

Food Habits of Wolves in Kluane National Park

The food habits of wolves (*Canis lupus*) were studied at two different den-sites in Kluane National Park in the southwest of the Yukon Territory, in 1972 and 1973, as part of an assessment of predator-prey dynamics in that newly-designated reserve. No published data exist on the diets of wolves in northern British Columbia or the Yukon Territory; the closest available information concerns the wolf populations of Alaska.

THE STUDY SITES

The wolf dens were located in the southern part of the Kluane mountain ranges, in valleys leading westward into the higher St. Elias mountains. Kluane mountain heights vary from 1,050 to 1,700 metres. In general, the vegetation consists of the Kluane type of boreal forest¹, at elevations below about 1090 m; subalpine, found in bands of variable width, above the boreal forests and up to an elevation of about 1,250 m; and alpine tundra, in the upper parts of the mountains and the high passes. More complete descriptions have been provided by Douglas², Muller³ and Theberge⁴.

The Kathleen den was situated at an elevation of 760 m in a valley floor near Kathleen Lakes (60°33'N, 138°30'W). It was dug out of a sandy bank at the interface of a thick stand of climax spruce (*Picea glauca*) and a gravel alluvial fan, vegetated with only scattered, stunted spruce and willow (*Salix* spp). Two or three adult wolves and four pups inhabited this den in July 1972, and four adults and seven pups were there in July 1973. The den-site was not occupied in 1975 or 1976.

The Onion den was located in a pass at an elevation of 1,070 m (60°05'N, 138°30'W). The terrain surrounding it was open and flat, and covered by dwarf birch (*Betula glandulosa*) and willows of up to 1.5 m in height, interspersed with grasses. Two adult wolves and four pups occupied this den in July 1973.

METHODS

Scats were collected at both den-sites; 335 at Kathleen den and 118 at Onion den. The scats were considered to belong to the late spring and early summer periods. After the method of Peterson⁵, they were classified as pup or adult on the basis of a bimodal distribution of diameters; scats 20mm and less were classed as pup, and those 26mm and greater as adult. The few scats having diameters between these two were discarded.

The scats were subjected to a microscopic examination in order to discover the pattern

and structure of cuticular hair as shown in hair impressions left in gelva (polyvinyl acetate)^{6,7}. These were identified by reference to a collection of hairs from known species. Each scat was analysed to determine the percentage frequency of occurrence of each food item in it.

RESULTS

A total of 721 food items found in 453 scats collected at the two dens consisted of moose (*Alces alces*) with a 52.9% frequency of occurrence; beaver (*Castor canadensis*) 15.5%; arctic ground squirrel (*Spermophilus parryii*) 7.9%; mountain goat (*Oreamnas americanus*) 6.8%; snowshoe hare (*Lepus americanus*) 6.2%; and microtine species 6.1%. The remaining 4.6% consisted of Dall sheep (*Ovis dalli*), bird feathers, grizzly bear (*Ursus arctos*), black bear (*Ursus americanus*) and horse.

The frequencies of occurrence of the food items in the scats were however very different at the two dens. While those for moose were similar, making up close to half the total number of food items at both dens, arctic ground squirrel made up 26% at the Onion den as opposed to 0.6% at the Kathleen den. Also, microtine was present to twice as great an extent at the Onion den (11.1%) than at the Kathleen den (4.1%). Conversely, beaver was more common in scats at the Kathleen den (19.8%) than at the Onion den (4.8%). Represented only at the Kathleen den were snowshoe hare (8.8%) and Dall sheep (2.5%).

The comparison of pup with adult scats was based on 297 food items in 186 scats. Moose accounted for slightly more than half the percentage frequency of occurrence of food items in both pup and adult scats. However, pup scats contained twice as much beaver (15.8%) as adult scats (7.6%), and three times as much arctic ground squirrel (12.8%) as adult scats (3.5%). Scats collected at the Kathleen den contained the most beaver, while those collected at the Onion den contained the most ground squirrel. Adult scats contained more mountain goat (6.6%) and Dall sheep (5.6%) than pup scats, with 0.7% and 0.3%, respectively.

All the foregoing results are set out in Table 1.

DISCUSSION

Food habits of wolves at the denning period are particularly important to the survival of pups. The ability of wolves to capture a variety of prey, and turn to smaller mammals if large mammals are not available, is obviously important when the pack has to remain relatively stationary.

As indicated in Table 1, smaller mammals (beaver, snowshoe hare, arctic ground squirrel)

TABLE 1. Comparison of results obtained at the two den-sites.

	Numbers of scats	Numbers of food items	Percentage occurrences of food items							
			MOOSE	BEAVER	SNOWSHOE HARE	ARCTIC GROUND SQUIRREL	MICROTINE	MOUNTAIN GOAT	DALL SHEEP	OTHER
<i>Adult</i>										
Kathleen den	104	168	55.4	8.9	11.9	0.6	8.3	4.2	6.6	4.2
Onion den	17	30	46.6			20.0	13.3	20.0		
TOTALS/MEANS	121	198	54.0	7.6	10.1	3.5	9.1	6.6	5.6	3.5
<i>Pup</i>										
Kathleen den	115	171	60.2	23.3	10.5	1.2	1.7	1.2	0.6	1.2
Onion den	71	126	53.2	5.6		28.6	10.3			2.4
TOTALS/MEANS	186	297	57.2	15.8	6.1	12.8	5.4	0.7	0.3	1.7
<i>Adult, pup and intermediate</i>										
Kathleen den	335	513	54.6	18.8	8.8	0.6	4.1	7.0	2.5	2.6
Onion den	118	208	49.0	4.8		26.0	11.1	6.3		2.9
TOTALS/MEANS	453	721	52.9	15.5	6.2	7.9	6.1	6.8	1.8	2.6

rel and microtines) together represented in frequency of occurrence 35.7% of food items, a figure comparable to that reported in two other studies in mountainous areas: 32% for scats collected in summer in the Jasper and Banff National Parks⁸ and 31% for scats collected all year in Mount McKinley National Park, Alaska⁹.

Eaten infrequently were Dall sheep and mountain goats, although the former was present in scats in the Kathleen Lake valley and the latter in those from the Onion Lake valley. Murie⁹ found Dall sheep to be an important food item for wolves (26%) in Mount McKinley Park. Conversely, Cowan⁸ found bighorn sheep (*Ovis canadensis*) in only 8% of summer food items, and recorded only one goat kill, remarking that "the preferred terrain of goats seems to render them almost immune to attack by wolves". Carbyn¹⁰ reported 1-3% sheep and no goats in summer scats in Jasper National Park in the early nineteen-seventies. The data obtained during the present study support the conclusion that normally the two species are relatively inaccessible to wolves.

The high percentage occurrence of arctic ground squirrels especially in the scats of pups (28.6%) at the Onion den is unusual; it is explained by the fact that the den was surrounded by a colony of squirrels. The results demonstrate the use of a local non-ungulate prey species available close to a den. Cowan⁸ found only 4% occurrence of Columbia ground squirrel (*Citellus columbianus*) in scats from Jasper and Banff National Parks: Kuyt¹¹ found only 1.1% arctic ground squirrel in scats collected in spring and summer near the Thelon River, N.W.T.; and Carbyn¹⁰ found Columbia ground squirrels only once in 671 scats collected at dens and rendezvous sites at Jasper, although "dense colonies of ground squirrels were within 2-3 miles [3.2-4.8 km] radius of the sites". Ground squirrels were not available in the vicinity of the Kathleen den.

ACKNOWLEDGMENTS

Data were collected as part of the junior author's work towards an MA thesis. The research was supported by grants to the senior author from the Arctic Institute of North

America. Logistic support was provided at the Institute's Icefield Ranges Research Station at Kluane Lake.

John B. Theberge
Thomas J. Cottrell
Faculty of Environmental Studies
University of Waterloo
Waterloo, Ontario, Canada

REFERENCES

- ¹Rowe, J. S. 1959. Forest regions of Canada. *Canada, Department of Northern Affairs and Natural Resources, Bulletin* 123.
- ²Douglas, G. W. 1974. Montane zone vegetation of the Alsek River region, southwest Yukon. *Canadian Journal of Botany*, 54(12):2525-32.
- ³Muller, J. E. 1967. Kluane Lake map-area, Yukon Territory. *Canada, Geological Survey, Memoir* no. 340.
- ⁴Theberge, J. B. 1976. Bird populations in the Kluane Mountains, southwest Yukon, with special reference to vegetation and fire. *Canadian Journal of Zoology*, 54(8): 1346-55.
- ⁵Peterson, R. O. 1974. Wolf ecology and prey relationships in Isle Royale. (Unpublished Ph.D. thesis, Purdue University, Lafayette, Indiana).
- ⁶Williamson, V. H. H. 1951. Determination of hairs by impressions. *Journal of Mammalogy*, 32:80-84.
- ⁷Adorjan, A. S. and Kolenosky, G. B. 1969. *A Manual for the Identification of Hairs of Ontario Mammals*. Toronto: Ontario Department of Lands and Forests (Research report on wildlife).
- ⁸Cowan, I. McT. 1947. The timber wolf in the Rocky Mountain National Parks of Canada. *Canadian Journal of Research*, 25(5):139-74.
- ⁹Murie, A. 1944. The wolves of Mount McKinley. *U.S., National Park Service, Fauna Series* no. 5.
- ¹⁰Carbyn, L. N. 1975. Wolf predation and behavioural interactions with elk and other ungulates in an area of high prey density. (Unpublished Ph.D. thesis, University of Toronto, Ontario.)
- ¹¹Kuyt, E. 1972. Food habits of wolves on barren-ground caribou range. *Canada, Wildlife Service, Report Series* no. 21.