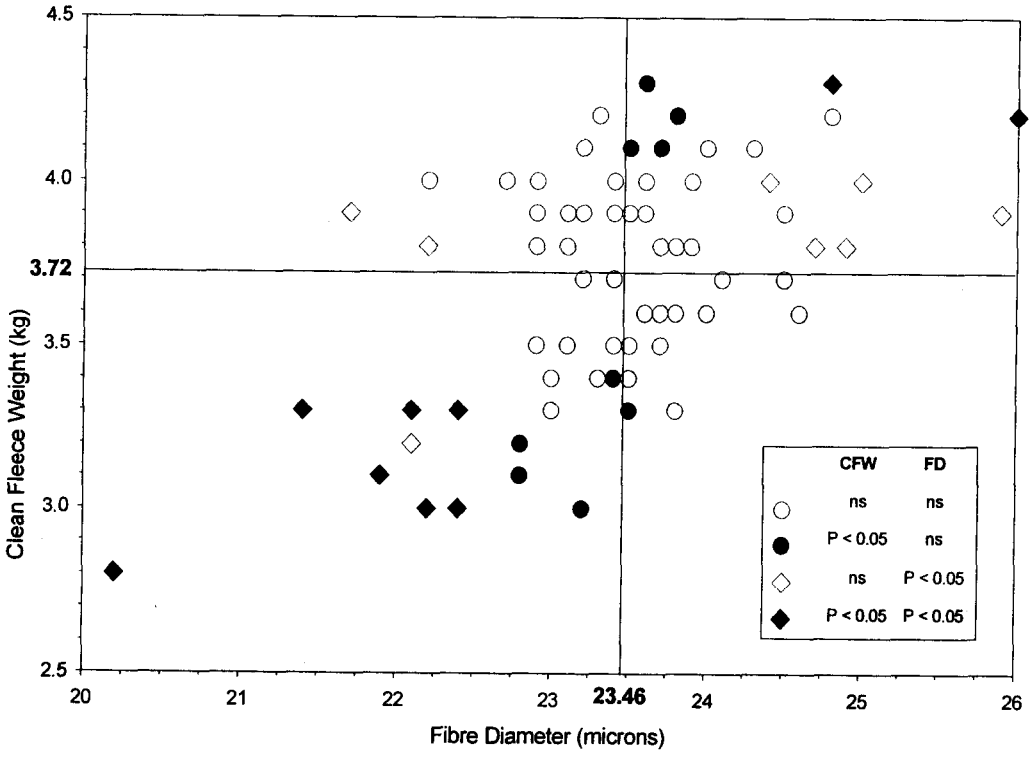

Figure 1. Four tooth wether team BLUP values for clean fleece weight (CFW) and fibre diameter (FD) showing significant differences from the trait means. Teams represented by open circles do not differ from the mean for either trait. Diamonds denote teams that differ (P<0.05) from the mean for FD. Teams with shaded symbols differ from the CFW mean (P<0.05).

Table 1. Distribution of teams differing from the mean for CFW or FD between trial sites

Trial Site	No. of Wethers per Team	%age of teams significantly different from the trait mean (P<0.05) for:	
		Clean FleeceWeight	Fibre Diameter
Esperance	6	0.0 %	0.0 %
Condingup	10	33.3 %	22.2 %
Newdegate	10	10.5 %	5.3 %
Katanning	15	20.0 %	20.0 %
Mingenew	20	60.0 %	55.0 %

DISCUSSION

These data provide participating woolgrowers with their first opportunity to benchmark their flocks' performance against those of other commercial producers throughout the agricultural areas of Western Australia. The spread of team averages for CFW (from 25 % below to 16 % above the mean) and FD (from 3.3 microns finer to 2.5 microns broader than the mean) observed in this study were very similar to those reported for bloodline analyses. Coelli *et al* (1998) reported a CFW range from 25 % below to 18 % above the mean and a FD range from 3 microns finer to 2.7 microns broader than the mean. This shows that like their counterparts elsewhere in Australia many Western Australian woolgrowers have the opportunity to improve the performance of their flocks by changing ram source. It also indicates that flocks with superior performance may be found within Western Australia. Increasing interest in wether trials in Western Australia and the presence of link teams between sites will hasten the inclusion of WA bloodlines in the national bloodline analysis. This will allow WA producers to benchmark their flocks on a nationwide basis.

The data in Table 1 clearly illustrate the limitations of wether trials with small numbers of animals per team. No significant differences from the mean were detected by the Esperance trial (n=6). Few significant differences were detected at Newdegate (n=10) where team size was reduced to an average of eight animals by plant poisoning. In contrast 16 of the 20 teams (80 %) entered in the Mingenew trial (n=20) differed from the mean ($P<0.05$) for either CFW or FD. Seven teams at Mingenew differed from the mean for both traits. This highlights the importance of team size as a consideration for the organisers of future trials.

The economic significance of production differences between flocks is highlighted by whole farm profit analysis. The differences in CFW and FD reported here equate to a difference in farm profit of up to $80,000 per annum when translated onto a typical farm in the high rainfall area of the Great Southern (Windsor and Young 1999).

In conclusion, these data provide a benchmarking tool for participating woolgrowers and an indication of the variation in production characteristics which exists between WA Merino flocks. They illustrate the opportunity for increased productivity through genetic change that exists for many WA woolgrowers. The growing number of linked wether trials (15 in 1998 compared with 5 in 1996) and the trend to increased team size will improve the future value of wether trial information to the WA wool industry.

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