

PREMATURE REPRODUCTIVE ACTIVITY IN WILD WOLVES

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This note discusses two female wolves that showed signs of reproductive activity despite anatomical evidence that they were reproductively immature.

Some female wolves can conceive at 10 months of age (Medjo and Mech, 1976; Zimen 1976), but most do not breed until at least 22 months old (Seal et al., 1979). The youngest wild female wolf known to have produced pups was 3 years old, although evidence from nipple size and condition indicated that a 2-year-old wolf produced pups that died before 4-months old (Mech, 1987). Captive wolves sometimes undergo pseudopregnancy (Seal et al., 1979), a condition in which a non-pregnant female with a *corpus luteum* sustains a hormonal and behavioral state indistinguishable from that of a pregnant animal at about 2 months post-estrus (Johnston, 1986). Pseudopregnancy has not been reported from wild wolves.

On 9 May 1970 wolf 2202 of unknown age and weighing 38.6 kg was live trapped in St. Louis County, Minnesota. Her nipples were flaccid and about 3 mm wide, an area of about 28 cm² around each was barren of guard hair (although underfur was present), and white, milk-like material was squeezed from each. The wolf was tagged and released, and on 25 March 1971 she was killed; she weighed 36.8 kg. Her reproductive tract was of mature size, but no placental scar, developing follicle, *corpus luteum*, or *corpus albicans*, was apparent upon gross examination.

The second wolf, 6433, was born in April 1982 to 8-year-old radioed female 5176 and radioed male 5132, who was at least 9-years old (Mech, 1987). Wolf 6433 was live trapped and radio-tagged as a pup on 19 September 1982 and was caught twice more in 1982 and twice in 1983. Luteinizing hormone (LH) levels at each capture indicated that 6433's hypothalamic-pituitary axis was normal, that she was not a functional castrate, and that in December 1982 she was approaching puberty. Her movements were monitored regularly until her death about 8-14 February 1985.

On 22 November 1983, # 6433 was first found outside her natal pack's territory, and 53 of 55 subsequent radio-locations in the next 6 months were outside her natal territory. She was first seen with another wolf on 11 January 1984 and, of the next 15 times she was observed, she was with a companion 12 times. On 12

March we identified her companion as radioed male 6496. This animal was found with 6433 during 17 of the next 32 radio locations, the last of which was on 11 June 1984. Wolf 6433 had alternated between an area of 59 km² and one of 146 km² whose centers were almost 18 km apart from the time she was first seen with a companion through 11 June.

From 5 through 29 April 1984, wolf 6433 localized in an area of 3.5 km² in the center of the larger area, as though denning, and male 6496 was found with her 5 of 7 times then. (Wolf 6433's mother, 5176, began localizing around her own den on 5 April and produced pups; she was not found away from her denning area until 11 June 1984.)

About 2 May 1984, 6433 left her area of localization, and by 25 June she had returned to her natal territory. The last time she was found with male 6496 was on 11 June, after which he resumed movements typical of a lone wolf (Mech and Frenzel, 1971; Fritts and Mech, 1981). On 10 July, 6433 was found within 75 m of her mother 5176 near 5176's den. Through 4 December during all 43 of her radio locations, 6433 remained in her natal territory, and 31 times she was found with her mother. During 4 of 10 locations from 11 December through about 12 February 1985, 6433 remained alone primarily along the edges of her natal territory. She once ranged as far as 13 km away to the south end of where she had localized in April. About 12 February 1985 she died after having been caught accidentally in a trap. Her reproductive tract showed no placental scar, *corpus luteum*, *corpus albicans*, or developing follicle when examined grossly or histologically.

Apparently neither wolf 2202 nor wolf 6433 had been pregnant or pseudopregnant, yet 2202 showed mammary activity, and 6433 paired and localized during the denning season. Conceivably either or both wolves had been pseudopregnant and their *corpora lutea* had regressed so thoroughly that there was no sign of them when examined 10 months later. However, each animal's tract was examined during one estrous period later, and new follicles or *corpora lutea* should have been apparent. Thus it seems unreasonable that each had had *corpora lutea* a year earlier. The only other conclusion seems to be that the degree and type of movement and reproductive activity that wolves 2202 and 6433 showed are progesterone-independent, unless adrenal production of progesterone was involved.

The physiological factor that caused wolf 6496 to remain with 6433 through gestational and denning season, 6433 to localize during denning season, and 2202 to show mammary activity remains unknown. Presumably the failure of 6433 to produce pups had some influence on why she stopped localizing after 29 April and why she and her mate split after 11 June. However, lack of pups is not sufficient for pair splitting because we have seen several cases where previously reproductive pairs that had not produced pups during a given year, or had lost them early, remained together. Perhaps only pairs that have never raised pups split upon first reproductive failure.

Why some wolves do not form *corpora lutea* is unknown. Wolf 6433 seemed to be maturing normally when 8 months old as indicated by her LH response to LH releasing hormone (LRH) challenge. Nevertheless she did not even show signs of ovulation when almost 3 years old. Wolf 2202 was at least 1 year old when first examined, and based on incisor wear, was probably 2 or 3 years old. When killed, she was at least 22 months old yet showed no sign of ovulating. Weight does not seem to be a factor because both 6433 and 2202 were heavier than known breeders in the area, at least when originally captured (Mech unpublished). (Wolf 6433 upon her death weighed only 19 kg. A wounded foot indicated that she had spent time in a trap before escaping and perishing, so condition could have been a factor in her failure to gain breeding condition when almost 3 years old.)

The events described above cannot be considered pseudopregnancy because of the lack of *corpora lutea*. Nevertheless they seem to mimic pseudopregnancy. The occurrence of both phenomena suggests that unfulfilled reproductive activity has adaptive value under some circumstances. Perhaps it allows both physiological and behavioral practice under ecological conditions when raising pups might be nutritionally detrimental.

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