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RESISTANCE OF YOUNG WOLF PUPS TO INCLEMENT WEATHER

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Three observations of young wolf (*Canis lupus*) pups in Denali National Park and Preserve, Alaska, and two on Ellesmere Island, Northwest Territories, Canada, indicate that pups <33 days of age are highly resistant to inclement weather, contrary to earlier conjecture.

Key words: *Canis lupus*, wolf pups

Based on information about young dog (*Canis familiaris*) pups, Mech (1970) concluded that wolf (*Canis lupus*) pups 0–2 weeks old probably do not thermoregulate well. This problem, plus the relative immobility of young pups, was thought to explain why pups generally remain inside dens until ca. 3 weeks of age. No further information to support or refute this contention has been published. Here I report more detailed information about the tolerance of young wolf pups to exposure.

METHODS AND RESULTS

The first observation was made in Denali National Park and Preserve, Alaska, at 63°N, 151°W on 15 May 1990. A radiotagged female was seen from the air to be lying on her side in a shallow depression, or "pit den" (Mech, 1991), on the top of a gentle rise in the tundra near Thorofare Pass, and on 31 May at least two newborn pups were observed with her. This wolf had been seen elsewhere on 14 May looking very heavy, so the pups probably were born ca. 15 May. The female appeared to spend most of her time during the first 10 days after the pups' birth in the pit with the pups. She moved the pups several times in the next few weeks, but not until 27 July were they found at a site with den holes, some 6.5 km away. During the intervening period, as much as 7 cm of snow fell in the area during one snowfall, and temperatures to -2°C were recorded at a warmer station many km away. At least 11 cm of rain also fell before the pups were in the den

holes, 8.8 cm during 1–27 July. Two pups survived with this female at least until 5 February 1991.

A radiocollared male was located near Eagle Gorge in Denali National Park and Preserve on 21 May 1991. An adult wolf, which was either this animal or a packmate, was observed from the air with four pups that appeared to be 2–3 weeks old climbing over it. One of them then struggled for 1–2 m across snow. On the same day, near Foraker River two to three pups about the same age were observed out on the bare ground with a pair of adult wolves. Pups from the first pack survived at least through September 1991 and from the second pack through at least August 1991.

On Ellesmere Island, Northwest Territories, Canada (80°N, 86°W), a female wolf was found in a pit den on 23 June 1990 with a pup estimated to be 10-days old (Mech, 1991). The adult was identified from appearance and behavior as a 3-year-old animal that I had observed as part of a pack habituated to me since 1986 (Mech, 1988) and which I had studied for summers 1986–1991. During the next 14 h the pup was left alone for 16% of the time, for periods of 5–63 min. On 24 June the female carried the pup ca. 0.8 km and kept it with her in another open pit near the base of a boulder for ca. 29 h. The female then carried the pup another 2.0 km to a cave in which the female had been raised and which the female had attended as a helper the previous year. The minimum temperature during June 23–25 was 9°C , and the wind 24 km/h; there was no precipitation. The pup survived at least through Novem-

ber 1991, although it appeared to be relatively poorly developed and lightweight.

On 14 June 1991, two male pups 10–14 days old (eyes barely open) were observed in the same pit den as in 1990, and no adult was in sight. The temperature was ca. 0°C, and the weather was overcast and windy. Because the pit was below the peak of a ridge and because the pups were in the pit, they may not have been so subject to the wind. The same female as observed in 1990 at this pit appeared 10 min later. For the next 4 days this female left the pups alone in the pit den for periods of 6–156 min totaling 38% of the 40.5 h that I or an assistant observed. On 18 June 1991, the female moved the pups singly 1.6 km to another pit den in the bottom of a valley. They remained there and in a series of three other pits within 100 m through 3 July. The female was away from the pups for periods of 5–311 min, some 47% of the 73.7 h observed during this period. The extreme temperatures from 14 June to 3 July varied from –7 to 28°C; snow fell during 11 of the 20 days, and rain fell on 2 more. On 20 June 7.5 cm of snow accumulated. Total precipitation in rain and snow 14 June–3 July was 10.2 cm. Winds ranged from ≤56 km/h, although the effect on the pups in the pit probably was much less. The pups survived at least through 4 August 1991, and appeared large and robust at that time.

DISCUSSION

Most wolf pups are born in enclosed shelters such as burrows, caves, rock crevices, hollow logs, or old beaver (*Castor canadensis*) houses (Mech, 1970). Thus they are well protected from inclement weather. However, the pit dens in the above observations were unprotected from above, and precipitation could dampen or wet their floors. When the female was away, pups were exposed to low temperatures. At times the female appeared wet and muddy, so when she did shelter the pups with her body they were still exposed to considerable dampness.

Despite exposure of the above pups ≤33 days of age to open air in the instances described above, and despite relatively low temperatures, wind, snow, and rain, the pups

all survived the immediate exposure and in most cases survived at least into autumn. These observations contradict the assumption by Mech (1970) that, because young dog pups do not begin to thermoregulate until ca. 2-weeks old (Scott and Fuller, 1965), neither can wolf pups. Alternatively, if young wolf pups cannot thermoregulate, this disability seems to have no important effect on their survival despite exposure to inclement weather.

Conceivably, more pups may have been born in the pit dens discussed above and had died from exposure before the surviving pups were found at 10–16 days of age. The fact that average litter size for wolves is 5–6 (Mech, 1970) lends some credence to this possibility. Conversely, the long survival of the remaining pups indicates that at least some pups can withstand cold and damp weather.

ACKNOWLEDGMENTS

This project was supported by the United States National Park Service, the National Geographic Society, the United States Fish and Wildlife Service, and the United States Department of Agriculture North Central Forest Experiment Station. The logistical help of the Atmospheric Environment Service of Canada, the Polar Continental Shelf Project, and the Northwest Territories Department of Renewable Resources also is appreciated. T. J. Meier, J. W. Burch, U. Swain, and N. Gedgaudas, L. Daniel, and B. Dale assisted with the field work.

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Submitted 18 May 1992. Accepted 22 July 1992.

Associate Editor was Stephen H. Vessey.

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