

ECONOMIC COMPARISON OF CENTRE PLUS MERINO AND FIRST-CROSS EWES AS PRIME LAMB DAMS

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SUMMARY

Centre Plus Merino and first-cross (Border Leicester ram x Merino ewe) ewes were joined to Prime Lamb Genetics White Suffolk rams of high and low index values, to compare the profitability of these ewes as prime lamb dams. The only difference found between lambs from Centre Plus Merino and first-cross dams was in GR fat depth; Merino-cross lambs were leaner. Lambs sired by high index value rams had higher carcass weights and a larger eye muscle area. First-cross ewes weaned more lambs than the Merinos, although Merinos ewes provided a higher gross margin return per dry sheep equivalent than first-cross ewes.

Keywords: sheep, Merino, crossbred, prime lambs, wool

INTRODUCTION

First-cross ewes (Border Leicester x Merino) have been the mainstay of the prime lamb industry, with Merino ewes playing a secondary role as prime lamb dams. Low wool prices have increased the attraction of using Merino ewes as prime lamb dams, to improve overall returns. Centre Plus (CP) is a Merino group-breeding scheme with members throughout NSW and Queensland, but centered in Tullamore, NSW. Selection within Centre Plus has been for liveweight, fertility and rearing ability, as well as other traits including fleece attributes and worm resistance. These qualities should make Centre Plus ewes well suited to a role as prime lamb dams. A trial comparing CP Merino ewes with first-cross ewes was therefore initiated to determine the validity of this assertion.

MATERIALS AND METHODS

Ewes

Ninety-nine CP Merino ewes and 94 first-cross ewes, all 18-months old, were purchased in March 1995. The ewes were run together at Nyora, Condobolin. Ewes were shorn and ultrasonically scanned to confirm non-pregnancy status in April, and alternately drafted into two joining groups comprising half the CP Merino and first-cross ewes in each group. Ewes were joined to Prime Lamb Genetics (PLG) White Suffolk rams for five and a half weeks. The two ram groups had average Lambplan Across-Flock index (Growth 80 + eye muscle) values of 120.5%(high) and 113.8%(low). Ewes were scanned to confirm pregnancy status two months after joining. Throughout the trial the ewes were managed as one group except during joining (two groups) and lambing (four groups) when they were run in paddocks of similar feed. All ewes were rejoined in March 1996 as before to PLG rams with average Lambplan Across-Flock index values of 117.6% (high) and 105.1%(low). In February 1997 all ewes were shorn, sold and the trial completed. Faecal samples were collected at six, 16 and 24 months after the initiation of the trial, to determine parasite levels from both groups of ewes. Ewes were only drenched twice during the whole trial, in March 1995 and February 1996. Ewe live weights were also recorded.

Lambs

Lambs were not mothered-up (identify dam, date of birth and rearing status) but were identified into the four lambing groups: High index: Merino and crossbred; Low index: Merino and crossbred. Lambs underwent general management practices including castration of males. Lambs were weighed at weaning and at approximately 38 and 73 day intervals for lambs born in 1995 and 1996 respectively. Average growth rate was calculated from the first liveweight and the last liveweight recorded prior to processing. Lambs born in 1995 were weaned at an average age of 2.6 months and relocated to Wellington for finishing at four months of age. At approximately seven months of age 49 lambs were processed over the hooks, with cold carcass weight, GR fat depth (total tissue thickness at the 12th rib, 110mm from the midline) and dressing percentage recorded. Eye muscle area was recorded for a sample of five carcasses from each group. Lambs not processed

were sold when they reached a minimum live weight of 42 kg. Lambs born in 1996 were weaned at an average age of three months and relocated to Canowindra and later to Molong for finishing. At approximately eight months of age 186 lambs were processed over the hooks and 57 lambs were sold through the sale yards on the same day. Cold carcass weight, GR fat depth, dressing percentage and eye muscle area were recorded for all lambs processed.

Gross margin

A gross margin budget was prepared using the performance data from the trial. Additional assumptions were made about the flock composition; purchase and sale price of ewes and rams, mortality rates and enterprise costs typical of the Condobolin area. The dry sheep equivalent (DSE) rating was determined using the CSIRO GrassGro model and meteorological data over a 10-year period for the Condobolin area. The gross margin budget compared wool prices received during the trial and prices for September 1997.

Statistical analysis

Lamb data were analysed by least squares analysis of variance. The model included fixed effects for year, sire, dam, sex and their interactions. Significant differences for ewe liveweight data were determined using a standard spreadsheet software package (Excel 7). When assessing differences, P values less than 0.05 were deemed significant (Sokal and Rolf 1969). GR fat depth and eye muscle area were adjusted to the average carcass weight for each sex prior to analysis.

RESULTS

Ewes

Merino ewes were significantly ($P < 0.05$) lighter than the first-cross ewes pre- and post-joining in 1995 (Table 1.), although there was no difference in 1996. Scanning and lambing data indicated first-cross ewes carried and reared more lambs than the Merino ewes in both years.

Merino ewes had higher fleece weights and returned \$5.18 and \$8.22/head more than the first-cross ewes in 1996 and 1997 respectively (Table 2). In 1996, only a 42 cents/kg difference was obtained between the main Merino and crossbred fleece lines. The average fibre diameter of the Merino wool decreased in the second year by 0.3 mm, although it increased for the crossbred wool by 1.7 mm. Lower greasy fleece weights were obtained in the second year when compared with the first year's weights adjusted for 12 months wool growth.

Table 1. Average ewe liveweight, scanning, and lambing data

	1995		1996	
	Merino	First-cross	Merino	First-cross
Number of ewes	99	94	95	91
Pre-joining liveweight (kg)	40.0	42.7*	49.9	50.4
Lambs marked to ewes joined (%)	81	117	114	152
Lambs weaned to ewes joined (%)	78	114	114	147
Post joining scanning: ^A Single (%)	92	76	57	33
Twin (%)	4	21	42	64
Dry (%)	4	3	1	3

Significance * $P < 0.05$, ^A scanning results indicate percentage of ewes scanned single, twin or dry

Table 2. Average wool production from ewes in 1996 and 1997

	1996		1997	
	Merino	First-cross	Merino	First-cross
Wool growth (months)	10.75	10.75	12	12
Greasy fleece weight (kg) ^A	6.4	5.2	6.5	5.4
Fibre diameter (mm)	20.6	28.0	20.3	29.7
Yield (%) ^B	57.9	66.3	57.0	61.3
Auction price fleece wool (£/kg)	368	326	366	260
Net wool return (\$/head)	19.42	14.24	18.19	9.97

^A greasy fleece weight includes bellies and locks, ^B Schlumberger yield

Average faecal egg counts were higher for Merino ewes than first-cross ewes for each sampling (Table 3). Larval cultures from combined faecal samples taken from Merino and first-cross ewes, indicated the following parasite burdens: 74% *Haemonchus*, 23% *Trichostrongylus* for July 1996; 83% *Haemonchus*, 12% *Trichostrongylus* for February 1997.

Lambs

A significant difference ($P < 0.05$) was found between years for all measured traits in Table 4; all values were higher in 1996. Year x sire and year x dam interactions were found for liveweight. Lambs from the high index sires and Merino dams had significantly ($P < 0.05$) higher liveweights than the low index sires and first-cross dams in 1996. Second-cross lambs (from the first-cross dams) had significantly ($P < 0.05$) higher growth rates in 1995 and lower growth rates in 1996, than first-cross lambs from Merino ewes, although multiple births were higher in 1996 for the second-cross lambs. Also first-cross lambs grew 23g/day ($P < 0.05$) more in 1996 compared with 1995. Castrates had significantly ($P < 0.05$) heavier (2.2kg) liveweights and higher growth rates (9g/day) than females.

A dam x sex interaction was found for GR fat depth; castrate and female second-cross lambs had a significantly ($P < 0.05$) higher GR fat depth than the first-cross sexes respectively. Second-cross females had a higher GR fat depth than second-cross castrates ($P < 0.05$), although no difference were found between sex for first-cross lambs. Lambs from the high index sire group had a higher carcass weight and an eye muscle area that was 69 mm² ($P < 0.05$) larger than the low index group.

Table 3. Average ewe faecal egg counts (FEC) recorded during the trial

Date sampled	Merino		First-cross	
	No. of samples	FEC (epg) ^A	No. of samples	FEC (epg) ^A
September 1995	11	305	11	22
July 1996	40	248	40	93
February 1997	47	2877	43	2094

^A eggs per gram

Table 4. Effect of dam and sire group over both years, on lamb liveweight, growth rate, return per head and carcass measurements, least square means and standard errors (\pm)

	Dam line				Sire group			
	Merino		First-cross		High		Low	
All lambs								
Last liveweight (kg)	41.6	(0.320)	40.9	(0.330)	41.46	(0.330)	41.04	(0.330)
Growth rate (g/day)	98	(0.079)	87	(0.089)	104	(0.094)	103	(0.096)
Price per head (\$)	45.88		45.43		46.08		44.95	
<i>Lambs processed over the hooks</i>								
Cold carcass weight (kg)	19.39	(0.185)	19.44	(0.172)	19.81*	(0.184)	19.02	(0.174)
Dressing (%)	45	(0.003)	46	(0.003)	46	(0.003)	45	(0.003)
GR fat (mm)	9.69*	(0.260)	11.61	(0.240)	10.83	(0.250)	10.48	(0.240)
Eye muscle area (mm ²)	1385.2	(18.02)	1384.9	(17.70)	1419.8*	(17.60)	1350.40	(18.20)

Significance * < 0.05

Table 5. Gross margins (\$) of CP Merino and first-cross ewe, prime lamb enterprises

	March 1997 wool values		September 1997 wool values	
	Merino	First-cross	Merino	First-cross
Purchase price	50.00	70.00	50.00	70.00
Lamb price/head	45.00	45.00	45.00	45.00
Net wool income/ewe	19.60	12.08	24.64	12.96
Total stock sales/ewe	51.45	66.78	51.45	66.78
Variable costs/ewe	23.58	28.90	23.58	28.90
Gross margin/ewe	47.46	49.95	52.49	50.83
Gross margin/DSE	23.73	20.81	26.25	21.18

Gross margin

The CP Merino flock was rated at 2.0 DSE/ha while the first-cross ewe flock was rated at 2.4 DSE/ha due to the higher reproductive performance. Changing the wool values from March 1997 to September 1997 (Table 5) increased the net wool income margin of the Merino ewes from \$7.52 to \$11.68 above wool returns from the first-cross ewes. The Merino ewes provided a higher gross margin/DSE return of \$2.92 (March 1997 wool prices) and \$5.07 (September 1997 wool prices) above the first-cross ewes.

DISCUSSION

Reproductive performance of the ewes in 1995 should be viewed with caution as they were raised in different environments prior to the start of the trial. The lower liveweights of the Merino ewes in 1995 may have contributed to the below average lambing percentage achieved for the CP maiden Merinos, which is normally 100% ($\pm 5\%$) (R. Mortimer pers.comm.). In the second year, reproductive performance of both groups was good with the first-cross ewes well above the Merinos, this difference was due to a higher twinning percentage. In a similar trial run at a separate location the CP Merino ewes provided higher lambing percentages than the first-cross ewes over the same two year period (T. Bird unpublished data). This indicates that higher lambing percentages can be achieved from CP Merino ewes.

In both years the CP Merinos produced more wool of greater value than the first-cross ewes. Wool yields were average for a summer shearing, for the type of country the ewes were run on in the Condobolin area. Variation in FEC numbers between the Merino and first-cross ewes were assumed to be due to innate resistance rather than acquired immunity from pre-trial environments. The last FEC was high and consisted mainly of *Haemonchus*.

Lambs were not mothered up, therefore no adjustment could be made to the data for birth date or rearing status. Average lamb growth rates indicated no difference between dam lines. These results were supported by a similar trial mentioned above, where the number of multiple births were higher among first-cross progeny, although in this trial a larger number of multiple births occurred in the second-cross progeny. These results are dissimilar to those reported by Hopkins *et al.* (1996) who found that second-cross lambs grew faster than first-cross lambs. It is speculated that selection within CP Merinos for high fecundity and survivability has subsequently increased the milking ability of these ewes compared to other Merinos and may explain the similar growth rates achieved between first-cross and second-cross lambs in this trial. First-cross lambs were leaner than the second-cross lambs over both years; this supports results published by Hopkins *et al.* (1996). The significantly larger eye muscle area in lambs from the high index sire group, clearly shows that rams with high Lambplan index values (for eye muscle) will produce progeny with larger eye muscle areas than low index sires.

The calculated gross margins favoured the CP Merinos over the first-cross ewes. This difference was 14% when March 1997 wool prices were used and jumped to 24% when September wool values were used. Lowering the purchase price of the first-cross ewe to \$50 (the same as the Merino ewes) improved the gross margin of the first-cross ewes by eight percent.

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