

PREGNANCY DIAGNOSIS AS A MANAGEMENT TOOL FOR MOOSE

J.C. Haigh

Department of Herd Medicine and Theriogenology, WCVI*

E.H. Kowal and W. Runge

Department of Northern Saskatchewan, Resource Branch, Wildlife Division, Prince Albert, Canada.

G. Wobeser

Department of Veterinary Pathology, WCVI*

* University of Saskatchewan, Saskatoon, Canada, S7N 0W0

Abstract: Pregnancy determination was carried out by rectal palpation on immobilized moose in Saskatchewan in March 1981. Fifteen of 16 female moose were diagnosed as pregnant; 4 of them with twins. Serum samples collected at the same time revealed serum progesterone levels between 5.4 and 11.5 ng/ml in pregnant moose, < 0.5 ng/ml in a non-pregnant female and 0.15 ng/ml in a male.

In 1977 a new moose management system was instigated in Saskatchewan. One of its features involved protection of cow moose except to resident hunters during 2 short weeks and the hunting of bulls or calves only at other times.

Complaints were subsequently received from outfitters, sportsmen and northern residents that the productivity of Saskatchewan's moose population was declining because of excessive bull harvests and a subsequent shortage of males for breeding purposes.

Moose herd production surveys in block 27 (Cumberland) in August of 1979 and 1980 had revealed low calf numbers (35 and 30 calves per 100 cows respectively) and low bull numbers (40:100 cows) with most of the bulls (86%) being below 4 years of age in 1980. Most of the commercial guide and outfitter complaints related to this same block, which has traditionally supported the highest density of moose in the province.

For these reasons a survey of pregnancy rates in cow moose was carried out in block 27. By determining productivity "in utero" we hoped to establish a minimum pregnancy rate and eliminate some of the problems that might be associated with difficulty in seeing calves hidden in thick vegetation.

MATERIALS AND METHODS

In the first week of March 1978, 17 moose (16 female, 1 male) were captured by dart immobilization from a Bell 206 Jet Ranger. The drugs used for immobilization were either 90 mg fentanyl citrate^a or 2.5 mg carfentanil^a together with 100 mg xylazine hydrochloride^b. The narcotic antagonist was naloxone hydrochloride^c.

a Janssen Pharmaceutica, Beerse, Belgium.

b Bayvet Division, Cutter Labs, Mississauga, Ontario.

c Endo Labs, Baie d'Urfe, Quebec.



Rectal palpation was carried out on recumbent female moose, and blood samples were collected. Pregnancy diagnosis per rectum was based on criteria used in domestic cattle (*Bos spp.*). The location of the cervix relative to the pelvis, the turgidity of the uterus, ballottment of the fetus within the uterus (and the presence of two fetal heads for determination of twinning), the slipping of fetal membranes and the presence of placentomes were all used (Ball 1980). The moose were treated with 4-6 mg/kg of sodium bicarbonate in a solution containing 900 mEq of NaHCO_3 /litre in a balanced electrolyte solution. Serum was harvested from blood samples and frozen. Progesterone assays were carried out on the serum.

RESULTS

Of 16 female moose examined, 15 were pregnant. Twins were detected in 4 of these. Of the 15 pregnancies, 13 were felt to be similar in development to the 16-20 week pregnancy of the domestic cow. Two were considered to be somewhat less advanced (12-16 weeks).

Irregular firm structures, somewhat resembling pancakes, being from 0.5 - 3 cm in thickness and from 5 - 15 cm in diameter were detected in some uteri. These structures appeared to be free floating within uterine fluids and may have been similar to hippomanes as described in horses (King 1967). In one non-pregnant cow there were no palpable structures on either ovary.

Serum progesterone was elevated in pregnant animals. The bull had

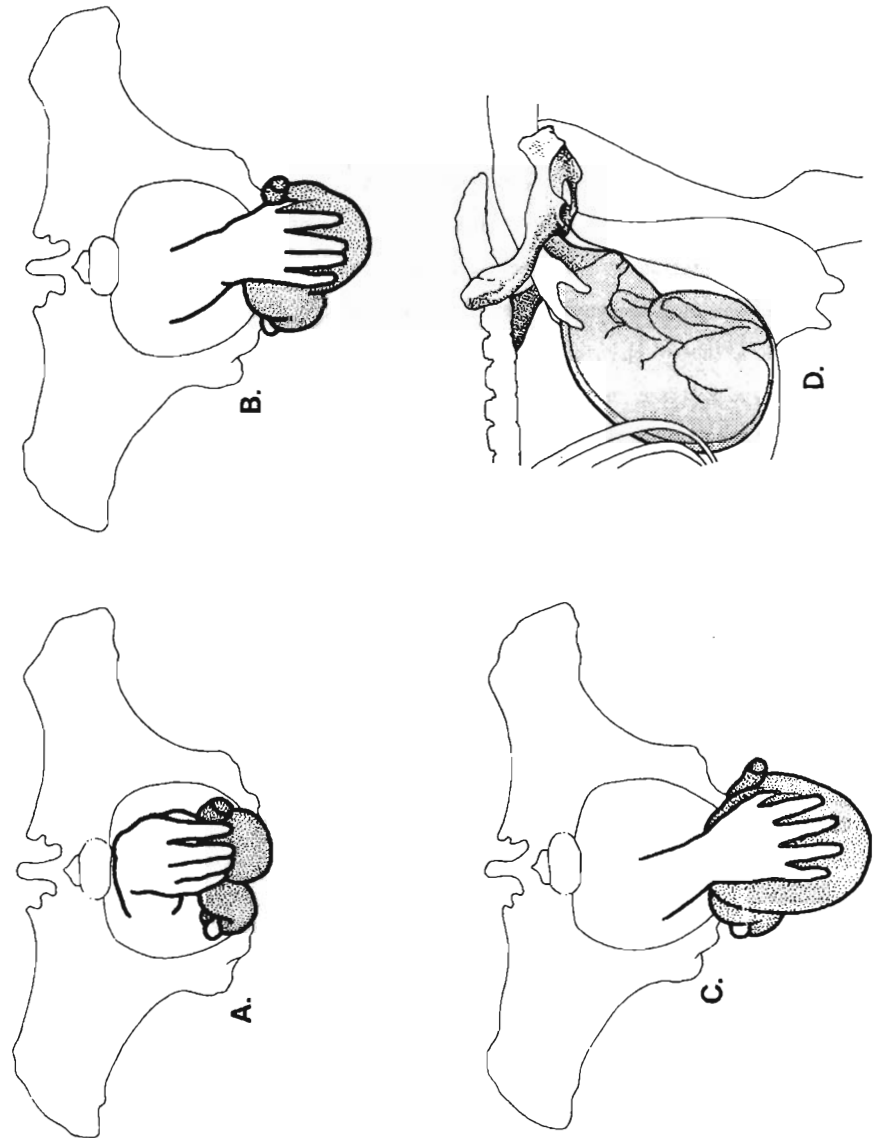


Fig. 1 A,B,C,D: Diagrams representing views of manual palpation per rectum of the reproductive tract of the domestic cow. (lost uteri palpated in this study appeared somewhat further advanced than C.

- A - Gravid uterus 70 days.
- B - Gravid uterus 90 days.
- C - Gravid uterus 110 days.
- D - Approximately term.

the lowest serum progesterone and the non-pregnant cow had a value < 0.5 ng/ml. The results including age, number of fetuses and progesterone levels are presented in Table 1.

DISCUSSION

Pregnancy diagnosis is an important management tool in many domestic species of mammal. A description of features of pregnancy diagnosis has been given in wapiti (*Cervus elaphus*) (Greer and Hawkins 1967) but this does not appear to have been done in moose.

In common with the wapiti, the cervix of the pregnant moose appears somewhat longer and thinner than that of the domestic cow (about 5 cm diameter and 8-10 cm long). Other relationships appear to be basically similar to the cow in the 12-20 week period, although the exact timing remains to be elucidated in terms of gestation period.

During rectal palpation in ruminants lying in sternal recumbency the investigator must be aware of external factors acting on the abdomen which may cause a change in the position of the abdominal contents due to an increase in intra-abdominal pressure.

Serum progesterone has been used to aid in pregnancy diagnosis of a variety of species with varying success (Weber and Wolfe 1982). Until such time as serum progesterone concentrations during the estrus cycle and early pregnancy of moose have been determined it is difficult to confirm the reliability of this item as an indicator of pregnancy.

The fact that a pregnancy rate of approximately 94% was detected in the small sample studied belied the claims of hunters that the Saskatchewan

Table 1: The Reproductive Condition of a Sample of Moose from Saskatchewan Game Management Zone 27 as Determined by Palpation and by Serum Progesterone Levels

Moose I.D. #	Age (# of Yrs)	Number of Fetuses	Plasma Progesterone Level (ng/ml)
1	9	1	7.25
2	6	2	10.20
3	3	1	5.44
4	3	0	0.42
5	7	2	7.15
6	9	1	7.41
7	6	2	7.08
8	8	1	6.86
9	11	1	6.70
10	3	1	7.57
11	3	1	6.42
12	4	2	11.45
13	3	1	7.02
14	2	1	6.01
15	2	1	8.03
16	2	1	6.40
17	Adult Male	-	0.15

moose harvest had overly depleted the number of bulls in this portion of the herd. Spring surveys carried out at the end of May and beginning of June in 1981 and 1982 have confirmed that a high proportion of cows had calves. Had bull numbers been depleted due to overhunting one might have expected a spread in the calving season or a real drop in the number of calves per cow.

While the study may have clarified the question of bull shortages it has not solved the question relating to low calf numbers in later summer surveys. Mounting evidence from our own and other Saskatchewan studies (Stewart pers. comm.) has incriminated the black bear (*Ursus americanus*) as a predator of moose calves. This adds to other studies that have shown the importance of bears as predators of moose (Ballard et al 1980, LeResche 1968) and particularly of black bears as predators of young moose calves (Franzmann et al 1980).

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