

white Swift Foxes. This information suggests that the white color phase and light blue eyes are a genetic mutation that can be inherited by Swift Foxes.

A white pelage and/or light blue eyes have been reported in other canid species. In addition to albino Coyotes documented by Young and Jackson (1951), one litter of Coyotes in Nebraska contained four young that had a white pelage and milky blue eyes, suggesting those characteristics were inherited. Cole and Shackelford (1943) reported that some litters of farm-raised Red Foxes contained all white pups. Gray Wolves exhibit a white color phase, especially in the high Arctic (Miller 1995), and light blue eyes also have been reported in this species (Mech 2000).

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Death of Gray Wolves, *Canis lupus*, in Porcupine *Erethizon dorsatum*, Dens in Wisconsin

ADRIAN P. WYDEVEN¹, SARAH R. BOLES¹, RONALD N. SCHULTZ¹, and THOMAS DOOLITTLE²

¹Wisconsin Department of Natural Resources, 875 S. 4th Ave., Park Falls, Wisconsin 54552 USA

²Bad River Band of Chippewa, Environmental Protection/Natural Resource Department, Odanah, Wisconsin 54861 USA

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Three Gray Wolves (*Canis lupus*) were found dead in porcupine (*Erethizon dorsatum*) dens in northern Wisconsin between 1996-2000. Use of these dens appeared to be cases of shelter-seeking behavior by wolves suffering from sarcoptic mange.

Key Words: Gray Wolf, *Canis lupus*, Porcupine, *Erethizon dorsatum*, den, sarcoptic mange.

Mammals suffering the affects of debilitating diseases may display unusual behavior in attempts to alleviate discomfort. Gray Wolves (*Canis lupus*) affected by sarcoptic mange may lose normal fears and attempt to seek shelter in areas not normally used by them, including buildings (Todd et al. 1981). During a 35-day period in December 1995-January 1996, four of 25 radio-collared wolves being monitored, including wolf 234M, died with severe mange cases (Wisconsin DNR files). One of the mange affected wolves had also been shot, while effects of sarcoptic mange was the primary cause of death of the other three. We describe one of these wolves with mange seeking shelter and dying in Porcupine (*Erethizon dorsatum*) den in Wisconsin, and describe two additional wolves that died in Porcupine dens in later years.

Wolf populations in Wisconsin have been monitored annually since 1979 by snowtrack surveys, and by livecapturing and radiotracking (Wydeven et al. 1995). On 10 January 1996, a mortality signal was received from adult 234M, a male collared initially

14 May 1994, that appeared to have been living as a loner at the periphery of the Torch River Pack since summer 1996.

Wolf 234M was located in a porcupine den at the base of an uprooted Red Maple (*Acer rubrum*) with an opening height of 25 cm and width of 50 cm (Figure 1). The site was in a lowland of mixed conifer-hardwoods in Ashland County, Wisconsin (latitude 46° 4' N, longitude 90° 38' W). Wolf 234M was detected on mortality mode at 1345, and the carcass was located at 1600 on 10 January; he had last been detected alive on 3 January 1996 1.6 km to the northeast.

The wolf was suffering from advanced stages of sarcoptic mange, and porcupine quills covered extensive areas of the body (Figure 2). Sarcoptic mange as well as heart failure and systemic infection appeared to be the main causes of death (N. J. Thomas, personal communication). At the time of death, 43-50 cm of snow covered the ground, and night temperatures were -24°C or lower.



FIGURE 1. Dead wolf at entrance to Porcupine den in northern Wisconsin 10 January 1996.

Wolf 234M had been dead for 24 or more hours at the time the carcass was found. A Porcupine continued to visit the den site after the death of the wolf, as evident by urine and fresh Porcupine tracks at the entrance, and it may have just left the den site when we initially approached, and was observed about 20 m from the den. It is unknown whether the wolf had entered the den while the Porcupine was using it, or if the Porcupine had moved in after the wolf had occupied the den.

Two additional cases of wolf use and death in Porcupine dens have been observed in Wisconsin in recent years. On 17 December 1997 wolf 243F, the alpha female of the Miles Lake Pack in northeastern Price County (latitude 45° 59'N, longitude 90°6' W) was found dead in an uprooted White Cedar (*Thuja occidentalis*) cavity full of Porcupine droppings. The wolf had severe alopecia and apparently died due to the effects of sarcoptic mange. Her two pups had died from a combination of mange and parvovirus during the previous summer (N. J. Thomas, personal communication).

On 27 January 2000, a radio-collared female wolf was found dead in a Porcupine den at the base of a Silver Maple (*Acer saccharinum*) in the Bad River Indian Reservation of Ashland County (latitude 46° 28'N, longitude 90°6'W). The wolf had been the alpha female of the West Firelane Pack which consisted only of three wolves in early winter. All pack members were observed to have sarcoptic mange. The female wolf also apparently died from the effects of sarcoptic mange.

Sarcoptic mange was first identified in Great Lakes wolves in late 1991 (Wydeven et al. 1996), and seemed

to affect most intensely the Wisconsin wolf population in 1992-1993 (Wisconsin Department of Natural Resources, 1999). Wolves affected by this disease appear to be willing to use any shelter available. Along with wolves dying inside of Porcupine dens, one adult female (203F) with severe alopecia died after being retrieved from a garage on 14 January 1993, and a yearling male (276M) was found dead in an old wolf den on 15 January 1998.

The use of Porcupine dens by wolves appears to be an extreme case of shelter-seeking behavior by individuals with advanced sarcoptic mange at the coldest time of the year. Because all the documented use of these Porcupine dens was by wolves that died, the behavior seemed to have minimum benefits. In 24 years of monitoring wolves in Wisconsin, we are unaware of healthy wolves using Porcupine dens. The use of their dens did not seem to disrupt the use of dens by Porcupines, which also share their dens with conspecifics during winter months (Griesemer et al. 1996).

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FIGURE 2. Wolf 234M, adult male, with severe alopecia due to sarcoptic mange and imbedded Porcupine quills, 10 January 1996.

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