CONTROL AND MANIPULATION OF THE BREEDING SEASON IN RED DEER

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INTRODUCTION Red deer (Cervus elaphus) are seasonal breeders with oestrus in hinds occurring during autumn. With mating in late March-April, calving takes place in November-December following a 233-day gestation. In the stag, the sexual cycle is closely related to the antler cycle, with the antlers being cast and regrown during the period of low levels of circulating testosterone. The antlers are cleaned of their velvet (skin) as testosterone levels rise, leaving the stag in hard antler for the rut. Female red deer normally reach puberty at about 15-16 months of age so long as they have attained a threshold bodyweight of about 70% of mature liveweight (2). The seasonality of breeding in adult red deer has been likened to a yearly puberty, with photoperiodic changes implicated in the control of both events. In this respect, hinds subjected to earlier seasonal photoperiods by shortening daylength or treatment with melatonin designed to mimic photoperiodic changes, may be induced to ovulate and calve earlier in the season (3).

MANIPULATION OF THE BREEDING SEASON Advancing the breeding season so that hinds calve in spring rather than in summer would ensure that lactating hinds have access to high quality pasture. Therefore at Invermay, there have been two main lines of approach, namely melatonin treatment or direct gonadotrophic stimulation.

TABLE 1. Induction of ovulation in control (run remotely from melatonin-treated hinds) and melatonin-treated yearling hinds.

	n	Hinds ovulating
Control	6	0
Fed melatonin		
Did not eat supplement	9	0
Ate supplement	11	9
Melatonin implants	16	12

[1] Melatonin treatments were administered from December to March; the hinds were treated to synchronise oestrus and incidence of ovulation was recorded by laparoscopy on March 12.

Yearling hinds at pasture were offered melatonin mixed with a daily ration of pelleted feed supplement (see also 4) or given a new experimental long-acting implant of melatonin ('Regulin', Gene Link Australia). The results, summarised in Table 1 indicate that alteration in the pattern of melatonin stimulation is sufficient to induce reproductive activity.

Adult red deer stags have also been implanted at monthly intervals from November (early) or December (late). Two groups of controls were run, one remote from the treated stags and the other with them. Maximum scrotal circumference was recorded for the early melatonin group in January, the late melatonin group in February and for the two control groups in March. The treated stags started to roar in January. All of the melatonin-treated stags cast their hard antlers in April/early May (compared with August/September in the controls). As expected, antler casting was associated with very low scrotal circumference measurements.

TABLE 2. Ovulation and calving results for yearling hinds subject to gonadotrophic stimulation prior to the start of the normal breeding season (hinds treated on March 15)

Treatment[1]	n	Ovulated at laparoscopy	Calved to induced ovulation[2]	Calved prior[3] to 26 November
Control	19	1	0	0
Progesterone	18	5	2	2
Prog/PMSG	20	14	2	4
Prog/GnRH	34	13	3	8

Gonadotrophic stimulation following progesterone priming is a satisfactory procedure for inducing ovulation in red deer hinds although fertility at the resulting oestrus is poor (Table 2). It is likely that stag fertility and/or behaviour is a major contributor to the problem.

[1] Progesterone (controlled internal drug releasing device, AHI, Hamilton); GnRH, gonadotrophin releasing hormone administered via an Alzet osmotic minipump (Alza, USA).
[2] Calved about 4 Nov, calculated gestation lengths of <240 days.
[3] 13/14 of these hinds had ovulated in response to treatment as detected at laparoscopy.

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