

## EFFECT OF SELECTION FOR INCREASED MUSCLING ON EARLY FEMALE REPRODUCTIVE POTENTIAL

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Selection for increased muscling in cattle has great potential to increase the value of the carcass and improve profitability of the beef industry by increasing retail beef yield. Carcass traits are usually considered in the context of slaughtered animals, but the overall productivity and profitability of the herd is very dependent on the fertility of the breeding unit. Age at puberty is an important parameter of fertility as it sets the earliest possible start to a female's reproductive life, which in turn impacts on her lifetime performance. We assessed early reproductive potential in Angus heifers in a herd selected for increased or decreased muscularity.

The 69 heifers used in this study were bred in a herd selected for increased and decreased muscularity (assessed by visual muscle score), described by McKiernan and Robards (1997). As well as the divergent selection groups, there was also a group of unselected animals of similar breeding. All heifers were born in spring 2001 and were examined 4 times from December 2002 (approx 13 months old) to November 2003 (24 months old), the last observation being just prior to their first mating. On each occasion the animals were weighed and assessed for fatness. Their ovaries were examined *per rectum* by realtime ultrasound imaging, using an Aloka SSD 500 unit fitted with a 7.5 MHz probe. Both ovaries were inspected for the presence of a *corpus luteum* (CL) and developing follicles. The presence of follicles larger than 5 mm in diameter was described, with those of 10 mm or greater being indicative of potential ovulation. Thus, heifers were classified as having ovulated (CL present) or with 'active' ovaries. The ovarian data were analysed by the Genstat REML procedure, using liveweight and fatness as covariates, and accounting for variation between sires.

**Table 1. The effect, on 4 occasions, of heifers selected for increased (High) or decreased (Low) muscularity, or unselected, on the proportions ovulated (with corpus luteum (CL)) or with 'active' ovaries (with CL or with follicles  $\geq 10$  mm). Ovarian data are presented as raw means with least squares means (l.s.m.) in parentheses.**

		6/12/02	8/4/03	19/5/03	25/11/03
Mean liveweight(kg) (n)	High	243 (23)	322 (16)	342 (16)	390 (16)
	Low	234 (23)	310 (15)	330 (15)	387 (15)
	Unselected	230 (23)	306 (10)	330 (10)	403 (10)
Proportions with CL (l.s.m.)	High	0.43 (0.42)	0.56 (0.52)	0.88 (0.79)	0.94 (0.94)
	Low	0.43 (0.54)	0.60 (0.67)	0.73 (0.81)	1.00 (1.00)
	Unselected	0.13 (0.16)	0.60 (0.65)	0.90 (0.92)	1.00 (1.00)
Proportions with "active" ovaries (l.s.m.)	High	0.78 (0.73)	0.88 (0.84)	1.00 (0.96)	1.00 (1.00)
	Low	0.61 (0.63)	0.73 (0.76)	0.93 (0.97)	1.00 (1.00)
	Unselected	0.43 (0.48)	0.80 (0.83)	1.00 (1.00)	1.00 (1.00)

The proportions of heifers ovulating rose considerably over the first 3 observation times, with most having "active ovaries" status by about 18 months of age (Table 1). The differences between the groups in the ovarian parameters examined were not significant. There was, however, a significant effect of liveweight ( $P < 0.05$ ), causing some apparently larger, but non-significant differences in the least squares means due to the heavier weights of the "high" line. The results suggest that there is unlikely to be any detrimental effect on early female fertility as a consequence of selection for increased muscularity in the herd.

MCKIERNAN, W.A. and ROBARDS, G.E. (1997). *Proc. Assoc. Advmt. Anim. Breed. Genet.* **12**, 77-80.

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