

## Breeding Season of Wolves, *Canis lupus*, in Relation to Latitude

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A significant relationship was found between Wolf (*Canis lupus*) breeding dates and latitudes between 12° and 80° N, with Wolves breeding earlier at lower latitudes, probably because of differences in seasonality.

**Key Words:** Wolf, *Canis lupus*, reproduction, latitude, breeding, mating.

A general relationship between breeding dates in Wolves (*Canis lupus*) and latitudes from 41°–71°N was noticed by Mech (1970: 117) when he summarized published data from several locales. However, he conducted no statistical test of this hypothesis. Herein, I add data from other areas of latitude from 12° to 80° N (Table 1) and statistically test the effect of latitude.

I used latitude as the independent variable in a simple linear regression and the reported breeding date as the dependent variable. For breeding date, I used the mid date for the reported breeding season and converted all dates to sequential numbers starting with 15 October to facilitate comparing breeding dates before and after the start of the calendar year.

The relationship between breeding date and latitude was highly significant ( $r^2 = 0.74$ ;  $P < 0.0001$ ;  $y = 16.19 + 2.23x$ ), supporting Mech's (1970) hypothesis. On average, breeding season shifts 22

days later with each 10° latitude increase. It seems reasonable to suggest that the shift is related to differences in general seasonality and thus in associated ecological conditions.

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TABLE 1. Mating seasons of wolves at various latitudes.

Location	N Latitude	Season	Authority
Southern India	12°	October	Kumar and Rahmani 2001
Arizona <sup>a</sup>	34°	February, March	W. Brown, personal communication
Illinois <sup>a</sup>	42°	February	Rabb 1968
Yellowstone National Park <sup>b</sup>	45°	February	Smith et al. 1998
Ontario	47°	Early March	Joslin 1966
North Dakota	46°–49°	January	Bailey 1926
Isle Royale (Michigan)	47°	Late February	Mech 1966
Minnesota	48°	February	Mech and Knick 1978; Fritts and Mech 1981; Fuller 1989
British Columbia	51°–53°	March	Cowan 1947
Germany <sup>a</sup>	52°	Mid March	Schonberner 1965
Alberta	60°	February, March	Soper 1942; Fuller and Novakowski 1955
Northwest Territories	60°–65°	Late March	Kelsall 1960
Alaska	60°–71°	March	Murie 1944; Kelly 1954; Rausch 1967; Lentfer and Sanders 1973; Mech et al. 1998
Finland	60°–70°	March	Pulliainen 1965
Russia	71°	Late March–early April	Makridin 1962
Ellesmere Island	80°	Late March–early April	Mech 1993

<sup>a</sup>Captive wolves

<sup>b</sup>Wolves translocated from 53–56° N.

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