Proc. Aust. Soc. Anim. Prod. 1994 Vol. 20

REPRODUCTIVE SEASONALITY IN MALE AUSTRALIAN CASHMERE GOATS

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Seasonal variation in a range of reproductive variables has been previously described in cashmere bucks (Walkden-Brown *et al.* 1994). In other species, including the sheep, such changes are often driven by photoperiod and mediated by changing responsiveness of the hypothalamic GnRH pulse generator to negative feedback from gonadal steroids (Legan *et al.* 1977). We tested this mechanism in 3 year-old grazing bucks at Wollongbar (29°S,153°E) by comparing luteinizing hormone (LH) concentrations over 2 years in entire bucks, recently castrated bucks and recent castrates implanted with testosterone (4 x Ropel® pellets every 12 weeks) or oestradiol (2 x silastic implants, internal length 25 mm, diameter 2 mm) (n = 6/group). Three blood samples were collected each week 40 minutes apart and pooled to form a single sample. These were assayed for LH and testosterone by RIA. Scrotal circumference was also measured weekly in entire bucks. Monthly means of these measurements were analysed by repeated measures ANOVA.

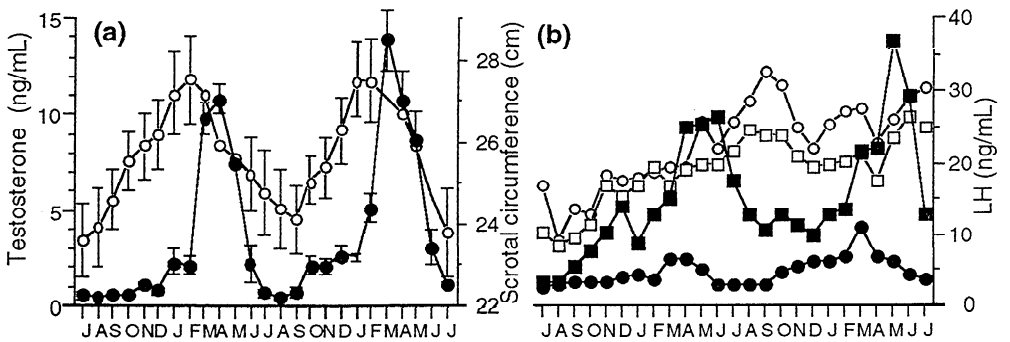

Figure 1. (a) Scrotal circumference (open circles) and plasma testosterone concentrations (closed circles) in entire bucks. (b) Plasma luteinizing hormone concentrations in entire bucks (closed circles) and castrates (open circles), and castrates implanted with testosterone (open squares) or oestradiol (closed squares)

Entire bucks showed clear circannual cycles of LH and testosterone concentration with peaks in early to mid autumn (Figure 1a,b). These cycles lagged 1-2 months behind that of testicular size which peaked in late summer, at the same time as liveweight. In castrated bucks LH concentration rose in the 2 weeks following castration then fell to lower concentrations over the next 4 weeks. Subsequently it rose to a peak in September of the second year beyond which it did not vary significantly. Implantation with testosterone had no effect on LH concentration, despite inducing physiological concentrations of testosterone (1.2 ± 0.08 ng/ml). On the other hand, implantation with oestradiol ablated the acute post-castration rise in LH levels and induced a significant circannual pattern of LH concentration although this cycle was of greater amplitude and delayed by some 2 months compared with that seen in entire bucks. These findings confirm the seasonal nature of reproduction in cashmere bucks and suggest that oestradiol rather than testosterone is the steroid of greatest importance in the seasonal regulation of LH secretion. However, the seasonal LH profile in oestradiol implanted castrates differed from that in entire bucks suggesting that the actions of oestradiol may be modulated by other testicular products.

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