Selection Indexes for Bloodline Comparisons to Reflect Different Breeding Objectives

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The Merino industry is large and diverse and therefore breeding objectives vary considerably depending on the environment, market expectations and personal preference. To address this diversity, comparisons designed to assist producers in the decision of selecting a stud should, like sire evaluations, rank studs to reflect more than one breeding objective. This paper reports on the use of selection indexes in the Merinos to Match trial that evaluated 29 studs over 4 linked sites for wool and carcase traits (Brien et al., 2004).

The analytical model included age and sites as fixed effects and studs, studs by site and flocks within studs as random effects. The stud effects were therefore Best Linear Unbiased Predictors (BLUPs). Economic values for 3 indexes, used by Sheep Genetics, were used to derive an estimate of the extra returns per Dry Sheep Equivalent (DSE) per year from choosing a different stud. The index economic values for clean fleece weight (CFW), fibre diameter (FD), liveweight (LWt), coefficient of variation of FD and staple strength, as supplied by K. Atkins (2006; personal communication), were applied to BLUP means and standard errors relevant to the Merinos to Match project. An effect of this approach is to regress the predictions back toward the mean, thus avoiding the bias of fixed effects estimates. The indexes estimated were the Merino 7% (M7%), Merino 14% (M14%) and the Dual Purpose 3.5% (DP3.5%). The percentage figures (e.g. M7%) represent the FD premium and hence the emphasis on reducing FD. The results showed economic differences between studs from best to worst of $2.60 to $3.41 per DSE/year, depending on the index. Whilst some studs performed well for all indexes, some varied considerably. Table 1 reports single trait performance (as deviations from the average), the index values as $/DSE/year and the single figure gross margin supplied as a percent deviation from the mean (as $/DSE/year) in the 2006 NSW Merino Bloodline Performance analysis (Atkins et al, 2007), for 4 studs. The data from the Merinos to Match trials were included in the NSW analysis and so trait performances were relatively similar.

Table 1: Single trait performance and estimated selection indexes of 4 studs in Merinos to Match plus the single gross margin deviation ($/DSE) calculated in the NSW bloodline analysis

	Merinos to Match Results						NSW
Stud	FD (μ deviation)	CFW (% deviation)	LWt (% deviation)	DP3.5% $/DSE/yr	M7% $/DSE/yr	M14% $/DSE/yr	GM/DSE//yr % deviation
Belbourie	0.8	10.4	0.9	$0.90	$0.35	-$0.53	+4.2%
Nareeb Nareeb	0.2	4.7	0.6	$0.42	$0.15	$0.26	+6.2%
Cressbrook	-0.6	-10.0	-1.8	-$0.88	-$0.16	$0.87	+5.6%
Snowy Plain	-0.7	-7.0	-1.0	-$0.60	-$0.14	$0.56	+6.0%

Where a single gross margin return was used to analyse performance, the percentage deviation above the gross margin for these bloodlines was positive and similar (between 4% and 6%) indicating a similar profitability for changing to these bloodlines. Belbourie and Nareeb Nareeb performed above average for CFW, FD and LWt. This was reflected in above average results for the DP3.5% and M7% indexes (favouring larger heavy cutting sheep) but negative for M14%. This indicates that these studs may not be a choice for many producers aiming to breed finer wool but may be for those wanting to increase fleece weight. Conversely, Cressbrook and Snowy Plain were much finer and had lower live weights and wool cuts. This put them above average on a M14% index but negative for the DP3.5% index. The difference in performance between Cressbrook and Belbourie was a 20% difference in CFW and 1.5 micrometre in FD. Whilst a gross margin may give a long term view of relative profitability, it gives no indication of performance in different markets or for different objectives.

As with sire evaluation, the use of selection indexes is a valid way of ranking studs given the diversity of the industry. Whilst the use of a number of indexes will better reflect the different selection decisions made by producers, the interpretation may be more difficult and hence require an aligned extension strategy.

Atkins, K., Martin, S., Casey A., Graham R., Semple S., and Gordon R. (2007) Primefact 700 NSW DPI, September, 2007

Brien, F., Court, J., Hallam, G., Keating, D., Kubeil, L., Konstantinov,K. and Stapleton, P. (2004). Animal Production in Australia 25: 17-20

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