A NOTE ON PARTURITION AND MATERNAL BEHAVIOUR IN CAPTIVE RED DEER (*CERVUS ELAPHUS* L.)

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Summary. Parturition was observed in four of six pregnant red deer hinds, housed indoors. In two normal calvings, labour took 37 and 42 min from the appearance of the amniotic sac to the birth of the calf: labour was prolonged in one hind after disturbance, and two hinds had calving difficulties. The calves stood 30 to 58 min and sucked 43 to 129 min after birth. Maternal behaviour is described. The incidence of perinatal mortality in wild deer is discussed.

Wild red deer in Scotland rut in October and produce their single calves in June. Jones (1966) and Bubenik (1965) have described the birth of four calves. The present paper describes parturition and maternal behaviour in captive hinds kept indoors.

The hinds were kept individually, or with their calves, in unheated indoor pens 3.7×1.3 m in size. Details of the six hinds used are given by Arman, Kay, Goodall & Sharman (1974). They were fed on dried grass plus a concentrate mixture, Hind 10 being given restricted amounts of food.

The signs of impending parturition were variable and sometimes slight and difficult to detect. There was often a depression in appetite or a filling-out of the udder, a swelling of the vulva or restlessness before calving.

The observations on parturition are summarized in Table 1. All hinds except Hind 10 were sufficiently tame to be undisturbed by the observer. Hind 10 showed a pause in labour after disturbance. The timings for the normal, rapid calvings of Hinds 5, 6, 8 and 11 may have been even shorter than those given in Table 1. The amniotic fluid, membranes and placenta were immediately licked up or eaten.

In Hind 10, after the pause in labour and posterior presentation, the placenta did not detach and the uterus everted. This condition was successfully treated and she recovered well, although she gave little milk during the first day. Hind 12 also had a posterior presentation, with one hind foot of the calf caught back. The calving was assisted, but the calf died of an umbilical haemorrhage into the uterus.

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Table 1. Parturition in captive red deer

<i>Hind</i>	<i>No. of calves</i>	<i>Calving date</i>	<i>Gestation period (days)</i>	<i>Calf weight (kg) and sex</i>	<i>Presentation</i>	<i>Calf first seen to birth (min)</i>	<i>Amniotic sac bursting to birth (min)</i>	<i>Birth to loss of placenta (min)</i>	<i>Birth to calf standing (min)</i>	<i>Birth to first sucking (min)</i>
5	1	20.VII	223	8.0 Male	Anterior, dorsal	32	42	90 to 150	58	129
6	1	5.VIII	233	7.0 Male	Anterior, dorsal	30	37	140	30	78
8	1?	14.VI	—	5.0 Female	Anterior, dorsal	—	—	120 approx.	40 approx.	60 approx.
10	4?	7.VI	—	6.3 Male	Posterior, dorsal	240	—	4 (did not detach)	60 approx.	43
11	2	3.VI	—	9.0 Male	—	—	—	—	—	—
12	1	17.VI	227	6.4 Female (died)	Posterior, dorsal, only one leg	Prolonged: birth assisted	—	300 approx.	—	—

Only two of the six calvings occurred during the night. During labour, the animals were restless, standing and lying alternately. Of the three seen, two hinds calved standing and one lying down.

The calves started to move and squeak soon after birth. These movements and sounds, plus the covering of amniotic fluid, usually attracted the mother and caused immediate acceptance of the calf. Hind 5, a first-calver, calved standing and then jumped away, only returning to lick her calf 13 min later. Hind 12 accepted a foster-calf which was introduced after rubbing with her dead calf. She became ill 5 days after calving and eventually died on the 31st day in spite of antibiotic treatment. Examination *post mortem* showed that a resolved metritis, had been followed by necrotic cystitis and peritonitis.

After calving, during the third stage of labour, the hinds continued to stand and lie alternately, while the calves tried to seek the udder and struggled to stand. In three out of the five cases seen, the hind happened to lie down with her underside facing the calf, which started to suck as she lay, even before it was strong enough to stand. In the other two cases, the calves stood before finding the udder. Later, sucking was always from a standing position and nearly always from the side. The calves could reach all four teats from one side, switching rapidly from one to the other. Sucking usually lasted only $\frac{3}{4}$ to 4 min, and in that time a calf could take in 150 to 600 ml milk when the yield was good. The hinds licked the perineal area of their calves while they sucked, and the calves responded by defaecating and urinating. The hind ate the calf's faeces and drank its urine, continuing to do so for a long time. Part of the faeces was still eaten when the calves were as much as 17 weeks old. Details of the yield and composition of milk have been given by Arman *et al.* (1974), and studies on calf growth will be reported elsewhere.

The details of parturition recorded in Table 1 are similar to those described for red deer (Bubenik, 1965) and some other ruminants of similar size, e.g. the sheep and the hartebeest (*Alcelaphus buselaphus*) (Gosling, 1969). Normal labour appears to take at least as long as in these other species. The prolonged labour in Hind 10 may have been exceptional, and due to disturbance. Maternal behaviour in the red deer resembles that in other ruminants. As in sheep, a prolonged labour or lack of maternal experience, especially at first calving, could cause desertion.

Consumption of the calf's faeces and urine by the dam for the first few days has been recorded in hartebeest (Gosling, 1969) and is probably widespread among animals.

Red deer calves develop relatively slowly after birth, the time taken to stand being similar to, or longer than, that for lambs and hartebeest, but markedly longer than that for wildebeest (*Connochaetes taurinus*) (Estes, 1966). The post-natal development of three red deer calves seen by Bubenik (1965) in Czechoslovakia was rather faster than that of our calves in Scotland, and his hinds and calves were larger than those in our study. An unusual feature in our records was that the first suckling often occurred while the hind was lying down. The case of Hind 12 is believed to be the first record of successful fostering in red deer.

Wild red deer have a short calving season in late May to early June. There

is probably an advantage in calving at this time when high nutrient intakes can be achieved.

It is recognized that animals in captivity are under stress and lack exercise, and may not behave normally, and it is hoped to make comparable observations on free-living deer later. Calving abnormalities may be less common in the wild, but it is difficult to determine the extent of perinatal mortality. Adult hinds seen without calves at foot would be recorded in counts as non-breeders, and dead calves are difficult to find. Staines (1970), studying deer in Glen Dye, found that the proportion of hinds with calves at foot 2 months after the calving season was 29 to 44 % less than that expected from the proportion pregnant at mid-gestation, the loss being greatest in first-breeders. In most areas, the bulk of calf mortality occurs in late winter to early spring (Lowe, 1969), but in good areas such as Glen Dye, where winter mortality is low, perinatal losses have a major effect on recruitment to the population.

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