The effect of growth rate selection and stocking rate on milk production of Angus cows

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Beef producers in Australia have placed a great deal of emphasis on growth rate selection. Selection for growth rate produces faster growing and bigger animals at all ages (Parnell et al. 1994). However, the resultant effect on cow milk production, particularly at different stocking rates (SR) is less certain.

Mixed age autumn calving cows from 3 lines (Line) selected since 1974 for high (H) and low (L) yearling liveweight, together with a randomly selected control line (C) were set stocked at 0.8, 1.2, 1.6, and 2.0 cows per hectare. In 1990, 1991 and 1992 milk production of the cows was measured using the calf “weigh suckle weigh technique”. In 1990, milk production was measured approximately 84, 126, 168 and 203 days after calving (Days). In 1991 and 1992, measurements were taken at 14, 50, 107, 169 and 128, 166 and 226 Days respectively. These measurements were converted to 24 hour milk yield (Milk), averaged to obtain mean milk production for each SR and Line for each year, and analysed by analysis of variance.

The effect of year was significant, with respective means for 1990, 1991, and 1992 being 4.7, 5.6 and 4.8 kg Milk, ($P<0.01$; SED = 0.203). There was no interaction between year, Line ($P=0.32$) or SR ($P=0.78$).

Both Line (4.5, 5.2 and 5.5 kg Milk for L, C and H respectively; $P<0.013$; SED = 0.29) and SR (5.8, 5.6, 4.6 and 4.1 kg Milk for 0.8, 1.2, 1.6, and 2.0 cows/ha respectively; $P<0.001$; SED = 0.33) influenced Milk. The effect of year could be partly attributed to the fact that in 1991 the first and final measurements commenced and ended earlier in the lactation period than the other 2 years, thus being at slightly different stages of the lactation curve.

Multiple regression analysis using the terms Milk, Line, Days and Days$^2$ (model: $y = a + bx + cx^2$) indicated that the H line dams produced significantly more milk earlier in lactation than the L line dams ($P<0.002$). There was no significant difference between the L and C line.

These results indicate the significant influence of stocking rate on milk production, with up to a 35% decrease in milk production between stocking rates of 0.8 and 2.0 cows/ha. Whilst selection for growth gives a correlated increase in milk production early in the lactation period, this effect decreases over time, and at 4 to 5 months post calving the differences are negligible.