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Expanded abstract

Yersiniosis in muskoxen on Banks Island, N.W.T., 1987-1990

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Yersinia pseudotuberculosis is a gram-negative bacteria known to cause a variety of disease conditions in many species and is a major cause of mortality in farm and captive wild ungulates (Obwolo 1976, Mackintosh and Henderson 1984). It has not been as well documented in wild populations. *Yersinia pseudotuberculosis* was first confirmed in wild muskoxen on Banks Island in 1986 (Blake *et al.* 1991). All age and sexes suffered *Yersinia* mortalities but bulls accounted for at least 75 % of the mortalities in 1986 (Blake *et al.* 1989).

The objectives of this study in 1987-90 were:

1) Locate carcasses and determine the cause of death of all muskoxen in the study area.
2) Estimate total numbers of muskoxen in the study area and classify a sample of the age and sex structure.

Muskox carcasses and skeletal remains were located by aerial and ground surveys in the study area in July or August. Age, sex if discernible, location, and the position (sternal, side) of the carcass were noted. A full necropsy was done using standard field technique on intact carcasses, to assess physical condition at time of death and possible cause of mortality. Any evidence of rauma prior to death was noted.

Suspected *Yersinia* mortalities generally had good fat stores, died in the summer, and if recent, had obvious enteritis, enlarged lymph nodes or septicemia. A loop of intestine, a mesenteric lymph node and intestinal swabs (placed in Phosphate Buffered Saline (PBS)) were taken for subsequent culturing for the presence of bacteria. Overwinter mortalities were determined by the absence of a solid marrow core, position (sternal, fetal, spread out) of the carcass and the state of decomposition in some cases. Any new carcasses since the previous year's survey were examined as potential *Yersinia* mortalities which occurred after we left the study area and were added to the yearly totals.

Suspected *Yersinia* mortalities accounted for 88 % of 72 carcasses found in 1987 but only 23 % of 109 carcasses found in 1989 (Table 1). The estimated *Yersinia* mortality rate was 8-10 % of the 1987 summer population, while in 1989 and 1990 the rate was only approximately 2-4 % of the summer population. The data for 1987-1990 suggests that adult males are still the age/sex class most affected by *Yersinia* while starvation affected all age classes but predominantly young and old age classes (Table 2).

The expression of this disease in muskoxen may be an indication of stress associated with a high density population and the high contamination levels in some years. Densities of muskoxen in the area varied from 2.7 to 3.2 muskoxen per km^2 (excluding calves) in the summer. Adult bulls are the most susceptible to infection

Table 1. Cause of mortality in the Muskox River study area 1987–1990.

Year	Cause of mortality				
	Yersinia	Winter kill	Predation	Unknown	Total
1987	63	6	0	3	72
1988	48	0	7	1	56
1989	25	64	9	11	109
1990	12	15	2	5	34
	148	85	18	20	271

Table 2. Age and sex of *Yersinia* and winter mortalities 1987–1990 (pooled).

	Male		Female				Total
	Adult	Subadult	Adult	Subadult	Yearling &	Calves	
Yersinia	124	5	11	5	2	1	148
Winter	13	6	6	0	60		85

and mortality can be significant in some years. Overwinter starvation, in the long term, may be a very important factor limiting the growth of the population.

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