

Mustela nigripes. By Conrad N. Hillman and Tim W. Clark

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Mustela nigripes Audubon and Bachman, 1851

Black-footed Ferret

Putorius nigripes Audubon and Bachman, 1851:297. Type locality Fort Laramie, Goshen Co., Wyoming.
Mustela nigripes Miller, 1912:102.

CONTEXT AND CONTENT. Order Carnivora, Family Mustelidae, Genus *Mustela*, Subgenus *Putorius*. There are about 14 living species of *Mustela* including three of *Putorius*. No subspecies of *M. nigripes* have been recognized.

DIAGNOSIS. *Mustela nigripes* is about mink-sized; upper parts are yellowish buff, occasionally whitish, especially on the face and venter (Fig. 1); feet are black; tail is tipped with black; mastoid process is notably angular (Fig. 2) (Long, 1965). Ferrets (subgenus *Putorius*) differ from other *Mustela* (weasels and mink) in being larger than weasels and in having the following combination of characters: ventral and dorsal pelage without sharp boundary (it is present in some species of weasels); light and dark markings present on face (lacking in most weasels and mink); legs darker than body; body yellowish brown or whitish and somewhat obscured by darker guard hairs; and more angular mastoid process. The black-footed ferret differs from the Old World ferrets (*M. putorius*) in having greater contrast between blackish feet and paler body, and usually shorter black part of tail (distal third or less). Pelage differences between *M. eversmanni* and *M. nigripes* are very slight. Anderson (1977) examined 19 skulls of *M. eversmanni* and 79 skulls of *M. nigripes*; there were no significant differences in size between the two species.

GENERAL CHARACTERISTICS. Range of external measurements (in mm) of adult males: total length, 500-533; length of tail, 114-127; length of hind foot, 60-73; ear from notch, 29-31. Basilar lengths of skull of two males from Coolidge, Kansas, are 62.2 and 66.8 mm, and zygomatic breadths are 38.8 and 43.0 mm. Tail vertebrae are 17 in number, and their combined length is 22 to 25% of length of head and body. Females average approximately 10% smaller than males in linear measurements (Hall and Kelson, 1959).

DISTRIBUTION. Formerly, black-footed ferrets were found throughout the Great Plains, mountain basins, and semi-arid grasslands of North America (Fig. 3). The geographic range of the black-footed ferret nearly coincides with the range of the prairie dogs (*Cynomys* spp.) (Hall and Kelson, 1959).

Although the past history of the ferret is poorly understood, Hillman (1974) noted that ferrets may have been more abundant than previously reported. Recent evidence reported by Clark (1978) showed that ferrets occurred further west in Wyoming than previously known. The present range is unknown, but it is certainly much smaller than the historic range. Several records (mostly unverified) from Montana, North Dakota, South Dakota, Nebraska, Oklahoma, Kansas, Wyoming, Colorado, and New Mexico were reported in Linder and Hillman (1973). It appears that several remnant ferret populations may remain in parts of its former range.

FOSSIL RECORD. The earliest record of *M. nigripes* is from an upper Illinoian deposit in Clay County, Nebraska. It is also known from Sangamon deposits in Nebraska, and Medicine Hat, Alberta. Wisconsin records include Old Crow River, Yukon Territory; Orr Cave, Montana; Jaguar Cave, Idaho; Little Box Elder Cave, Wyoming; Chimney Rock, Colorado; Isleta Cave, New Mexico; and Moore Pit, Texas (Anderson, 1973, 1977). Anderson (1977) reported the presence of ferrets in central Alaska. Comparison of the Alaskan material with both Pleistocene and Recent *M. (Putorius) nigripes*, Recent *M. (P.) eversmanni*, and Recent *M. (P.) putorius* showed that the specimens most closely resemble *M. (P.) eversmanni michnoi*. The question of conspecificity between *M. nigripes* and *M. eversmanni* is yet to be resolved.

Ferrets are thought to have entered the New World from Siberia, spread across Beringia, and then advanced southeastward to the Great Plains through ice-free corridors. Prairie dog (*Cynomys*) remains were found at six of the Pleistocene sites yielding ferrets. Apparently, ferrets and prairie dogs have remained in close association to the present (Clark, 1975).

ONTOGENY AND REPRODUCTION. Aspects of the reproductive biology of captive ferrets were described by Hillman and Carpenter (unpublished manuscript). Captive females en-



FIGURE 1. A black-footed ferret in a prairie dog burrow. Note distinct black mask and feet.

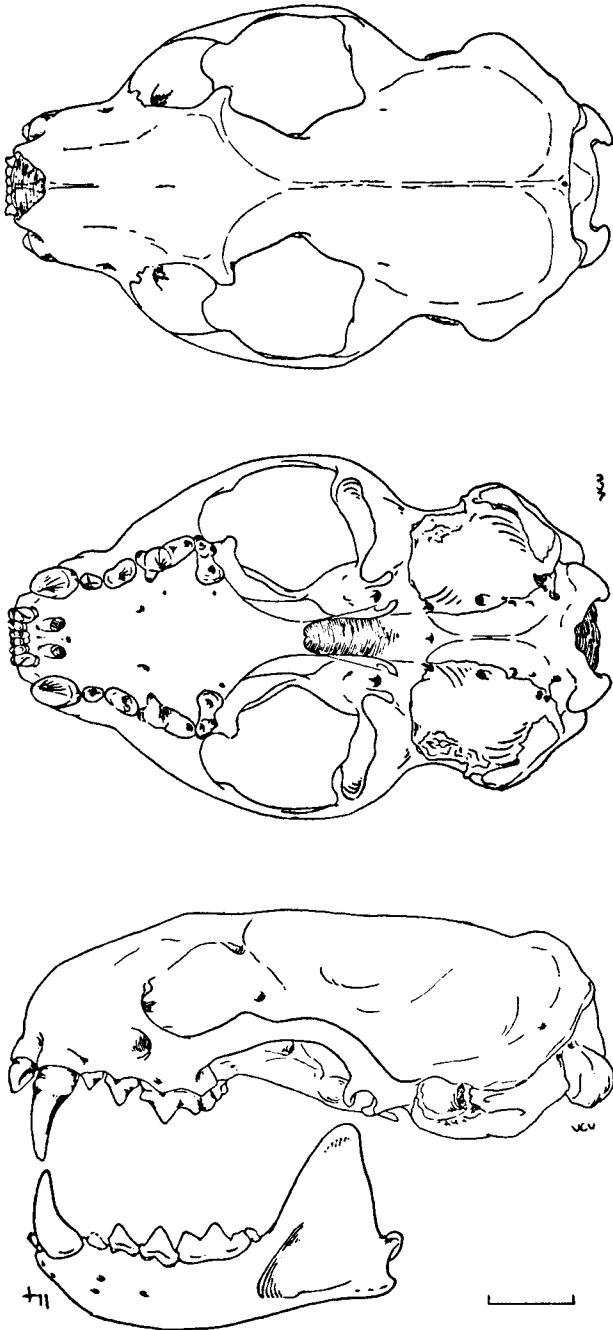


FIGURE 2. Views of skull of *Mustela nigripes* (from Hall and Kelson, 1959:915, by permission of Ronald Press, Inc., New York). The scale represents 10 mm.

tered breeding condition in late February to early March. Length of proestrus lasted 21–28 days; estrus was characterized by vulvar swelling and a sparse mucus-like discharge. Copulation occurred in March and early April, and gestation of one female in two breeding seasons was 42 and 45 days. Litter size of wild females ($N = 11$) averaged 3.5 (range 1 to 5) (Linder et al., 1972). Two litters of five each were produced in captivity; description and measurements of young were described by Hillman and Carpenter (unpublished manuscript). However, information on growth and development is lacking as young did not survive. Young ferrets are rarely observed in the wild before appearances above ground in July, at which time most young approach adult size (Hillman and Linder, 1973).

ECOLOGY. Historical and recent literature document the close association of black-footed ferrets and prairie dogs (Seton, 1929; Cahalane, 1954; Hall and Kelson, 1959; Henderson et al.,

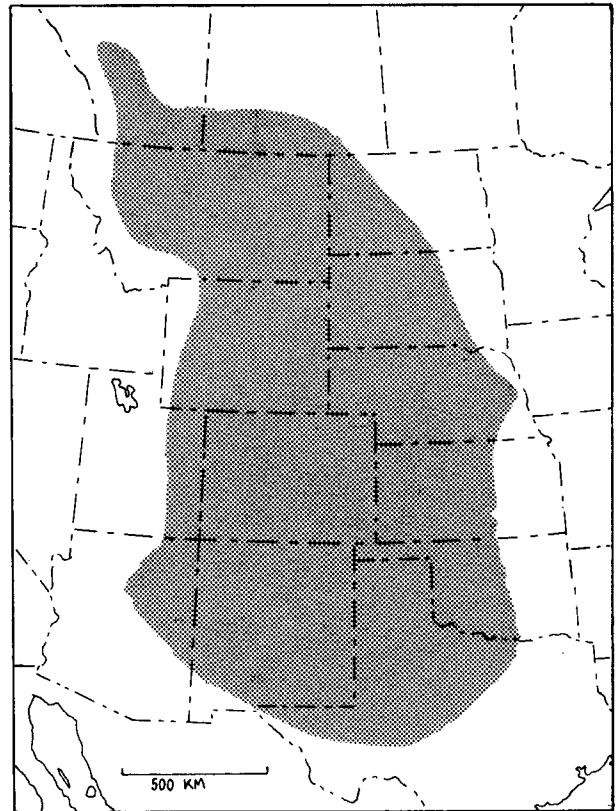


FIGURE 3. Distribution of *Mustela nigripes* in central North America (modified from Hall and Kelson, 1959:915).

1969; Linder et al., 1972; Hillman and Linder, 1973; and Hillman, 1974). Ferrets prey on prairie dogs and utilize their burrows for shelter and denning. Sheets et al. (1972) found prairie dog remains in 91% of the ferret scats analyzed ($N = 82$); mice (unidentified) occurred in 26% of the scats. Alternate prey may be important if prairie dogs are not available (Lock, 1973; Clark, 1978). Hillman (1968) reported that ferrets consumed both live and dead thirteen-lined ground squirrels (*Spermophilus tridecemlineatus*), cottontail rabbits (*Sylvilagus floridanus*), deer mice (*Peromyscus* spp.), and birds that were offered in feeding trials.

Predation by ferrets does not significantly reduce prairie dog populations because ferrets tend to kill only what they can eat. Prairie dog numbers declined in portions of towns frequented by ferrets; however, total numbers were not greatly reduced. The comparatively high breeding potential of prairie dogs offsets the effect of ferret predation (Hillman, 1968; Hillman and Linder, 1973).

The distribution and characteristics of prairie dog towns in one area of South Dakota inhabited by ferrets were described by Hillman et al. (1979). Mean distance between prairie dog towns was 2.4 km; mean distance between towns inhabited by ferrets was 5.4 km (range 1.0 to 11.1). Ferrets have a tendency to reoccupy prairie dog towns that they inhabited in prior years. Information on ferret movements and size of home range is lacking, however. The fall dispersal of young ferrets and occasional road-kills suggest that some movements may be extensive (Hillman and Linder, 1973).

Factors that have caused the decimation of ferret populations have been discussed by Seton (1929), Cahalane (1954), Henderson et al. (1969), and many others. The ferret's decline was related to habitat destruction caused by prairie dog control and agricultural land-use changes. Direct effects of man included trapping, shooting, use of toxicants that exhibit secondary poisoning (example, Compound 1080), and highway mortalities.

Many avian and mammalian predators are attracted to prairie dog towns where they may encounter ferrets. Sperry (1941) found ferret remains in three coyote (*Canis latrans*) stomachs. A ferret was found in a golden eagle (*Aquila chrysaetos*) nest, and great horned owls (*Bubo virginianus*) have been observed attempting to take ferrets (Henderson et al., 1969). Domestic dogs and cats

also have been known to kill ferrets. Hillman (1974) suggested that a high mortality rate among young ferrets might occur during fall dispersal if they traveled far before relocating in other prairie dog towns.

Parasites and disease of black-footed ferrets were described by Boddicker (1968), Carpenter et al. (1976), Carpenter and Novilla (1977), and Carpenter and Hillman (unpublished manuscript). Ferrets are extremely susceptible to distemper, and this virus may pose a threat to ferret populations in areas where outbreaks occur among other wild and domestic animals. Inbreeding also has been discussed as a possible limiting factor in remnant populations. A captive male was a monorchid and suffered from diabetes mellitus; both conditions may be heritable. Sylvatic plague has been suggested as a possible threat to ferrets when prairie dog towns are infected, but no case has been reported.

BEHAVIOR. Black-footed ferrets are secretive and rarely observed. Ferrets can only be seen with regularity when females with young are located. The animals are primarily nocturnal except for occasional early morning activity of young. Females den in prairie dog burrows and bring young above ground in early July. The young remain in the prairie dog town until they disperse in September or early October. Hillman (1968) and Henderson et al. (1969) described the daily activity and behavior of females with young. Ferrets are less active in winter, and are probably solitary except during the breeding season in early spring.

Hillman and Carpenter (unpublished manuscript) observed the breeding behavior of captive ferrets. The male sniffed the genital region of an estrus female but made no attempt to mount until the animals had been together for several hours. This lack of aggressive behavior by the male was unlike that observed with Eurasian ferrets (*M. evermanni* and *M. putorius*). During copulatory attempts, the male grasped the female by the nape of the neck and mounted in a prone position. Copulatory ties were prolonged, generally lasting one and one-half to three hours, and were accompanied by whimpering on the part of the female.

Vocalizations of a captive ferret were described by Progulske (1969). In the wild, ferrets chatter and hiss when frightened or alarmed. Females utter whimpering sounds when encouraging their young to follow. Little is known of olfactory communication. Odor recognition, however, aids ferrets in retracing the same course during nightly travels (Hillman, 1968).

Interspecific encounters between ferrets and prairie dogs were recorded by Hillman (1968) and Henderson et al. (1969). Apparently prairie dogs are formidable prey, and ferrets appear reluctant to pursue them above ground. Prairie dogs displayed aggressive behavior towards ferrets, including chase and harassment, direct contact then retreat, and covering of burrows occupied by ferrets.

REMARKS. Because the subterranean habits of ferrets prevent continuous observation, information is lacking on many aspects of the life history and ecology of the black-footed ferret. Renewed interest and funding for studies of rare and endangered species should encourage researchers to learn more of the ferret's status, distribution, and ecological needs.

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