

ADVANCEMENT OF MATING IN PUBERTAL RED DEER HINDS
USING MELATONIN OR REDUCED DAILY PHOTOPERIOD.
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Utilisation of pastures by deer in New Zealand could be improved if the date of calving was a few weeks earlier than it is at present; most hinds currently give birth during December. This study was carried out to see if mating, and hence calving, could be advanced by subjecting yearling red deer hinds to reduced daily photoperiods or to melatonin treatment.

Commencing on the 8th January four yearling hinds were given a subcutaneous injection of 3.7 mg melatonin in safflower oil at 16.00 h each day until 31 March. Another group of three yearling hinds was placed into a darkened room each afternoon at 16.00 h and released at 8.00 h each morning throughout the same period. Three other yearling hinds served as untreated controls. All hinds not receiving melatonin were injected daily with safflower oil at 16.00 h. Blood samples were collected weekly during the first four months for prolactin and progesterone assays and the dates of both mating and subsequent calving were recorded.

Visual inspection of the pelage of each hind on 9 March revealed that the treated hinds had prematurely moulted their summer coats when compared with the control hinds.

Serum prolactin levels declined in all three groups of hinds during the first three months of the study, but the decline in both treated groups was such that baseline prolactin concentrations were recorded from these hinds about 30 days earlier than in controls.

Mating was also significantly advanced in melatonin (87 ± 3.4 days, mean \pm s.e.m.; day 1 = January 1st) and shortened daily photoperiod (82 ± 2.3 days) groups compared with controls (114 ± 7.9 days; $p < 0.01$) and these effects were reflected in calving dates (315 ± 3.2 days and 315 ± 1.7 days versus 347 ± 7.9 days, respectively; $p < 0.005$). All calves were born in healthy condition and without assistance. Serum progesterone levels confirmed the mating data and indicated that mating was usually preceded by variable periods of elevated progesterone secretion consistent with the occurrence of 'silent' ovulations.

These results confirm the role of daily photoperiod as a regulator of prolactin secretion and of puberty or seasonal breeding in red deer, and support the view that these effects are mediated by the pineal gland probably via secretion of melatonin. Furthermore they demonstrate that the breeding season in pubertal hinds can be advanced by treatment with exogenous melatonin.

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