REPRODUCTIVE PERFORMANCE AND WOOL PRODUCTION OF MERINO AND HIGH FERTILITY STRAIN (BOOROOLA) × MERINO EWES

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SUMMARY

High fertility strain (Booroola) Merino rams were mated with local Merino ewes. The 1½- to 2½-year-old daughters had 0.75 to 0.98 more ovulations/ewe at mating than local Merino ewes of similar age; this resulted in 0.48 to 0.61 more lambs per ewe lambing in the crossbred ewes. These increases in lambing were attained without a large drop in fleece weight or quality.

INTRODUCTION

The use of high-fecundity breeds in crossbreeding programmes to give substantial increases in lamb drop is an attractive means towards increasing the efficiency of sheep production. Coop (1967) has stated that a twin-bearing ewe is more efficient in feed utilization than a single-bearing ewe by 30% for meat plus wool production and 50% for meat production alone.

Merino rams (Booroola Merinos) from two flocks in Australia which have a very high lamb drop have been used for crossbreeding at Tara Hills since 1973. This is a preliminary report on the growth rates, reproductive performance and wool production of the progeny of Booroola rams mated with ewes from the Tara Hills flock compared with the progeny of commercially available Merino rams mated with similar ewes.

MATERIALS AND METHODS

ANIMALS AND MANAGEMENT

In 1973 and 1974, Booroola Merino rams and Merino rams from local sources were joined with Merino ewes (2½ years or older). Three Booroola rams were each joined with 150-152 ewes in 1973, and a further five with 90-91 ewes each in 1974. Eight Merino rams from commercial sources were each joined with 50-52 ewes in 1973 and 1974, different rams being used in

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each year. The Booroola × Tara Hills Merino (B ×) and straightbred local Merino (TH) female progeny from these matings have since been compared.

Both groups of progeny have been run together at all times since weaning, with the exception of mating and lambing. The ewes were first joined when 1½ years of age. TH ewes were joined in single-sire flocks of 25 to 65 ewes per ram, and B × ewes in single-sire flocks of 71 to 111 ewes per ram. Within the flocks of TH ewes, approximately 30 to 50% of the ewes were 3½ years or older, from the groups used in the previous two years.

Measurements

Lambs were weighed at birth, weaning, one year of age, and immediately prior to the commencement of mating. All lambs were shorn after weaning in late January-early February. Ewe hoggets born in 1973 were shorn in September 1974 but 1974-born animals were shorn in February 1976 (*i.e.*, approximately 8 and 12 months' wool growth, respectively). Individual fleece weights were recorded, and mid-side samples taken for measurement of percentage yield and fibre diameter.

Two to three weeks after the commencement of mating the number of ovulations was recorded by laparoscopy (Kelly and Allison, 1976) in a sample of mated ewes from each group. Numbers of lambs born to each ewe were recorded twice daily.

RESULTS

Liveweights

Liveweights of B × and TH ewes, corrected for birthdate, birth rank and rearing rank, are presented in Table 1. There were no significant differences between the two groups in 3-month (weaning), 1- or 1½-year-old weights. Pre-mating weights were higher in the 2½-year-old TH ewes than their B × counterparts ($P < 0.01$).

Hogget Fleece Weight

Fleece characteristics of the hogget wool are presented in Table 2. Except for the difference of 0.39 kg in greasy fleece weight between TH and B × ewe hoggets born in 1973 ($P < 0.01$), most of the other differences in fleece characteristics were small. However, a large number of samples and low variability

have resulted in some minor differences attaining significance. Percentage yield (dry weight basis) was 0.7 (n.s.) and 2.3 ($P < 0.01$) higher in TH ewes in the two years, and mean fibre diameter was 1.2 microns greater in the B × ewes born in 1974 ($P < 0.01$).

TABLE 1: MEAN LIVEWEIGHTS OF MERINO AND B × MERINO EWES (kg)

Age	*Ewes Born 1973*		*Ewes Born 1974*	
	TH Merino	*B × Merino*	*TH Merino*	*B × Merino*
3 months (weaning)	21.2	21.3	17.8	17.8
1 year	31.9	31.8	28.6	27.7
1½ years (pre-mating)	47.2	47.2	40.0	39.0
2½ years (pre-mating)	45.3	43.5		

Reproductive Performance

Ovulation rates and lambing performances of the two breed groups are given in Table 3. As none of the 1½-year-old ewes lambed in one of the TH groups the data from this group have been deleted. Ovulation rates were substantially higher in the B × than TH ewes ($P < 0.01$). Of 153 B × ewes examined, 50 had one ovulation, and 57, 37, 7 and 2 ewes had two, three, four and five ovulations, respectively. In contrast, of 125 TH ewes examined, only 28 ewes had two ovulations with the remainder one only. These higher ovulation rates in the B × ewes resulted in 0.48 to 0.61 more lambs per ewe lambing than the TH ewes. Barrenness was less in the B × ewes born in 1973 for both years of lambing.

TABLE 2: FLEECE WEIGHTS (kg), PERCENTAGE YIELD AND FIBRE DIAMETER (MICRONS) OF MERINO AND B × MERINO EWE HOGGETS

Fleece Characteristic	*Ewes Born 1973*		*Ewes Born 1974*		
	TH Merino	*B × Merino*	*TH Merino*	*B × Merino*	*S.E.*
Greasy weight*	3.91	3.51	5.07	5.20	0.04
% Yield (dry weight basis)	62.0	61.3	60.8	58.5	0.3
Fibre diameter	19.7	19.7	20.0	21.2	0.2

*Approximately 8 and 12 months' wool growth for animals born in 1973 and 1974, respectively.

TABLE 3: REPRODUCTIVE PERFORMANCE OF MERINO AND B × MERINO EWES

Age at Mating (yr)	*Breed*	*Ovulations per Ewe*	*Lambs Born/ Ewes Lambing*	*% Barren*
1975 Results:				
1½	Merino	1.10 ± 0.07 (21)	1.07 ± 0.03 (131)	36.6
	B × Merino	2.08 ± 0.14 (50)	1.67 ± 0.07 (148)	14.3
1976 Results:				
1½	Merino	1.19 ± 0.05 (53)	1.06 ± 0.02 (211)	31.3
	B × Merino	1.96 ± 0.13 (51)	1.54 ± 0.06 (218)	30.3
2½	Merino	1.35 ± 0.07 (51)	1.26 ± 0.04 (152)	26.8
	B × Merino	2.10 ± 0.13 (52)	1.87 ± 0.07 (148)	11.5

Values in parentheses are number of ewes examined and number of ewes present at lambing.

DISCUSSION

Progeny from Merino ewes mated with Booroola rams have shown substantially higher ovulation rates and as a consequence more lambs born than their local Merino counterparts. Ovulation rates recorded in our ewes are at least comparable with the values recorded in Australia in unselected Merino ewes and B × Merino ewes (Piper *et al.*, 1976; Robertson, 1976) where mean ovulation rates were 12 to 75% greater in the B × Merino ewes. These differences have been maintained in the lambing performances of the ewes, with Robertson (1976) recording increases of more than 60% over unselected Merino ewes in number of lambs born per ewe mated, while the present results show increases of the same magnitude.

These gains have been achieved without any major reduction in fleece weight or quality. Further analyses of the results have shown significant between-sire variation in the wool production of the B × Merino ewes, which suggests that selection for wool weight should enable wool production in comparison with Merino ewes to be maintained. Measurements of fleece weights on a commercial station (Haldon) running B × Merino ewes have shown almost identical weights with Merino ewes of the same age.

Barrenness data reported in this paper are of little comparative value owing to the single-sire mating groups and the groups being of varying size. Also with TH ewes, older ewes were run with the groups at mating, a situation not conducive to high fertility of young ewes (Allison, 1977). The differences in levels of barrenness as 1½-year-old ewes resulted in the significant difference in pre-mating liveweights between 2½-year-old B ×

and TH ewes. Relative to ewes rearing lambs in 1975, barren ewes gained 5 to 6 kg by weaning in late January. The ewes which lambed made up approximately 40% of this difference by joining in May.

Data reported here show the Booroola Merino to be a very effective sire for giving substantial increases in lamb drop in the ewe progeny. These increases can be achieved without large decreases in wool production, and hence would seem to be more attractive than long-term selection programmes or other techniques to increase the lambing performance of the New Zealand Merino and possibly other breeds of sheep.

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