

A PRELIMINARY STUDY ON DOMINANCE, TEMPERAMENT AND CORTISOL LEVELS
IN DROUGHTMASTER HEIFERS

I. RUBIO, J.K. BLACKSYAW, Y.J. CHENOWETH and A.W. BEATTIE

Studies of the social hierarchy in domestic cattle have been mainly conducted with *Bos taurus* genotypes. Social relationships among cattle have been shown to influence reproduction, production and welfare aspects. 'Good' temperament has been positively related to production measures such as growth rate (Fordyce et al. 1985). Stress induced by handling and management can influence blood hormone levels. The measurement of blood cortisol levels is of value in identifying stress factors and elevated blood cortisol levels have been associated with lowered reproduction (Echternkamp 1984).

The present work was conducted with 10 Droughtmaster heifers (average age and weight 435 days and 392 kg respectively) to compare hierarchy and different reactions to handling, with cortisol levels and physical characteristics of the animals. It consisted of two parts. The first part included studies on dominance rank order, and the second part included studies on temperament and cortisol.

Agonistic encounters decreased over the 4 observation days and during the 3 observations taken during the day. The repeatability from day to day of agonistic encounters in individuals was high ($r = 0.79$; $P < 0.01$). There was a positive relationship between the number of agonistic encounters initiated by an individual and both live weight and condition score ($r = 0.74$; $P < 0.05$ and $r = 0.64$; $P < 0.10$ respectively). The dominance rank order of the animals was maintained over the 4 days of observation (Coefficient of Concordance $W = 0.95$; $P < 0.01$). Temperament (period 2) as assessed by order of entry to the race and behaviour both in the race and in the crush showed significant repeatability ($r = 0.28, 0.32, 0.29$ respectively; $P < 0.01$). Table 1 shows the mean cortisol levels obtained on 7 occasions during period 2. The average decline was 0.31 nmol/handling (day).

Table 1 Mean cortisol levels at sequential handlings during period 2

<u>Day</u>	<u>Cortisol level (nmol/l)</u>
0	71.2
15	62.9
31	56.6
42	56.8
53	57.4
56	58.4
79	40.7

Standard error of means: 5.2.

The decrease in cortisol observed with subsequent handling could be related to a learning experience, with animals being less 'stressed' with each handling. Overall, individual heifers showed low, although significant repeatability ($r = 0.38$; $P < 0.01$) in cortisol levels from one observation to another. There were no significant relationships between dominance rank order, order of entry into the crush, reaction to handling in crush and cortisol levels. However, there was a positive relationship ($r = 0.74$; $P < 0.05$) between reaction to handling in the crush and cortisol levels.

ECHTERNKAMP, S.E. (1984). *Theriogenology* 22:305.

FORDYCE, G., GOODARD, M.E., TYLER, R., WILLIAMS, G. and TOLEMAN, M.A. (1985). *Aust. J. Exp. Agric.* 25:283.