

THE TIMING OF MELATONIN TREATMENT AFFECTS THE SEASONAL ONSET OF OVARIAN ACTIVITY, COAT GROWTH AND LIVE WEIGHT IN YOUNG RED DEER HINDS

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The effect of the timing of melatonin treatment during spring and summer on the onset of ovarian activity, the summer moult and winter coat regrowth and liveweight change was investigated in yearling red deer hinds. There was 1 control and 6 treated groups each of 5 hinds. Melatonin was administered beginning at 20 day intervals on Oct 21, Nov 10, Nov 30, Dec 20, Jan 9 and Jan 29. Treatment consisted of 2 subcutaneous implants each containing 18 mg melatonin (Regulin, Regulin Ltd, Melbourne, Australia) on 3 occasions at 30 day intervals. Ovarian activity was monitored by determining plasma progesterone concentrations in blood samples collected twice weekly from mid-January to mid-April. Coat condition was assessed visually twice weekly as either summer (reddish-brown) moulting or winter (greyish-brown). Hind live weights were recorded at two to three week intervals.

Treatment begun in November resulted in all animals displaying ovarian activity before 13 April, the normal onset of the breeding season. October, December and January treatments resulted in only a proportion of animals responding. The mean (and range) of onset of ovarian activity of those hinds responding was 15 March (25 February-28 March) representing about a four week advancement. Seasonal coat changes were also advanced by melatonin treatment.

Group	Hinds with early ovarian activity	Beginning of summer coat moult	Appearance of complete winter coat
Oct 21	2	20 Feb	2 Apr
Nov 10	5	13 Feb	19 Mar
Nov 30	5	8 Feb	16 Mar
Dec 20	3	11 Feb	12 Mar
Jan 9	3	17 Feb	18 Mar
Jan 29	0	5 Mar	1 Apr
Control	0	7 Mar	3 Apr

The phase of minimal body growth which occurred in control hinds in autumn was advanced by up to four weeks by melatonin treatment and this was especially so in the earliest treated groups. For example, liveweight gain from 10 to 28 March, for groups treated in October, November and December was -30 g/d, compared with 84 g/d and 100 g/d in the January treated and Control groups respectively. When growth resumed towards the end of winter it tended to do so earlier in most treated hinds and mean live weights at the end of the experiment in late spring were not significantly affected by treatment.

These results indicate that the timing of puberty as well as seasonal changes in coat growth and liveweight in the red deer hind can be altered by exogenous melatonin and that the time treatment is begun is important in determining the response.