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Brief Communication

Pregnancy Status of Reindeer Calves (*Rangifer tarandus tarandus*) on Two Occasions During the Winter Season

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Reindeer are seasonal breeders. Mating coincides with decreasing daylenght in the autumn, while calving takes place in the spring. The rut is confined to a 2-3-week period in September/October. Animals are kept freely with no control being exerted over matings, and under normal conditions, the pregnancy rate is generally high. Calving usually takes place in May, and few calves are born outside the peak calving season (*Lenvik* 1988).

In recent years, overgrazing in winter, associated with increased stock density, has become a major problem, especially in northern Norway. As a result, the nutritional status of many herds has declined, and some reports indicate that severe nutritional imbalances may occur (*Hoff et al.* 1993). Under such circumstances, it is important to optimise the potential production of reindeer herds by matching stock density with the availability of the winter pasture resource. Consequently, early and accurate pregnancy diagnosis to permit the removal of barren females would allow reindeer production to be managed more efficiently.

Progesterone levels, indicating the maintenance of a corpus luteum of pregnancy, have been used in pregnancy diagnosis of domestic and wild ruminants (*Willard et al.* 1994). Progesterone production is, however, also associated with the luteal phase of the oestrous cycle as well as pathological conditions, such as persistent corpora lutea and luteal cysts (*Arthur et al.* 1996), and may therefore not be a reliable diagnostic tool for pregnancy determination. However, it is believed that the vast majority of pregnancies in reindeer are established during the rut, which is confined to a few weeks in October. This means that repeated oestrous cycling is not likely to be common in this species, provided that a sufficient number of males are available (*White et al.* 1989). There is little information in the literature regarding the accuracy of using progesterone levels as an indicator of pregnancy at various stages in the winter season. However, it is known that non-pregnant animals can continue cycling at least until February (*Ropstad et al.* 1995), and that conceptions may occur as late as March or April (*Reimers* 1983).

The objective of this study was to describe morphological findings in reproductive organs from reindeer slaughtered on 2 occasions (November/December and late January), with special reference to pregnancy status and ovarian function. The frequency with which corpora lutea are present, combined with information on

pregnancy status, could shed light on the usefulness of assessing ovarian function (i.e. progesterone analysis) in pregnancy diagnosis in reindeer.

Reproductive organs were collected from 476 female reindeer calves slaughtered in the last week of November and the first week of December 1987 and from 156 female calves slaughtered in the third week of January 1988. All calves were from the central part of southern Norway. The ovaries were examined for corpora lutea and follicles. Pregnancy was determined by macroscopical identification of a fetus and foetal membranes. In the absence of such findings, the animal was recorded as being non-pregnant. A pair of ovaries were considered active if they contained corpora lutea. Details of ovarian findings, and the relationship between body weight, body condition and pregnancy status, have been described in a previous paper (*Ropstad et al.* 1991).

Of the 476 calves slaughtered in November/December, 389 were non-pregnant, 110 (28.3%) of these having active ovaries. Of the calves slaughtered in January, 117 were non-pregnant, only 4 (3.4%) of these having active ovaries (Table 1).

The plasma progesterone levels of reindeer show considerable variation. Maximum concentrations during the luteal phase ranged from 8.1 to 28.6 nmol l^{-1} (*Ropstad et al.* 1995). Blood samples taken in March from 114 reindeer which were observed with a calf at foot in the following autumn, showed values from 3.9 – >40 nmol l^{-1} (*Ropstad et al.* unpublished). This wide range in plasma progesterone concentrations in pregnant animals is in accordance with findings by other authors (*McEwan & Whitehead* 1980, *Blom et al.* 1983). This apparent substantial overlap in plasma progesterone concentrations in pregnant and cycling females is obviously of practical significance.

Little information is available regarding suitable methods for pregnancy diagnosis in reindeer. However, although knowledge of the endocrinology of pregnancy in reindeer is limited, there is nevertheless evidence that analysis of reproductive hormones, including progesterone, can be used for this purpose (*Messier et al.* 1990).

The present results indicate that oestrus cycling took place in only a few reindeer calves in January, most females being either pregnant or anoestrous at this stage. Assessment of ovarian function based on progesterone analysis, may provide a useful and accurate tool for pregnancy diagnosis in population studies, when performed in late January.

Further research is needed to determine the factors which influence the duration of the breeding season in reindeer and the transition to anoestrous in cases of non-pregnancy. The fact that this study was carried out in young females, some having their first reproductive season and others remaining prepubertal, should be kept in mind when interpreting the results. Although not decisively proven for reindeer, it is likely that young, growing females have a prolonged breeding season. This can explain the pregnancy rate of 25% found in January, as compared with 18.3% in November/December (*Ropstad et al.* 1991). The frequency of adult animals with active ovaries without a pregnant uterus is not known, but it is unlikely to be any higher than that found in the calves in the present study.

Several studies have shown that the main factors relating to onset of cyclic ovarian activity and pregnancy in *Rangifer* are female body weight and fat reserves (*Reimers* 1983, *Lenvik et al.* 1988, *Ropstad et al.* 1991, *Gerhart et al.* 1997). Herdsmen report that small females in poor condition start the rut later and continue for a longer period than those in normal body condition. *Dauphiné & McClure* (1974) found that the timing of conception in caribou was un-

Table 1. Number of pregnant and non-pregnant calves with active or inactive ovaries on two occasions; November/December and January.

Pregnancy status	November/December			January		
	Active	Inactive	Total	Active	Inactive	Total
Pregnant	87	0	87	39	0	39
Non-pregnant	110	279	389	4	113	117
Total	197	279	476	43	113	156

influenced by body weight or fat deposits. In contrast, *Lenvik* (1988) found earlier conception in reindeer with increasing female body weight. Poor grazing conditions were associated with delayed conception within weight classes. Under these circumstances, young animals conceived later than adults.

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