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The heat is on in Western Australian summer feedlots

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Feedlots are important in both fattening of lambs prior to slaughter and familiarizing sheep with a pellet diet prior to live export. Feedlotting is prominent in Western Australia, with 19% of prime lamb producers identifying feedlotting as their main finishing method (Connell et al. 2002). Anecdotal reports are that temperatures within a Western Australian feedlot during summer can often be in excess of 40˚C. Past research has shown that excessive heat load is a problem with lotfed cattle (Hahn and Nienaber 1993); however, the extent of the problem in sheep is unknown. Previous work has shown that high temperatures combined with the high energy diet fed in feedlots can contribute to heat stress of the sheep (Riek et al. 1950). This heat stress may lead to a decrease in feed intake and therefore productivity of the animal (Clark and Quinn 1947). The aim of this study was to determine environmental conditions in a Western Australian feedlot during summer and to determine the core temperature of both wethers and ewes within this feedlot. The hypothesis was that sheep exposed to feedlot conditions during summer would have an increased core body temperature above normal.

Three cross-bred ewes (35.2 kg ± 0.93) and three cross-bred wethers (36.0 kg ± 1.26) were surgically implanted with core temperature loggers. These loggers recorded core temperature of the sheep every 15 minutes until their removal. Sheep were held in a feedlot for a period of 40 days during February and March. Sheep were fed pellets and hay adlib and had water available adlib. Sheep had access to shaded areas while in the feedlot. Individual behaviour of the six sheep was monitored from 0900 to 1600 on four of the days that sheep were in the feedlot. Climatic conditions within the feedlot were monitored during the study using temperature data loggers and a weather station.

Both the ewes and the wethers had increased core body temperatures above normal during their time in the feedlot ($p < 0.05$). During the times behaviour was monitored, the sheep spent significantly more time resting in the shade then resting in the sun or eating ($p < 0.01$). There was no significant difference in the behaviour between the ewes and wethers. The dry bulb temperature reached a maximum at or above 35˚C on 20 out of the 40 days that sheep were in the feedlot.

Table 1. The mean daily minimum, mean daily maximum and mean for the entire study of the core temperature of ewes and wethers, environmental temperature and solar radiation within the feedlot ± SE.

	Core temperature of Ewes (˚C)	Core temperature of Wethers (˚C)	Environmental dry bulb temperature (˚C)	Solar radiation (W/m^2)
Daily mean	$39.46^{a} \pm 0.1$	$39.86^{b} \pm 0.2$	24.10 ± 0.2	173.32 ± 18.1
Mean minimum	$38.76^{a} \pm 0.1$	$39.32^{b} \pm 0.2$	16.15 ± 0.5	0
Mean maximum	$40.12^{a} \pm 0.1$	$40.40^{a} \pm 0.2$	34.67 ± 0.8	619.02 ± 64.3

Within rows, means with different superscripts differ significantly ($P<0.50$)

The results of this study demonstrate that both ewes and wethers did increase core temperature above normal while in the feedlot. Other studies have shown that increased core temperature above normal is associated with a decrease in feed intake (Clark and Quinn 1947) and changes in acid base physiology (Hales and Webster 1967) of the animal. More intensive studies will examine whether

such physiological changes take place in sheep during a feedlot in summer, to determine if there are deleterious effects of heat stress on production of sheep in summer feedlots.

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