GROWTH AND CARCASE COMPOSITION OF FINN X MERINO, BORDER BOOROOLA X MERINO AND BORDER LEICESTER X MERINO LAMBS

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SUMMARY

Data was collected on the rate of growth from weaning to market weight, and on the subsequent carcase measurements, in four groups of cross-bred wether lambs. The lambs were born in July/August 1992 to Merino ewes which had been joined in groups of 250 to one of four ram types. The rams were commercial Border Leicester, CSIRO Booroola Leicester, UNSW Border Booroola and Finnish Landrace. Growth rate was highest in Border Leicester-sired and Finn-sired lambs. Finn-sired lambs had relatively less fat over the 12th/13th rib but more abdominal fat than the other crosses.

INTRODUCTION

The meat sheep industry in Australia has developed from a limited base of imported breeds and with an emphasis on utilising aged and cull Merinos joined to Border Leicester (BL) rams to produce a dam for the breeding of prime lambs. Thus selection has largely been confined to growth rate and carcase characteristics, and has been concentrated in the terminal sire; the ram breed joined to the Border Leicester x Merino ewe. The obvious potential for increasing profitability through improving reproductive efficiency has not widely been exploited because of the difficulty and the perceived inappropriateness of selecting for fecundity in wool-producing Merinos. However, in recent years there has been a growing interest in on-farm efficiency of production and a realisation of the potential role of improved fecundity in contributing to an increase in efficiency.

Two sources of genes producing high fecundity are now available to the Australian meat sheep industry: the Booroola Merino Fec^b gene (Stafford and Earle 1990) and the Finnish Landrace (Maijala 1984). The Booroola gene which increases ovulation rate and litter size in the Merino and its crosses (Bindon et al. 1984) has been incorporated into the Border Leicester by CSIRO to generate 1/8 Booroola Merino x 7/8 BL rams (Booroola Leicesters) homozygous for the Fec^b gene.

The Finn has potential to contribute more to a modern meat production system than simply high fecundity among breeding crossbred sheep. The breed is noted for its lean carcase and high proportion of fat deposited internally relative to that deposited over the rib area of the carcase (Clarke et al. 1988). This characteristic has meant that while Finns and their crosses may have poorer carcase conformation than most recognised meat breeds, their proportion of saleable meat is similar to other breeds (Magid et al. 1981). Thus, with increasing emphasis on lean carcases and prepackaged meat and reduced fat on saleable cuts, the Finn may have a useful contribution to make to the Australian sheep meat industry.

The data presented here compare the growth rate and some carcase characteristics of wether lambs from ewes derived by mating Merino ewes to Finn, Booroola Leicester, Booroola Merino x Border Leicester or commercial Border Leicester rams.

MATERIALS AND METHODS

Growth from birth to market weight and carcase characteristics of four genotypes of crossbred wether lambs were compared at the UNSW field station at Hay as part of a comparison of the productivity of Finns and Border Leicester x Booroolas (Eppleston and Robards 1995). The lambs were produced by joining groups of about 250 adult medium-wool Merino ewes to one of four genotypes of ram :- a) CSIRO Booroola Leicester (CSIRO - 7/8 BL x 1/8 Booroola Merino) which were homozygous for the Fec^b gene : two homozygous rams were mated by artificial insemination (AI) from semen supplied by CSIRO, Armidale; b) UNSW Border Booroola (UNSW - 1/2 BL x 1/2 Booroola Merino) in which the Fec^b genotype of the rams was unknown, but is at a frequency of around 50% in the UNSW flock : five two year-old rams from the UNSW flock; c) 7/8 Finn x 1/8 BL (Finn) : five two year-old 7/8 rams from the UNSW Finn flock; and, d) Border Leicester (BL) : two flock rams each from three unrelated Border Leicester stud flocks.

After joining in February/March the Merino ewes were run together until lambing in late winter when they were separated into their four groups and inspected daily for the recording of date of birth, birth weight and birth status of the lambs. The lower number of lambs born in the CSIRO group (Table 1) was due to the fact that AI was used, however, there was no obvious reason for the low number of lambs in the Finn group. After weaning at an average of 12 week of age, all single-born wether lambs (19 CSIRO, 35 UNSW, 60 Finn, 64 BL) were allocated within each genotype to two nutrition groups in the ratio 2:1. Both groups were run on irrigated pasture, but the smaller group received ad libitum a supplement of palatable commercial ewe and lamb nuts (14% CP). Liveweights were recorded after a 16 hour fast at weaning and again 14 weeks later on 16-3-93. At this time all lambs heavier than 36.0 kg (101 or 56.7%, averaging 40.7 kg) were taken to Griffith abattoir for slaughter on 17-3-93. The remaining lambs were slaughtered seven weeks later at an average weight of 36.7 kg (range 22-45 kg). At slaughter, carcase weights, leg and carcase lengths, kidney/channel fat weight, and the GR fat depth were recorded.

The data were analysed by least squares analysis of variance (Harvey 1990) with a model that fitted effects due to sire genotype and nutrition treatment. Liveweight data was corrected for age and carcase data was corrected to a common carcase weight.

RESULTS

Single-born Border Leicester-sired wether lambs were heaviest ($P<0.05$) at birth, and similar to the results of Young and Dickerson (1991) Finn-sired lambs were heavier than either of the BL-Booroola genotypes at weaning and at 30 weeks of age (Table 1). Average daily growth rates favoured Border Leicester-sired (172.4 g/day) and Finn-sired (165.2 g/day) lambs in comparison to the BL-Booroola genotypes (CSIRO - 151.0 g/day; UNSW - 147.6 g/day), so that BL-sired lambs retained their superiority ($P<0.05$) through to 30 weeks of age (Table 1). Supplementation of one group of lambs only marginally (1.6 kg; $P<0.05$) improved liveweight to 30 weeks compared to the unsupplemented group.

The carcase measurements show that Finn-sired lambs had longer carcases ($P<0.05$) and longer legs ($P<0.05$) than carcases of the other crosses (Table 1). The carcase data also show that Finn-sired lambs had less depth of fat at the GR site and more kidney/channel fat than lambs of the other crosses, although the differences were not all statistically significant. Border Leicester-sired lambs produced the heaviest carcases (P<0.05; Table 1), with Finn-sired lambs producing similar weight carcases to CSIRO Border Booroolas but heavier carcases than UNSW Border Booroolas. Supplementation resulted in a significant increase in fat depth at the GR site (12.0 versus 10.6 mm; P<0.05), but had no significant effect on carcase measurements or weight of kidney/channel fat.

Table 1 : Liveweight and carcase characteristics (means •SEM) for single born crossbred wether lambs sired by Booroola Leicester (CSIRO), Border Booroola (UNSW), Finn or BL rams

Flock:	CSIRO	UNSW	Finn	BL
Number of lambs	21	41	64	64
Birth weight (kg)	4.1•0.2^{a}	4.5•0.1^{ab}	4.7•0.1^{b}	5.1•0.1^{c}
Weaning weight (kg)	17.7•0.9^{a}	19.3•0.8^{b}	21.6•0.7^{c}	21.5•0.8^{c}
30 week weight (kg)	35.8•1.2^{a}	35.5•0.7^{a}	39.4•0.6^{b}	41.3•0.6^{c}
Hot carcase weight (kg)	18.8•0.5^{ab}	17.7•0.4^{a}	18.8•0.3^{b}	20.0•0.3^{c}
Carcase length (cm)	106.0•0.5^{a}	105.2•0.4^{a}	107.2•0.3^{b}	105.8•0.3^{a}
Leg length (cm)	25.2•0.3^{a}	25.5•0.2^{a}	26.8•0.2^{b}	25.3•0.2^{a}
Carcase GR (mm)	13.1•0.6^{a}	10.9•0.4^{bc}	10.2•0.3^{b}	11.1•0.3^{c}
Kidney fat wt. (kg)	0.6•0.04^{ab}	0.6•0.03^{ab}	0.6•0.02^{a}	0.5•0.02^{c}

a,b,c - means within rows with different letters are significantly different at P<0.05.

DISCUSSION

The longer legs and carcases of the Finn-sired lambs in this study are in keeping with Donald and Read (1967) and Clarke et al. (1988). Similarly, the thinner subcutaneous layer and greater quantity of internal fat in these Finn-sired lamb carcases was similar to the observations of Maijala and Osterberg (1977) and Olthoff and Boylan (1991). The distribution of fat away from retail cuts and the relatively good weight of carcases in these 50% Merino lambs, indicates that Finn crosses may have considerable potential for lamb production in Australia, particularly with the increasing emphasis on lean carcases. Further studies are required to assess the effect of different proportions of Finn genes in crosses with Merino on the growth and particularly the carcase attributes of market lambs.

Supplementation of grazing lambs in this study only marginally improved growth and caused an increase in GR fat depth. However, the top growth rate of 172 g/day was probably about 100 g/day below the genetic potential of most, if not all, of these crosses if fed to optimum nutrition. Thus, potential differences in maximum growth rates of the crosses may not have been expressed, and the significance of reduced external fat deposition in Finn sheep may not have been fully demonstrated. The impact of the Finn gene needs further assessment with better availability or quality of pasture throughout the lamb's growing period, or with more effective supplementation.

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