SELECTION FOR YEARLING GAIN IN CATTLE

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Growth rate appears favourably correlated with efficiency of gain, but little is known about genetic correlation with many other traits. This provides an unsatisfactory basis for formulating selection programmes. Selection lines were established at Trangie Agricultural Research Station in 1974 to determine the nature and magnitude of correlated responses to selection for average daily gain from birth to 12 months of age. Lines selected for high (H) or low (L) gain and a randomly selected control (C) line were drawn from a herd of Angus cattle. Each selection line contains 85 females and five sires while the control line contains 50 females and 10 sires. All sires are replaced annually. Stock are grown on pasture but bulls are supplemented with grain from weaning to 12 months.

Analyses of variance were used to determine the responses obtained in the first generation (1975 and 1976 progeny) for a number of traits. The uncorrected mean weights at 12 months in the control line were 272.8 and 351.8 kg for heifers and bulls respectively. Divergence between the H and L lines was significant for most measures of growth and skeletal size (Table 1). The divergence in 12 month weight was similar for both sexes and averaged 20.0 kg ($P<0.05$). Weaning gain

TABLE 1: Least squares estimates of between line differences.

Trait	Females		Males	
	H-C	H-L	H-C	H-L
Birth weight (kg)	1.80*	2.49*	0.31	0.63
Weaning gain (kg)	4.70	12.16*	7.72*	10.34*
Postweaning gain (kg)	1.64	5.06	7.65*	9.27*
Yearling height (cm)	1.51*	2.03*	1.31	2.15*
Yearling length (cm)	2.39*	2.95*	1.31	2.31*
Pelvic height (cm)	0.25	0.53*	0.09	0.20
Pelvic width (cm)	0.07	0.28	0.46*	0.32

contributed 56.4 per cent to this response. This was much higher than Anderson, Fredeen and Weiss (1974) reported (19.4 per cent) in lines selected for high yearling weight. Estimates of realised genetic correlations between yearling gain and birth weight, weaning gain, postweaning gain and yearling weight were 0.63, 1.36, 0.80 and 1.94 respectively, estimated from the ratio of mean correlated response to mean direct response, using heritabilities derived from the base herd (Barlow and Dettmann unpublished). The ratio of birth weight to pelvic area was unaltered by selection. These preliminary results are encouraging as they suggest that selection for yearling gain at pasture may increase early growth relative to later gains and the incidence of calving difficulties should not increase among heifers.

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