

## POLYGYNY IN A WILD WOLF PACK

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Wolf (*Canis lupus*) mating systems vary considerably, but it is difficult to obtain data on the subject from wild wolves (Harrington et al., 1982). To date, no clear record of polygyny in wild wolves has been reported, although male wolves that we studied have bred different females in different years. Herein, we document the breeding of two females by a single male wolf during the same breeding season and the raising of pups by both females.

All three animals were radio-tagged and aerially radio-tracked in the central Superior National Forest of northeastern Minnesota (Mech, 1974). The two females were thought to be littermates born in 1984; one was captured as a pup on 24 November 1984, and the other as a probable yearling 2 km away on 16 July 1985. During winter 1984-1985, the aforementioned female was part of a pack of six (Fig. 1).

From the date that both females were radio-tagged to 30 September 1986, their ranges overlapped considerably (Fig. 1), and they were found by telemetry either near each other or together two of 45 times they were located, 3 and 7 October 1985. Their ranges were primarily outside the known territory of the pack of six (Fig. 1). On 7 May 1986, the first-captured female was found 64 km E of its previous locations, but it returned to its natal range a week later.

A male wolf, radio-collared on 11 July 1986, was an adult member of a pack of  $\geq 10$  whose territory lay about 18 km S of the ranges of the two females. The last time the male was known to be in its pack's territory was 30 October 1986. Subsequently, it was found twice between areas occupied by its pack and those of the females. The first time the male was located in the range of the females, 24 November 1986, it was seen with both of them. At five locations determined between 7 October and 10 November 1986, the females were near or with each other twice.

From 24 November 1986 through 3 April 1987, the three animals were located together based on telemetry 49 of 50 times (Fig. 1); on 1 December 1986 the female marked in 1985 was away from the other two wolves. All three were observed together 19 times, and no other wolves were ever seen near them. The breeding season in this region can be from 28 January through 4 March (Mech and Knick, 1978), so the male was the only possible consort of these females.

After 3 April 1987, the latter female was never found with either of the other two wolves. It may be significant that it lacked a hind foot. On 6 April 1987, the crippled female was near the area where the other female later dened while it was about 1 km away. The crippled female was first known to den on 17 April 1987 about 21 km W of where the other female dened between 17 and 24 April (Fig. 1). From 6 April through 5 August 1987, the latter female was found by telemetry with or near the male during 16 of 32 times they were located. The male was found near the den of the female caught in 1984 several times

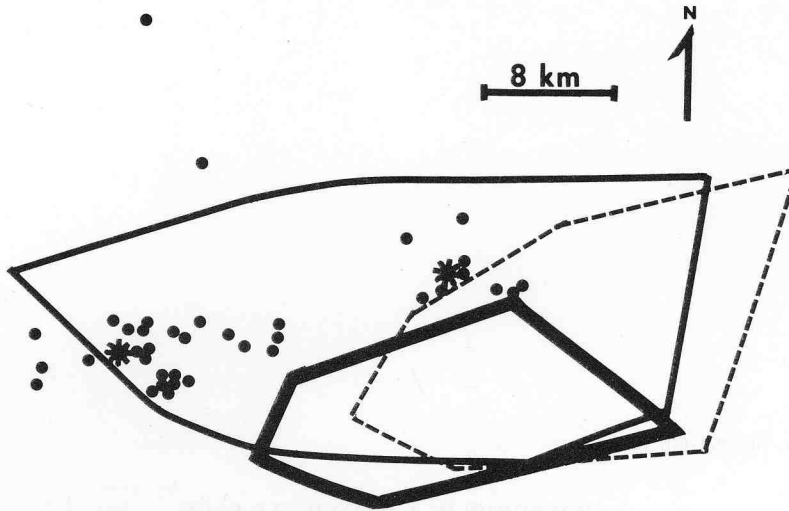


FIG. 1.—Ranges of two female wolves bred by a single male during the 1987 breeding season in northern Minnesota. The thick solid line represents the range of the pack of six wolves of which the female caught in 1984 had been a member and the dashed line its range as a lone wolf (two points E of range not shown, including one 64 km E). The thin solid line represents the range of the other (crippled) female as a lone wolf. Dots represent locations at which male and both female wolves were found together; asterisks indicate locations of dens at which females had pups (crippled female westernmost).

and spent most of its time in the range of that female. The male's radio signal was heard near the den of the crippled female a few times during the summer, but never for more than a few minutes.

The male was killed about 9 August 1987, apparently by a moose (*Alces alces*). Four pups were observed with the crippled female on 13 August 1987, and two with the other female on 16 June 1987. The former was known to have scavenged heavily at a carcass dump throughout summer. On 16 March 1988, the latter was seen with three other wolves, and on the next day, the crippled female was observed with three other wolves. Because pups cannot be distinguished readily from adults after autumn, we cannot conclude definitively that the pups of both females survived through winter. However, unless the females joined packs inhabiting their own territories, an unlikely occurrence, it is highly probable that at least some of the animals seen with them in March were 1987 pups. In either event, an adult male could also have joined either group. In 1988, the first-caught female denned, but whether the other female did was unclear.

This record of successful polygyny in free-ranging wolves demonstrates greater flexibility in wolf mating systems than thought previously. It is perhaps significant that the two females involved had a high probability of being sisters.

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