

Site Variation in Summer Foods of Arctic Fox, Prince of Wales Island, Northwest Territories

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ABSTRACT. Analysis of 840 arctic fox (*Alopex lagopus*) feces (scats) from Prince of Wales Island, indicate that collared lemming (*Dicrostonyx groenlandicus*) are the most frequent food item. Caribou (*Rangifer*), arctic hare (*Lepus arcticus*) and ermine *Mustela erminea* were less important. Bird remains were not prevalent in the arctic fox scats. A marked difference was found between prey items at a den site and those recovered in scats from general searches. Caribou remains were more prevalent in scats from a den site because adult foxes were scavenging nearby wolf kills.

Arctic fox scats were collected on Prince of Wales Island, Northwest Territories during July and August 1977 at a den site (n=375) and on general searches (n=465) surrounding the den. The Russell River den site (73° 41' N, 97° 41' W) is situated 100 m from an unnamed river, approximately 5.0 km from the northeast coast of the island. The den site is a low (<1m) ice mound covered predominantly with sand and gravel. Vegetation on the site is dominated by purple saxifrage (*Saxifaga oppositifolia*) and dryas (*Dryas integrifolia*). Two adult arctic foxes and four whelps were observed at the den site from June to August 1977.

General searches were made for arctic fox scats over a 20 km² area in the northeastern region of the island between Bellot Cliff (73° 32' N, 97° 41' W) and Back Bay. These areas completely surround the den site and were an adequate scat sample for other arctic foxes travelling the general vicinity of the den site.

All scats were collected separately and labelled with location. Winter scats were easily discerned from summer scats by their leached appearance and by the apparent age of the scat deposition site. Only scats considered to be from the summer of 1977 were used in the analysis. Adult and whelp scats were separated following the criteria presented by Speller (1972). On general searches, scats were collected at a distance from the den to avoid overlap between den scats and those found elsewhere.

Analysis of the scats was done on the basis of the microstructure of the hair or feathers recovered. After the scats were washed through 2 sieves (mesh size 75 and 200 μ m), the hair remains were mounted on acetate strips and examined microscopically (Williamson, 1951). A reference collection of known hair samples of all possible prey species available to arctic fox on Prince of Wales was used to identify hair. Feather remains were identified to taxonomic order after the methods outlined by Day (1966). All species identified from the scats were listed and these data were analysed by frequency of occurrence of items in the total numbers of scats. A Chi-square test of independence was used to find the significance of the variation in food items from each site.

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A total of 886 food items was found in 840 scats collected on Prince of Wales. Most scats contained collared lemming (72.2½); lesser frequency occurrences were recorded for caribou (28.2½), bird (2.4½), arctic hare (<1.0 and ermine (<1.0).

Compositional differences were significant ($P. < 0.005$) when scats were analysed as to those collected at the den site or those found on searches elsewhere (Table 1). Collared lemming occurred at a similar rate from both collection sites. However, caribou hair was almost twice as prevalent in scats from the den site as in those scats found on general searches. Birds, arctic hare and ermine occurred infrequently in scats collected from either site.

TABLE 1. Food items in arctic fox scats from a den site and from general searches on Prince of Wales Island, Northwest Territories, 1977

Collection site	Total scats	Total prey items	% frequency occurrence of food items ^a					
			Mammalian				Avian	
			Collared lemming	Caribou	Arctic hare	Ermine	Feather ^b	Egg
Den site	375	414	61.3 (76.1) ^c	34.3 (18.3)	1.5 (2.2)	0.0	2.9 (3.4)	0.0
General searches	465	472	75.3	20.4	0.0	<1.0	4.3	<1.0

^a %Frequency occurrence equals the total number of each item recovered divided by n items and multiplied by 100.

^b Feathers included geese and jaeger (*Stercorarius*).

^c Values in parentheses equal % frequency occurrence of food items in whelp scats (n = 93).

Results of the analysis of 93 whelp scats indicated that whelps did not utilize caribou at the same rate as adults (Table 1). Other food items were recovered at similar rates in both whelp and adult scats.

Previous studies on food habits of arctic fox have noted the importance of lemmings on both island (Chesmore, 1968) and mainland (Macpherson, 1969; Speller, 1972) locations. Arctic foxes from Prince of Wales also prefer lemmings and appear to select collared lemmings over brown lemmings (*Lemmus*). Manning and Macpherson (1957) observed brown lemmings on wet lowland habitats and collared lemmings mainly on upland sites on Prince of Wales. The scats I collected came from only upland areas and were therefore from foxes that had a preponderance of collared lemmings available to them.

Although arctic foxes are known to prey heavily upon birds and their eggs (Chesmore, 1968; Macpherson, 1969; Speller, 1972) and may through predation determine nesting locations (Fay and Cade, 1959), feathers and eggs were recovered in only trace amounts in this study. Lack of bird predation by foxes is thought to be a result of the abundant collared lemming population available on the study area.

The striking difference in frequency occurrence of caribou in arctic fox scats collected at a den site and those found elsewhere has not been previously reported. Large mammal prey items are generally not important food items to arctic fox. For example, both Macpherson (1969) and Speller (1972) examined a large number of den site scats and found a very low caribou dietary component.



Sub-adult male Arctic fox in summer pelage, Prince of Wales Island, July, 1977.

During this study, adult foxes from the den site were observed visiting an abandoned wolf den less than 1 km from their den, where caribou carcasses were available. Further, I recovered several caribou hind legs in the ox den. It therefore appears that adult foxes were scavenging the caribou carcasses and bringing some remains to their den. The whelps, however, did not consume a large amount of these remains (Table 1). Whelps are known to prefer smaller foods, such as lemmings (Chesemore, 1968; Macpherson, 1969) and were probably not interested in the caribou remains as food.

The variation in food items recovered at the den and on general searches indicate that inclusion of both of these site types in arctic fox food studies is necessary.

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