

sustained squeals. The ground squirrel broke free only to be caught again and continue its squealing. During this attack, two other ground squirrels emerged from a nearby burrow, joined the tracas, and attacked the weasel. One of the joining ground squirrels was a yearling but I was unable to classify the other one. After a few seconds, the weasel broke off its attack and ran down slope with one of the ground squirrels pursuing it for a distance of 1.5 to 2 m. While I watched the chase, the other two ground squirrels entered burrows. I did not see if or how badly the first ground squirrel was injured. The ground squirrel that chased the weasel returned to the site and entered a burrow.

I do not know if the ground squirrels were siblings or otherwise related. Because of the short distance between where the first ground squirrel encountered the weasel and the burrow from which the other ground squirrels emerged to join the fight, they could have been from the same family group. Mobbing is an antipredator behaviour that has been observed for many species of birds (Curio 1978). Fewer reports occur for mammals (Smythe 1970; Owings and Coss 1977; Morse 1980). One explanation for mobbing, "aiding a distressed relative", is based on kin selection (Curio 1978).

Another explanation of mobbing is that it is a means of cultural transmission by which a young individual learns to recognize a predator (Curio 1978). Because I do not know if the ground squirrels that I observed were related, their mobbing of the weasel could be explained by either of these hypotheses.

#### Literature Cited

- Curio, E. 1978. The adaptive significance of avian mobbing. I. Telenomic hypotheses and predictions. *Zeitschrift für Tierpsychologie* 48: 175-183.
- Harvey, P. H., and P. J. Greenwood. 1978. Antipredator defence strategies: some evolutionary problems. Chapter 5, pages 129-151, in *Behavioural ecology, an evolutionary approach*. Edited by J. R. Krebs and N. B. Davies. Sinauer Associates Inc., Sunderland, Massachusetts.
- Morse, D. H. 1980. Behavioral mechanisms in ecology. Harvard University Press, Cambridge, Massachusetts.
- Owings, D. H., and R. G. Coss. 1977. Snake mobbing by California ground squirrels: adaptive variation and ontogeny. *Behaviour* 62: 50-69.
- Smythe, N. 1970. On the existence of "pursuit invitation" signals in mammals. *American Naturalist* 104: 491-494.

Received 1 June 1989

Accepted 26 February 1990

## Possible Use of Wolf, *Canis lupus*, Den Over Several Centuries

L. DAVID MECH and JANE M. PACKARD<sup>1</sup>

North Central Forest Experiment Station, 1992 Folwell Ave., St. Paul, Minnesota 55108

<sup>1</sup>Department of Wildlife and Fisheries Sciences, Nagle Hall, Texas A&M University, College Station, Texas 77843-2258

Mech, L. David, and Jane M. Packard. 1990. Possible use of Wolf, *Canis lupus*, den over several centuries. *Canadian Field-Naturalist* 104(3): 484-485.

Radiocarbon dating of bones found at a Wolf den on Ellesmere Island suggest it probably was used by Wolves over 700 years ago.

Key Words: Wolf, *Canis lupus*, den, Ellesmere Island, Musk-ox, *Ovibos moschatus*.

Wolves (*Canis lupus*) sometimes use dens in which to rear pups for several consecutive years, or intermittently over long periods. The longest documented case involves the East Fork den in Denali National Park (formerly Mount McKinley National Park), Alaska. Murie (1944) first recorded Wolves using that den in 1940 and 1941, and United States National Park Service records indicate that it has been used intermittently since. It has also been used annually from 1986 through 1989 (L.D.M., unpublished data). The present report provides evidence for the possible use of a den on Ellesmere Island, Northwest Territories, over a period of 700 years or more.

The den was a rock cave at the base of an igneous-intruded sandstone rock face (Mech 1987, 1988) on west-central Ellesmere Island (80°N, 86°W). The entrance was about 1-meter wide, and tunnels and a chamber stretched for several meters. Outside the den were nearby boulders and rock outcrop throughout which smaller tunnels used by pups wound. The den overlooked a small valley through which a stream flowed some 30 meters below. Seven adults and six pups used the den in 1986, six adults and five pups in 1987, and four adults and four pups in 1988.

Numerous old and fresh bones of prey, primarily Muskox (*Ovibos moschatus*), littered the area

within about 10 meters of the den, some of which were partly covered with soil. Adult Wolves were observed carrying pieces of prey including bones back to the den. Both adults and pups chewed fresh bones around the den.

Three well-weathered Muskox bones were collected and radiocarbon dated by GeoChron Laboratories, Cambridge, Maine<sup>1</sup>. One was considered post-1950 because of incorporation of carbon from nuclear testing, one was aged at  $232 \pm 70$  years, and one  $783 \pm 200$  years. The last would indicate Wolf activity around the den sometime between the years 1005 and 1405.

These bones do not prove Wolf use of the den centuries ago, since conceivably Wolves or other animals brought the old bones to the den more recently. However, hundreds of hours of watching Wolves around the den failed to demonstrate that Wolves brought back any bones other than those with at least some flesh attached. Furthermore, if Wolves tended to bring old bones to the den, there should have been hundreds of bones there, since such bones are common on the surrounding tundra. An alternate explanation for the presence

of the old bones around the den is that Muskoxen just died there long ago.

Considerable ground travel within 30 km of the den indicated no other rock caves large enough to fit adult Wolves. This fact, plus the permafrost that prevented digging of dens, probably helps explain why this den, which was so well suited to sheltering adult Wolves and pups, has been used for so many years.

#### Acknowledgments

Funding for this project was provided by the National Geographic Society. Logistical support came from Atmospheric Environment Service and the Polar Continental Shelf Project. We also thank Renewable Resources, Northwest Territories for the permit to study this den.

#### Literature Cited

- Mech, L. D. 1987. At home with the arctic wolf. *National Geographic* 171(5): 562-593.
- Mech, L. D. 1988. *The arctic wolf: living with the pack*. Voyageur Press, Stillwater, Minnesota. 128 pages.
- Murie, A. 1944. *The wolves of Mount McKinley*. United States Government Printing Office, Washington, D C. 238 pages.

<sup>1</sup>Mention of commercial manufacturers does not imply endorsement by the United States federal government.

Received 6 June 1989  
Accepted 6 March 1990