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Productivity of Booroola-Merino cross ewes grazing improved tussock grassland

A. R. BRAY

Winchmore Irrigation Research Station, Ashburton

A. J. ALLISON

Invermay Agricultural Research Centre, Mosgiel

ABSTRACT

Local Merino, ¼ Booroola—¾ local Merino and ½ Booroola—½ local Merino ewes were grazed on oversown and topdressed tussock grassland.

When ranked for lamb and wool productivity at 2 and 3 years of age both the Booroola crosses were superior to the Merino. Satisfactory lamb weights and ewe fleece weights were obtained at lambing percentages above those normally obtained on this class of land.

INTRODUCTION

High fecundity genes from the Booroola strain of Merino can be introduced into fine wool flocks to increase lambing percentages rapidly with limited effect on breed and wool type. Because of this, runholders in the South Island high country may find a Booroola cross flock more acceptable than alternative breed types provided they can be convinced that satisfactory wool and lamb production can be obtained at higher lambing percentages in their environment.

This report presents lamb and wool production data at 2 and 3 years of age of local Merinos and their Booroola crosses grazing oversown and topdressed tussock grassland at Tara Hills High Country Research Station, North Otago.

EXPERIMENTAL

Animals

Ewes of 3 breed types were generated in both 1977 and 1978. The local Merino (M) line was a random selection of ewe progeny born in the Tara Hills Merino flock. The ¼ Booroola—¾ local Merino (¼ B) line were the progeny of ½ Booroola—½ Merino (½ B) ewes (see Allison *et al.*, 1980) and Merino rams from the same sources as the sires of the M ewes. Local Merinos joined with Booroola type rams (¾ B or pure) produced the ½ B line.

Table 1 shows the numbers of ewes in year-of-birth classes within breed lines. Some of the M and ½ B ewes born in 1977 were removed from the flock at the end of their production season as 2-year olds.

Management

Within year-of-birth classes the 3 breed lines grazed as 1 flock from weaning at 14 weeks of age. The 2 year-of-birth classes grazed together from the time when the 1978-born ewes were first joined with the ram.

Merino rams (ratio 1:75 ewes) were joined with ewes in mid May for 50 days. Lambs were weaned in mid January (maximum age of 14 weeks). Ewes were shorn in late September. Anthelmintic and selenium were administered routinely during hogget growth and to ewes prior to mating and lambing. Lambs received selenium at lamb marking.

TABLE 1 Numbers of ewes present at joining with rams

	Age of ewes (years)			
	2		3	
Year of birth	1977	1978	1977	1978
Breed M	195	90	89	81
¼ B	204	176	193	168
½ B	188	70	83	70

Measurements

Animals were weighed without fasting at intervals during hogget growth, before joining, shearing and at weaning each year. At weaning progeny were weighed and the numbers in each breed line selected as prime for slaughter by a commercial drafter were recorded in 1980/1 and 1981/2.

Greasy fleece weights (unskirted fleece plus belly wool) were recorded and core samples taken from bales of skirted fleece wool for yield and fibre diameter determinations for each sub-class.

Three weeks after joining the ovulation rate (ovulations per ewe ovulating) was determined by laparoscopy of about 50 ewes of each sub-class. Lambing percentages (lambs docked per ewe joined) for each sub-class were determined by udder marking (Davis *et al.*, 1981a). Ewes were classed by inspection

TABLE 2 Live weight, reproduction and lamb production: mean of ewes at 2 and 3 years of age.

Breed	Joining weight (kg)	Fertility (%)	Ovulation rate	Lambs marked (%)	Lamb weight at weaning (kg)
M	45.0 a	85 a	1.24 aA	94 aA	21.4 aA
¼ B	45.6 a	91 a	1.68 bAB	114 bB	20.4 bB
½ B	47.5 b	87 a	2.18 cB	116 bB	19.9 cC

of udders as barren, lambed but not suckling and suckling.

The data were analysed by randomised block analysis of variance with breeds as treatments and each ewe age within year-of-birth class as replicates. Treatments means were subjected to Duncan's Multiple Range tests.

RESULTS

Live Weight

All 3 breed lines showed a similar pattern of weight change over the first 3 years of life. Small differences in weight between lines were apparent during the hogget year and the range of weight at joining was 2.5 kg (Table 2) with M ewes being lighter than the ½ B ($P < 0.05$).

Reproductive Performance

Fertility (ewes lambed/ewe joined) did not differ significantly between breed lines but differences in ovulation rate were marked (Table 2). The difference between the M ewes and the Booroola crosses was reduced by lamb marking time but was still highly significant ($P < 0.01$).

Lamb Production

M ewes weaned the heaviest lambs and ½ B ewes the lightest (Table 2). The mean weight of lamb weaned per ewe joined for M, ¼ B and ½ B were 20.5, 23.6 and 23.3 kg respectively and the corresponding numbers of lambs selected as prime for slaughter per 100 ewes joined were 55, 49 and 48 (does not include data from 1977 born ewes at 2 years of age which were not available).

Wool Production

The greasy fleece weight of ½ B ewes was higher than that of M ewes ($P < 0.05$). Measurements of fibre diameter indicated an advantage to the M ewes in that their wool was slightly higher yielding and finer in diameter (Table 3).

TABLE 3 Wool production: mean of ewes at 2 and 3 years of age.

Breed	Greasy fleece weight (kg)	Yield (%)	Fibre diameter (μm)
M	4.49 a	71.7 a	20.9 a
¼ B	4.80 b	71.2 a	22.4 a
½ B	4.61 ab	70.7 a	21.6 a

DISCUSSION

As expected from the performance of other lines of local Merinos and ½ and ¾ Booroola-Merino cross ewes grazed on irrigated pasture at Tara Hills (Allison *et al.*, 1980) the two Booroola crosses in this study had higher lambing percentages than the Merinos as a consequence of their higher fecundity. The finding that M ewes produced less wool than the Booroola crosses was contrary to that of Allison *et al.* (1980). Reasons for this may include sire effects. Wool production of the M ewes relative to the Booroola crosses did nevertheless, appear to increase with age, as it did for the lines described by Allison *et al.* (1980).

A greater proportion of the lambs born to Booroola cross ewes were born as multiples so it is not surprising that they were lighter at weaning. Although the disadvantage was not severe, particularly when viewed in the light of other gains, it indicates a need to feed the progeny of Booroola cross ewes well if the handicap of multiple birth is to be overcome.

The wool and lamb production data in Tables 2 and 3 indicate that a Booroola cross flock would be more productive than a Merino flock on a per ewe basis when grazed on oversown and topdressed tussock grassland. These results are preliminary, however, and require confirmation on a wider basis. Their applicability to commercial flocks is also limited by recent developments in the understanding of the inheritance of Booroola fecundity (Piper and Bindon, 1980; Davis *et al.*, 1981b). These indicate that the proportion of Booroola blood in a flock may not predict accurately the proportion of ewes possessing the fecundity trait. At present the exact proportion of ewes in the ¼ B and ½ B lines with the trait is not known but available evidence indicates that it may not differ greatly from that expected if all the Booroola sires used to generate the lines were heterozygous for the trait.

Doubts frequently expressed by runholders about the ability of ewes to produce fleeces and lambs of acceptable weights at higher than normal lambing percentages have not been substantiated. Both wool and lamb production by each of the 3 breed lines in this study were above the average for high country properties (Kerr *et al.*, 1979) with the Booroola crosses more productive than the Merinos. If these results are confirmed, the infusion of a limited amount of Booroola blood into their flocks will be a measure high country farmers who have undertaken a pasture improvement programme could take to increase meat and wool production without radically changing existing breed and wool types.

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