Seasonal pattern of secretion of luteinizing hormone in female fallow deer (*Dama dama*)

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G.W. Asher, C.J. Morrow[1], J.F. Smith[1] and A.J. Peterson[1]

New Zealand Pastoral Agriculture Research Institute, Invermay Agricultural Centre, Mosgiel, New Zealand and [1]Ruakura Agricultural Centre, Hamilton, New Zealand

Tonic and pulsatile secretion of luteinizing hormone (LH) during the annual cycle of non-pregnant entire (n = 4) and long-term ovariectomized (n = 2) fallow deer (*Dama dama*) does was examined. Blood samples were collected from tame, conscious deer via jugular catheters every 20 minutes for 12-hour periods at various times of the year (Fig. 1). Plasma concentrations of LH were measured by a heterologous radioimmunoassay (Asher *et al.*, 1986) and the data were subjected to PULSAR analysis.

Seasonal differences in plasma LH concentration were manifested as fluctuations in basal values, pulse frequency and amplitude (Fig. 1). For entire does, basal values and pulse frequency were highest during the transition into the breeding season (February-April) and lowest in early-mid anoestrus (November-January). However, LH pulse amplitude increased during anoestrus. Ovariectomized does exhibited a 3-5 fold change in basal LH concentrations across seasons, with highest mean values in January-March and lowest mean values in October. They also exhibited marked changes in LH pulse frequency from zero in October to 12-16 pulses per 12 h in January (Fig. 1).

There is clearly strong seasonal control of pituitary LH secretion in female fallow deer, similar to that observed in males of the species (Asher *et al.*, 1989) and other cervids, such as Père David's deer (*Elaphurus davidianus*; Curlewis *et al.*, 1991) and red deer (*Cervus elaphus*; Meikle & Fisher, 1994). The pronounced circannual rhythm of LH secretion in ovariectomized does indicates a high level of steroid-independent regulation of seasonal breeding, as seen in red deer (Meikle & Fisher, 1994).

REFERENCES

Asher, G.W., Barrell, G.K. & Peterson, A.J. 1986. Hormonal changes around oestrus of farmed fallow deer (*Dama dama*). *Journal of Reproduction and Fertility* **78**:487-496.

Asher, G.W., Peterson, A.J. & Bass, J.J. 1989. Seasonal pattern of LH and testosterone secretion in adult male fallow deer, *Dama dama*. *Journal of Reproduction and Fertility* **85**:657-665.

Curlewis, J.D., McLeod, B.J. & Loudon, A.S.I. 1991. LH secretion and response to GnRH during seasonal anoestrus of the Père David's deer hind (*Elaphurus davidianus*). *Journal of Reproduction and Fertility* **91**:131-138.

Meikle, L.M. & Fisher, M.W. 1996. Regulation of reproductive seasonality in the red deer hind: estradol-dependent and estradol-independent influences on the pattern of LH concentrations. *Journal of Reproduction and Fertility* **106**:213-220.

see Figure 1 overleaf

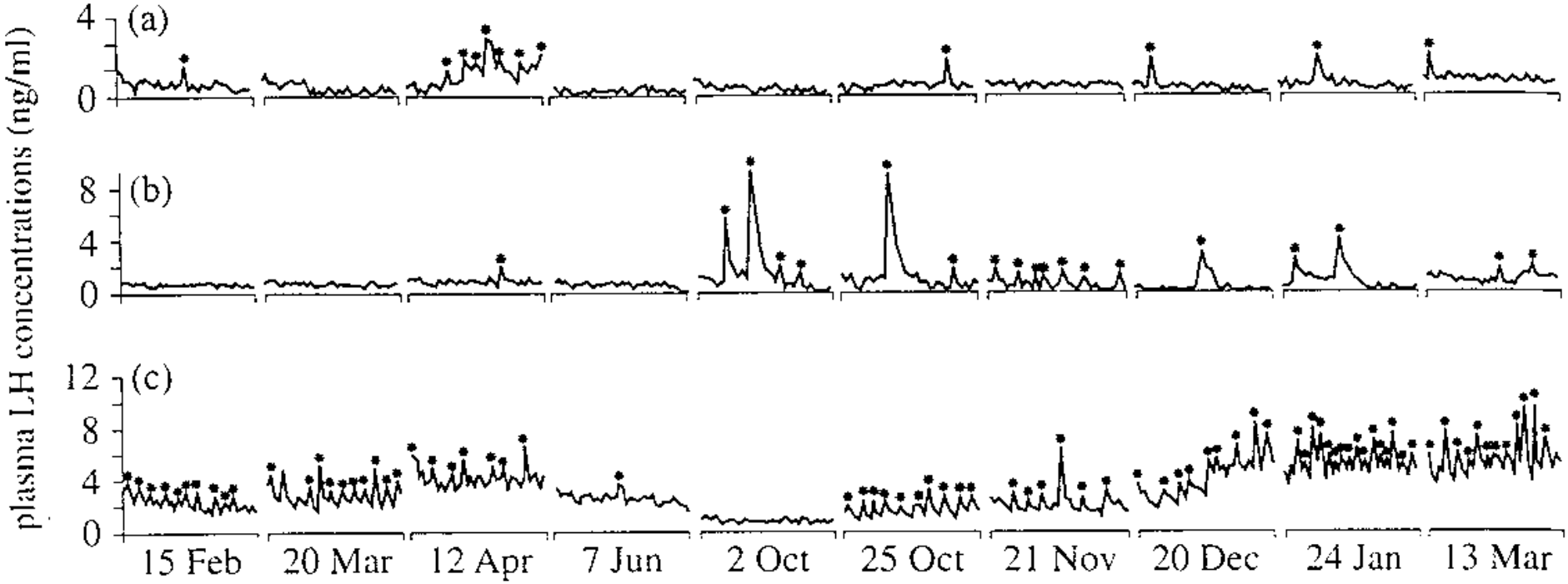

Figure 1. Representative seasonal profiles of plasma LH concentrations for entire (a & b) and ovariectomized (c) fallow deer does from samples collected at 20-minute intervals for 12-hour periods. Asterisks denote LH pulses.