

## THE EFFECT OF OVARIAN DYNAMICS ON CONCEPTION RATE TO ARTIFICIAL INSEMINATION IN ANGUS COWS

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Conception rates of post-partum cows in artificial breeding programs can be very variable, with many producers reporting problems with heat detection and lack of response to synchronisation protocols (Boothby *et al.* 1992). This study examined some factors likely to contribute to this variability, which include ovarian activity, body condition and the size of the largest follicle before synchrony treatment.

Commercial herds of multiparous Angus cows were mated in two successive years. In October 1994 (a drought year), 103 cows were condition scored, weighed and their ovaries examined by realtime ultrasound (Aloka 210DXII) to record the presence or absence of a corpus luteum (CL) and describe the follicle population just prior to the commencement of synchronisation. Cows were a mean 6.5 years old, with means and s.e. of  $376 \pm 4.7$  kg liveweight,  $2.4 \pm 0.07$  condition score and  $73.1 \pm 1.1$  days post-partum. Oestrous was synchronised using either CIDR-B (Carter Holt Harvey, NZ) or Crestar (Intervet Pty. Ltd.) regimes of nine days duration, with 500 i.u. of PMSG (Folligon) given at withdrawal. Oestrus was monitored using Kamar heat detectors and cows were artificially inseminated 12 hours after detected oestrus. All cows not detected were 'blanket' inseminated at 54 to 56 hours after device withdrawal. Cows were joined with 'back up bulls' 21 days later and pregnancy was diagnosed around day 90 using real time ultrasound. In 1995, 75 cows (7.3 years old,  $533 \pm 5.7$  kg liveweight,  $4.5 \pm 0.05$  condition score and  $68.6 \pm 1.0$  days post-partum) were mated, using only Crestar synchronisation. All other procedures were the same as for 1994. Conception rates and behavioural oestrus were treated as discrete events, and the effects of condition score, liveweight, ovarian status and synchronisation-treatment were examined using a generalised linear models procedure with a log-link function.

Few cows were cycling (2.9% with CL) in 1994 when body condition scores were low, compared with 52.6% with a CL in 1995 when the cows were in better condition. The conception rate in 1995 was significantly higher than for the previous year (47.2 vs 27.8;  $P < 0.05$ ). Within both years there was a significant positive effect ( $P < 0.05$ ) of body condition score on conception rate, condition score explaining a greater proportion of the variation in conception than live weight.

Across years there was a trend for higher conception rates to AI for cows cycling prior to synchronisation (with a CL) compared to those not cycling (52.4 vs 30.9%; n.s.), an effect consistent with other studies (Wilkins and Hoffman 1997). Differences between groups in the proportions of cows showing oestrus were not significant. In 1994 there was a significant ( $P < 0.05$ ) effect of the size of the largest follicle at initiation of synchronisation on conception rate, with a higher rate when follicles were  $< 6$  mm (57%) than for follicles 7 to 10 mm (29%). In 1995 conception rate of cows with follicles  $< 6$  mm was 67.2%, with follicles 7 to 10 mm was 32.2%, and for those  $> 11$  mm conception rate was 56% ( $P < 0.05$ ).

These data indicate that conception rates in synchronised AI programs may be influenced by a number of factors including condition score of the cows, prior cyclicity, and the follicle population of the ovaries at the commencement of synchronisation. Our results are consistent with the evidence of Thatcher *et al.* (1996) that the timing of the start of progesterone therapy in relation to the stage of the current follicle wave may affect follicle development. This may cause persistence of the dominant follicle and lower conception rates.

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