

## STRESS AND BRUISING IN CATTLE

J.L. BARNETT\*, G.A. ELDRIDGE\*, I.P. MCCAUSLAND\*\*, I.W. CAPLE†, H.W.C. MILLAR†, T.G. TRUSCOTT† and T. HOLLIER\*

The harvesting of meat animals involves a series of handling and transport procedures which may lead to physiological stress and physical injury with a consequent reduction in the yield and quality of meat produced (Lister 1979; Grandin 1980; Wythes et al. 1982). In Victoria the majority of bruising of cattle occurs within a few hours prior to slaughter (McCausland and Millar 1982). The following experiment was to test the hypothesis that susceptibility to bruising was associated with the physiological state (stress responsiveness) of the animal.

Three physiological conditions, chronic, acute and no applied stress (control), were induced in 49 Angus x Shorthorn cows. Chronically stressed cows (16) were drafted from the other two groups each day for eight days and then restrained for 2 h in a 'Squeeze' race and confined for a further 2 h in a yard. On the ninth day the cows in the acute stress treatment (16) were given an intramuscular injection of 350 i.u. adrenocorticotrophic hormone (ACTH) while the other two groups received an injection of saline. Two hours later all cows were bruised 50 mm posterior to the spine of the scapula using a modified captive bolt pistol. Samples of blood taken during the treatment period were analysed for plasma free corticosteroid concentrations. On the day of bruising the cows were transported 18 km to an abattoir, and 24 h after the bruising had occurred they were slaughtered; the experimentally bruised tissue was removed from the carcass and weighed.

The chronically stressed cows had significantly more bruised tissue than the acutely stressed cows ( $P < 0.05$ ), while the controls were not significantly different from either of the other groups (265, 153 and 190 g, respectively). Chronically stressed cows had higher ( $P < 0.05$ ) free plasma corticosteroid levels than the acute or control treatment cows on entry to the race on the day of bruising (1.6, 1.2 and 1.1 ng/ml, respectively). Twelve min after entering the race (the time of maximum corticosteroid response to stressors) the levels were 1.7, 1.5 and 1.5 ng/ml for the chronic, acute and control treatments. The within treatment differences between the values on entry to the race and 12 min later show that adrenal responsiveness was inhibited in the chronic stress treatment. Two hours after the injection of ACTH or saline (the time of maximum corticosteroid response to i.m. ACTH) the levels were 1.6, 4.8 and 0.9 ng/ml, respectively.

These results suggest that chronic stress suppresses the adrenocortical responses to the short term stressors of preslaughter handling and transport which in turn increases the susceptibility to bruising. If this is so, it may help account for the variation in the amount of bruising found in different lines of cattle at slaughter.

LISTER, D. (1979). Acta Ag. Scand. suppl. 21: 281.

GRANDIN, T. (1980). Int. J. Stud. Anim. Prob. 1: 313.

MCCAUSLAND, I.P. and MILLAR, H.W.C. (1982). Aust. Vet. J. 58: 253.

WYTHES, J.R., ARTHUR, R.J. and MEISCHKE, H.R.C. (1982). Aust. Soc. Anim. Prod. 14: 116.

---

Department of Agriculture, Vic.

\* Animal Research Institute, Werribee 3030.

\*\* Regional Veterinary Laboratory, Bairnsdale 3875.

+ Attwood Veterinary Research Laboratory, Westmeadows 3049.

† Wellington Parade, East Melbourne 3002.