EFFECT OF STOCKING RATE ON HEART RATE AND PERFORMANCE OF FEEDLOT CATTLE

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Pen space has been mooted as a factor influencing stress in feedlot cattle. Suggested minimum pen size vary from 9 m^2/hd - Australian Lot Feeders Association to 25 m^2/hd - Australia New Zealand Federation of Animal Societies (Senate Standing Committee 1992), although there is little or no scientific data to support these recommendations. In commercial situations stocking rates of less then 16 m^2/hd are common. In some situations rates of less then 9 m^2/hd are also seen.

Stress is not easy to measure (Ewbank 1992). Blood parameters such as the levels of cortisol and triiodothyronine (Friend *et al.* 1985) as well as heart rate may be useful indicators of stress. The heart responds to stress by beating faster as stress related hormones are released (Ewbank 1992). The techniques involved in measuring these parameters often involve handling and restraint which in turn may increase the level of stress. Environmental temperature (O'Neill and Kemp 1989) and feed intake are also known to influence heart rate.

The effect of 2 stocking rates on heart rate in Hereford heifers (mean liveweight of 362 kg) were compared with heart rate being used as an indicator of stress.

Six months prior to the start of the study 6 heifers had heart rate radio transmitters (Telonics, Mesa, Arizona) implanted sub-cutaneously in the flank, to monitor heart rate. Individual heart rate was measured in these animals and recorded to a data logger every 15 minutes for 28 days.

Two stocking rate treatments were used with equal numbers (n = 10) in each treatment. The treatments were T1 where heifers were housed at 4 m^2/hd and T2 where the stocking rate was 16 m^2/hd. The heifers were randomly allocated to T1 or T2 with 3 of the implanted heifers placed in each treatment group. After 14 days the stocking rate for treatment groups was reversed. Shade was provided in both yards at 3.32 m^2/hd, with feed and water being available *ad libitum.* A low quality roughage was placed into troughs twice each day at 0830 and 1600 hours. Refusals were removed and weighed each morning. A low quality roughage was used to avoid a heart rate response often seen when energy dense feedstuffs are used (Brosh pers comm). Environmental temperature was recorded every 2 minutes. The results for heart rate are shown in Table 1.

Table 1. Least square means (± s.e.m) for heart rate (beats/minute) for heifers housed at 4 m^2/hd and 16 m^2/hd

	4 m^2/hd	16 m^2/hd	Significance
Period 1	61.64 (0.23)	61.14 (0.33)	n.s.
Period 2	58.26 (0.18)	57.97 (0.24)	n.s.

Heart rates which ranged from 48 to 99 beats/minute were within the normal range for cattle (Rometsch and Becker 1993). Variations in heart rate showed a fairly consistent diurnal rhythm generally following environmental temperature and feed intake. There were no significant differences ($P > 0.05$) between heart rate and treatment. Growth performance and feed intake were also not significantly different ($P > 0.05$) between treatments. The results indicated that a reduction in pen size from 16 m^2/hd to 4 m^2/hd did not increase stress levels as measured by heart rate in feedlot cattle.

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