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PRODUCTION OF PRIME LAMBS FROM COOPWORTH EWES

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SUMMARY

Three trials were conducted to examine the performance of the Coopworth ewe as a prime lamb mother. Two hundred crossbred lambs sired by Dorset Down rams were used. Coopworth crossbred lambs suckled by their mothers on ryegrass-white clover pasture, and stocked at 22 ewes/ha (9/ac), achieved slaughter weights between 80 and 100 days of age. Growth rates were particularly fast during early lactation (300 g/day), but decreased later to 200 g per day. A breed comparison showed that Coopworth progeny grew faster at all stages to slaughter than those from Romney or Merino ewes. In this trial liveweight gains to slaughter weights were maintained by weaning on to lucerne but Coopworths remained superior because of heavier birth and weaning weights. Body composition studies indicated that Coopworth crossbred lambs were earlier maturing than those of Romneys.

It was concluded that interbreeding programmes aimed at upgrading New Zealand prime lamb flocks should include parameters in the selection index that relate to meatiness.

THE AIM of developing the Coopworth breed, by interbreeding Border Leicester \times Romney sheep was to incorporate the attributes of higher fecundity and better mothering ability, characteristics of the Border Leicester, into the interbred animal (Clarke, 1962; Coop and Clark, 1965). In terms of sheep production, first cross ewes (F_1) are superior to Romney ewes (Coop and Clark, 1965; Quinn, 1968; Hight and Jury, 1970) and Coop (1967) considers that intensively selected F_3 sheep perform similarly to those of the F_1 generation.

There are no data in the literature on the growth rate and composition of prime lambs from Coopworth ewes. Since Coopworths are being used widely in New Zealand, the purpose of this paper is to present data on the crossbred progeny of these dams.

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EXPERIMENTAL

Three trials were conducted in 1970 using 200 crossbred lambs sired by Dorset Down rams.

In Trial 1 the specific growth rates of 50 suckled lambs from Coopworth ewes were determined according to sex and birth number. The ewes grazed ryegrass-white clover pasture at 22/ha (9/ac) from late August to early December.

In Trial 2 the growth rates of the progeny of 54 Coopworth, 56 Romney and 18 Merino ewes, were compared. Lambs were run initially with their mothers on ryegrass-white clover pasture during the August-September period. At 4 weeks of age they were weaned and breakgrazed on lucerne pasture until drafting in December.

In Trial 3 the body composition of 10 Coopworth crossbred wether lambs was compared with that of 12 crossbred lambs from Romney ewes. Lambs were suckled by their mothers on ryegrass-white clover pasture until slaughter. They were selected for slaughter over a wide range of live-weights and the chemical composition determined using methods described by Jagusch and Mitchell (1971). The data were statistically evaluated by analysis of covariance of logarithmic regression lines relating individual body components to body or carcass weight (Seebeck, 1968; Jagusch and Nicol, 1970).

RESULTS

Mean values, with their standard errors, for the live-weights of the lambs in Trial 1 are given in Table 1. The values show that marketable weights of the various groups were achieved from 80 to 100 days of age. Mean liveweight gains for the three periods given in Table 1 were 301, 283 and 206 g per day, respectively. Higher rates of gain were achieved when the lambs relied entirely on milk in early

TABLE 1: MEAN LIVeweIGHTS, WITH THEIR STANDARD ERRORS (kg), FOR DORSET DOWN \times COOPWORTH LAMBS

Age (days)	Single		Twin	
	Wethers (10)	Females (11)	Wethers (13)	Females (16)
0	5.2 \pm 0.4	4.9 \pm 0.3	4.0 \pm 0.2	4.1 \pm 0.1
28	14.1 \pm 1.0	13.7 \pm 0.7	11.1 \pm 0.5	10.5 \pm 0.4
60	24.5 \pm 1.1	22.0 \pm 1.0	21.6 \pm 0.8*	19.8 \pm 0.8*
100	32.9 \pm 1.2	30.5 \pm 1.2	29.7 \pm 1.2*	27.8 \pm 1.0*

*Reared as single on the ewe after 28 days.

lactation and decreased as the contribution of pasture to total energy intake increased (Joyce and Rattray, 1970; Jagusch and Coop, 1971).

Linear regression equations were calculated for the relationships between liveweight and age of the Dorset Down \times Coopworth (C), Romney (R), and Merino (M) lambs used in Trial 2. The equations were:

$$LW_C = 0.294 A + 5.186 \quad (1a)$$

$$RSD = \pm 0.823; r = +0.99$$

$$LW_R = 0.277 A + 4.720 \quad (1b)$$

$$RSD = \pm 0.603; r = +0.99$$

$$LW_M = \pm 0.247 A + 4.216 \quad (1c)$$

$$RSD = \pm 0.435; r = +0.99$$

where LW = liveweight (kg), A = age (days), RSD = residual standard deviation and r = correlation coefficient. An analysis of covariance showed that the regression coefficients in equations (1a)-(1c) differed significantly ($P < 0.01$) indicating relative gains of 294, 277 and 247 g per day for C, R, and M lambs, respectively. The adjusted mean liveweights were also significantly different and at 100 days the breed means (with standards errors) were 34.6 ± 0.7 , 32.4 ± 0.5 , and 28.6 ± 0.4 kg, respectively. Weaned lambs fed on lucerne maintained preweaning gains compared with lambs suckled by the ewe on ryegrass-white clover pasture.

Allometric growth coefficients for water, fat, protein and ash in the whole bodies of lambs in Trial 3 are given in Table 2. The coefficients represent the relative growth rates

TABLE 2: ALLOMETRIC GROWTH COEFFICIENTS FOR DORSET DOWN \times COOPWORTH (C) AND ROMNEY (R) LAMBS

	<i>Water</i>	<i>Fat</i>	<i>Protein</i>	<i>Ash</i>
DD \times C (10)	0.81	1.90	0.92	0.92
DD \times R (12)	0.91	1.70	0.96	0.94

TABLE 3: CARCASS FAT AND MUSCLE CONTENT (%) OF DORSET DOWN \times COOPWORTH (C) AND ROMNEY (R) LAMBS

<i>Carcass wt</i> (kg)	<i>Fat</i>		<i>Muscle*</i>	
	<i>DD \times C</i>	<i>DD \times R</i>	<i>DD \times C</i>	<i>DD \times R</i>
5	10.8	11.7	86.7	83.0
10	20.2	18.5	74.8	77.3
15	29.2	24.9	68.7	74.1

*Water plus protein

of the various chemical components (Huxley, 1924). Covariance analyses showed that there were significant differences ($P < 0.01$) between breeds in the relative rates of water deposition, while that for fat and protein approached significance. These results suggest that the lambs from Coopworth ewes used in the present experiment were earlier maturing than those from Romney ewes. The data in Table 3 showing the proportion of fat and muscle in the carcass support this contention. It can be seen that with growth to slaughter weights the composition of the gain in Dorset Down \times Coopworth lambs contains more fat and less muscle than Dorset Down \times Romney lambs.

DISCUSSION

The results given in the present paper show that the Coopworth ewe grazed on lowland pastures in New Zealand is a suitable prime lamb mother. Attributes such as heavy birthweight of lambs, early rapid growth rates, and relatively heavy weights at weaning were particularly striking compared with other breeds used in the experiment. However, it is disconcerting to find that selection for these traits may not have produced a later maturing, meatier prime lamb than that from Romney ewes. This finding is unusual as the major difference between the Coopworth and the Romney is the Border Leicester component and it could reflect the situation in the flock at Lincoln College from which experimental animals were obtained. Therefore, in interbreeding programmes where intensive selection is practised, the inclusion of parameters that indicate meatiness (*e.g.*, ribeye area, backfat thickness) into a selection index is important. Unless late maturing breeds that produce lambs with the potential for rapid growth rate are developed, the problem of over-fat, relatively light-weight carcasses will continue in the New Zealand prime lamb industry.

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