

## THE INFLUENCE OF PHOTOPERIOD AND ENDOCRINE STATUS ON SEASONAL REPRODUCTIVE BEHAVIOUR IN THE MALE FALLOW DEER

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The fallow deer (*Dama dama*) is one of the major deer species used commercially in Australia. The fallow buck, as with other male deer, shows highly seasonal sexual activity which is associated with a markedly depressed feed intake.

Asher et al. (1987) have shown that the onset of sexual activity in the fallow buck corresponds with the seasonal decrease in daylength and that treatment with melatonin for 45 days at the summer solstice advanced testicular activity. In this study we have investigated the effect of artificially altering daylength and of administering melatonin on feed intake and endocrine status of the animals.

Fallow bucks were kept in individual pens with controlled lighting at Badgerys Creek, near Sydney (lat. 34°) and offered *ad libitum* a pelleted mixture of lucerne hay and oats (6:4 w/w) for a period of 32 weeks commencing early December. The bucks comprised three groups - (i) control group (n=6), exposed to natural photoperiod, (ii) long day (LD) group (n=9) exposed to a 16L:8D photoperiod, and (iii) long day + melatonin (LD+M) group (n=5) given two melatonin implants (Regulin) each month from December to February to mimic short daylengths. Feed intake was measured and venous blood samples for hormone assay were collected weekly.

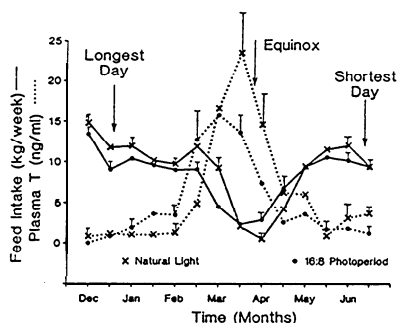


Fig. 1. Changes with time in feed intake and plasma testosterone (T) concentrations of bucks exposed to natural (x) (control) or long daylength (LD) (•).

The feed intake of the control group began to decline in early March and reached its minimum five weeks later (Fig. 1); the LD group showed a similar change (but its onset was about one week earlier). Feed intake decline with the LD+M group was of similar magnitude to the other groups but it began some five weeks earlier. Plasma T concentrations in the control and LD groups closely reflected feed intake (Fig. 1); the situation was similar for the LD+M group with the exception that the maximum T value ( $24 \pm 6$  ug/l) was recorded 5 weeks earlier at the beginning of February. Plasma T<sub>4</sub> levels paralleled feed intakes; e.g. the mean value for the control group during January ( $66 \pm 4$  ug/l) was significantly higher ( $P < 0.05$ ) than that during March ( $35 \pm 2$  ug/l).

The data show that in the fallow buck the seasonal increase in sexual activity is not triggered by decreasing daylength but may be by the development of refractoriness to the inhibitory action of exposure to long daylengths. As administration of melatonin advanced the onset of sexual activity and the associated depression in feed intake, we suggest that the melatonin signal does play a role in the timing of these behavioural changes. The negative correlation between plasma T and feed intake suggests that T may be implicated in the regulation of feeding behaviour.

ASHER, G.W., DAY, A.M. and BURRELL, G.K. (1987). J. Reprod. Fert. 79: 353.

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