EWES FOR THE FUTURE: A COMMERCIAL COMPARISON OF EWE BREEDS FOR REPRODUCTION, WOOL AND LAMB GROWTH

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SUMMARY

The Elmore Field Days Inc ran a comparison to determine the merit of six ewe genotypes in common commercial use for prime lamb and wool production from 2014 to 2019. Each of the six genotypes were represented by 42 ewes randomly selected from three properties. They were three crossbred types and three Merino types; Border Leicester x Merino cross, Multimeat x Merino cross carrying the Booroola high fecundity gene, Composites with genes from many meat breeds, local Merinos from northern Victoria and two specialist dual-purpose Merinos, Centre Plus and Leahcim Merinos. The ewes were joined annually to terminal sires for prime lamb production and run together as one mob except at lambing; there were five opportunities to lamb, the first as ewe lambs. The specialist dual purpose Merino team had the highest gross lamb and wool returns per ewe due to good reproduction, lamb growth and wool value. This is a similar result to a previous field study and subsequent financial analyses that highlighted gross margin increases of 20 to 30 percent from high performance dual purpose Merinos.

INTRODUCTION

The Elmore Field Days Inc ran a trial from 2014 to 2019 to compare the merit of six alternative sheep genotypes in common use in the northern Victorian environment at Elmore. This paper describes the results of the four adult years (2016-19) of ewe and lamb body weights, condition scores, reproduction data and key wool measurements. A previous study (Ransom *et al* 2015) and subsequent economic analyses (Ransom *et al* 2018) indicated large differences in profitability between genotypes in common use.

MATERIALS AND METHODS

Ewes were run on the Elmore Field Days site 3 km east of Elmore in northern Victoria from January 2015 to October 2019. The rainfall at the locality is winter dominant with a long term average of 466mm per year. Sheep grazed on annual pastures growing between late autumn and spring and dry pasture residues and crop stubbles over the summer.

The six ewe genotypes included in the trial were each represented by 42 ewes. Each genotype group was randomly selected as ewe lambs in November 2014 from three properties, with 14 lambs per property after an allowance for culling. The ewe lambs were fed a high-quality diet to reach a joining weight in late February 2015, when they were first joined to White Suffolk rams with a further four annual joinings to either White Suffolk or Poll Dorset rams.

The ewe genotypes were (i) Border Leicester x Merino cross ewes (BLxMo), the most common prime lamb dam in northern Victoria. (ii) MultiMeat x Merino cross ewes (MMxMo), the MultiMeat has been bred for homozygosity of the Booroola high fecundity gene and the first cross ewes bred from these rams thus carry one copy of the gene. (iii) Composites – represented by Cashmore-Oaklea Performance Maternals, a genotype based heavily on the Border Leicester and Romney breeds with smaller contributions from at least 10 other breeds. They are generally regarded as suited to more wet and cold conditions than Elmore. (iv) Merino LV - Loddon Valley Merinos, the second most common prime lamb dam in northern Victoria; mainly based on Peppin bloodlines. (v) Leahcim M – Leahcim Merino, a dual purpose type from South Australia. (vi) CP Merino - Centre Plus Merino, a dual purpose type from Central West NSW. Three of the genotypes were represented in the previous study, but originated from different farms.

This report covers the four adult years of body weights, condition scores, reproduction data, lamb growth and key wool measurements. Lambing time varied from year to year, from April (autumn) to July (late winter) as ram introduction to the adult ewes varied from 10 November to 26 January to reflect the variation in district practices and the possibility some genotypes could be disadvantaged by an early joining. Ewes were pregnancy scanned approximately 90 days after the rams were introduced and assigned as 'dry' or carrying a single, twins, triplets or quads, but not separated into litter classes post scanning. They were divided into their breed groups immediately prior to lambing and run together again from lamb marking. Ewes were inspected twice daily during lambing and assistance was only given when needed. Individual lambs were not identified with their dam at lambing. Instead ewe udders were inspected at lamb marking and weaning and each ewe was classed as 'wet' or 'dry' or 'lambed and lost' when linked to scan information.

Shearing was in early October each year and wool mid-side samples were taken about 3 weeks before shearing. Lambs were weaned at 12 to 14 weeks and sold when a commercial draft reached a minimum live weight of 46 kg. Dressing percentages were calculated from 4 slaughter batches totalling 520 lambs over three years. Wool, lamb carcase and skin returns per ewe were calculated each year using average Australian prices over the previous 12 months.

Statistical analyses. A linear mixed model was fitted to ewe traits that included fixed effects of year (2016-2019 which is confounded with ewe age 2-5 years), breed and the interaction between year and breed. Random effects included property of origin and ewe. The ewe effect accounts for repeated measures on the same ewes across years. The interaction between year and breed was significant, but not large in effect for any trait. Lambs born and marking rates were analysed using a non-parametric χ^2 test as there were only group data. Lamb traits were analysed with a linear model with fixed effects of year, sex, breed and the interaction between year and breed. Dressing percentage was analysed for the limited lambs with values. Analyses of variance were used for the wool bale tests.

RESULTS AND DISCUSSION

Ewe weight and wool. The three crossbred types had higher body weights and condition scores than the Merino types. There were also significant differences in weight and condition score within the Merino types. The two specialist dual purpose types breeds (Leahcim and CentrePlus) were heavier than the local Merinos. The wool bale measurements from core and grab samples and estimated returns from wool and lamb are presented in Table 4.

Reproduction. There were substantial differences in the number of lambs marked per ewe joined and some components of reproduction. Multimeat x Merino raised significantly more lambs and Leahcim ewes raised significantly less lambs than all other ewe types (Table 2). The results are also a reflection of the time of joining as crossbreds are more seasonal breeders than Merinos. Lambing in spring may have been more beneficial to the crossbreds.

The differences were mainly due to fecundity (litter size) as indicated by the fetuses scanned per ewe joined. The Leahcim genotype also had more dry ewes. The calculated fetal loss from scanning to birth indicated higher losses in the MultiMeat and Composites breeds. Specialist advice over the four years indicated these higher losses were likely due to (i) higher fetal losses in the more fecund breeds (Scott 2007) and (ii) scanning errors that over-estimate fetal counts when more than two fetuses are present, especially in fat ewes. Lambs removed by predators before morning lamb pickup could also have been an issue (Smith *et al* 1988). Campylobacter infection was thought not to be an issue as all ewes had the full vaccination program and subsequent blood antibody tests indicated infection was unlikely. Previous reproduction comparisons in Australia and South Africa (eg Mortimer *et al* 1985, Ransom *et al* 2015, Cloete *et al* 2003) also highlighted differences in sheep reproduction.

Table 1. Ewe weights, condition scores and wool characters from 2016 to 2019

Ewe Breed	Ewe weight, fleece free at joining (kg)	Condition score at joining (score 1-5)	Greasy fleece weight (kg)	Clean fleece weight (kg)	Fibre diameter mid-side (µm)
BL x Mo	74.0^{d}	3.82^{d}	5.41^{c}	3.95^{c}	28.5^{d}
MM x Mo	69.6^{c}	3.68^{c}	4.61^{b}	3.11^{b}	26.2^{c}
Composites	80.2^{e}	3.89^{d}	3.93^{a}	2.68^{a}	34.4^{e}
Merino LV	58.6^{a}	3.14^{a}	6.11^{d}	4.12^{c}	19.2^{ab}
Leahcim M	62.9^{b}	3.24^{a}	5.71^{cd}	3.91^{c}	19.7^{b}
CP Merino	64.7^{b}	3.49^{b}	5.74^{cd}	3.85^{c}	17.8^{a}
LSD	3.3	0.12	0.41	0.28	1.7

^{abc} Ewe breed means within columns with different superscripts differ significantly (P<0.05).

Table 2. Ewe reproduction characters for the four adult lambings from 2016 to 2019

Ewe Breed	Fetuses scanned per ewe joined	Scanned as dry per ewe joined	Lambed & lost per ewe joined	Lambs born per ewe joined	Lambs marked per ewe joined	Fetal loss, scanning to pre-birth	Lamb deaths, birth to marking
BL x Mo	1.55^{b}	0.03^{a}	0.07^{a}	1.51^{d}	1.31^{d}	0.04^{a}	0.13^{ab}
MM x Mo	2.62^{c}	0.03^{a}	0.08^{a}	1.95^{e}	1.46^{e}	0.26^{d}	0.24^{c}
Composites	1.67^{b}	0.04^{a}	0.07^{a}	1.36^{c}	1.24^{cd}	0.18^{c}	0.09^{a}
Merino LV	1.31^{ab}	0.04^{a}	0.06^{a}	1.18^{b}	1.09^{b}	0.10^{b}	0.08^{a}
Leahcim M	1.10^{a}	0.10^{b}	0.06^{a}	0.98^{a}	0.89^{a}	0.11^{b}	0.10^{a}
CP Merino	1.51^{b}	0.04^{a}	0.06^{a}	1.38^{c}	1.17^{bc}	0.09^{ab}	0.16^{b}
LSD	0.23	0.04	0.04	0.12	0.09	0.06	0.05

^{abc} Ewe breed means within columns with different superscripts differ significantly (P<0.05).

Lamb performance. Lambs from Composite ewes were the heaviest at first sale time, the BL x Mo, Leahcim and Centre Plus were intermediate and the Multimeat cross and local Merino were lowest (Table 3). The lower final weight of the Multimeats is likely due to more multiple births as indicated by their lower weight at marking, their early growth from marking to weaning being lower but after weaning their growth being similar to the other breeds except the Composites.

Industry application. Reproduction, lamb growth and wool are all highly relevant to improving profitability, but no single genotype excelled in all components. Table 4 details the total returns per ewe. The crossbreds had the greatest lamb returns while the Merinos had the greatest wool returns. When wool and meat were combined the Centre Plus had the highest gross returns closely followed by the MM x Mo and BL x Mo genotypes. Also the MM x Mo lambs may have more growth potential as their earlier growth was reduced by the higher number of multiple births.

The returns per hectare from higher body weight ewes and higher lambing percentages are reduced when accounting for their higher feed intake, due to higher number of lambs reared and heavier ewes. An economic analyses using the bio-economic model GrassGro of the previous study (Ransom *et al.* 2015) found specialist dual purpose merinos with very good lambing percentages, wool value and body growth had higher gross margins per hectare, by an average of 30% above four other breeds and 18% above the local Merinos when stocked at the same DSE per hectare (Ransom *et al*. 2018). These results complement the previous study and add to the knowledge base of current sheep genotype differences to enable further GrassGro analyses to help sheep farmers make better decisions.

Table 3. Lamb live weights, growth rates and dressing percentage

Ewe Breed	Weight at Marking (kg)	Weight in spring, before any sales (kg)	Weight gain, marking-weaning (g/day)	Percent in 1st slaughter batch	Weight gain, weaning-first sale (g/day)	Dressing percent
BL x Mo	16.5[c]	47.0[b]	294[b]	54.5[d]	258[b]	46.3[b]
MM x Mo	14.9[a]	44.2[a]	278[a]	35.3[b]	252[b]	46.7[c]
Composites	16.5[c]	48.5[d]	310[c]	66.6[e]	268[c]	46.4[b]
Merino LV	15.3[b]	43.8[a]	280[a]	29.8[a]	239[a]	45.9[a]
Leahcim M	17.8[e]	47.3[b]	281[a]	47.9[c]	252[b]	45.7[a]
CP Merino	16.8[d]	46.9[b]	294[b]	53.3[d]	250[b]	45.7[a]
LSD	0.3	0.9	9	3.3	9	0.3

[abc] Ewe breed means within columns with different superscripts differ significantly (P<0.05).

Table 4. Wool bale tests and the financial returns from wool and lambs from 2016 to 2019

Ewe Breed	Fibre diameter, bale core tests (µm)	Fibre diameter coeff of variation (%)	Clean fleece wool yield, (%)	Staple length (mm)	Staple strength (n/kt)	Wool returns per ewe ($/ewe)	Lamb returns per ewe ($/ewe)	Total wool and lamb returns ($/ewe)
BL x Mo	28.7[e]	21.3[c]	75.5[d]	112[b]	32.0[b]	$32.59	$196.29	$228.88
MM x Mo	26.4[d]	21.7[c]	68.9[a]	104[a]	30.8[ab]	$34.76	$203.97	$238.72
Composites	33.5[f]	22.9[d]	67.9[a]	109[ab]	26.0[a]	$10.46	$190.96	$201.42
Merino LV	19.6[b]	18.7[b]	71.9[c]	104[a]	27.5[a]	$72.99	$149.27	$222.26
Leahcim M	20.2[c]	18.4[ab]	70.4[b]	108[ab]	29.8[ab]	$68.30	$130.24	$198.53
CP Merino	18.1[a]	18.1[a]	68.1[a]	111[b]	32.8[b]	$74.02	$175.02	$249.05
LSD	0.5	0.5	1.1	6.9	5.2			

[abc] Ewe breed means within columns with different superscripts differ significantly (P<0.05).

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