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Mephitis mephitis.

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Mephitis E. Geoffroy Saint-Hilaire and G. Cuvier, 1795

Mephitis E. Geoffroy Saint-Hilaire and G. Cuvier, 1795:187. Type species *Viverra mephitis* Schreber.
Chincha Lesson, 1842:67. Type species *Chincha americana* Lesson [= *Viverra mephitis* Schreber].
Leucomitra Howell, 1901:39. Type species *Mephitis macroura* Lichtenstein. Used only as subgenus for *Mephitis macroura*.

CONTEXT AND CONTENT. Order Carnivora, Family Mustelidae, Subfamily Mephitinae. The genus contains two living species, *M. mephitis* and *M. macroura*.

Mephitis mephitis (Schreber, 1776)

Striped Skunk

Viverra mephitis Schreber, 1776:444. Type locality eastern Canada [= Province of Quebec].
Viverra mephitica Shaw, 1792:171. Type locality unknown.
Viverra nigra Peale and Palisot de Beauvois, 1796:37. Type locality Maryland.
Mephitis americana Desmarest, 1818:514. A composite species.
Mephitis mesomelas Lichtenstein, 1832:pl. 45, Fig. 2. Type locality Louisiana.
Mephitis varians Gray, 1837:581. Type locality Texas.
Chincha americana Lesson, 1842:67. Type locality North America.
Mephitis putida Boitard, 1842:147. Type locality New Jersey.
Mephitis olida Boitard, 1842:147. Type locality unknown.
Mephitis fetidissima Boitard, 1842:147. Type locality unknown.
Mephitis frontata Coues, 1875:7. Type locality Pennsylvania.
Mephitis estor Merriam, 1890:81. Type locality Little Spring, 8,200 ft, N base San Francisco Mountain, Coconino County, Arizona.
Mephitis occidentalis Mearns, 1897:4. Type locality, San Isidro Ranch, Baja California, Mexico, within 2 mi of border of San Diego County, California.
Mephitis spissigrada Bangs, 1898:31. Type locality Sumas, British Columbia, Canada.
Mephitis avia Bangs, 1898:32. Type locality San Jose, Mason County, Illinois.
Mephitis foetulenta Elliot, 1899:269. Type locality near Port Angeles, Clallam County, Washington.
Chincha platyrhina Howell, 1901:39. Type locality S fork Kern River, 3 mi above Onyx, California.
Mephitis minnesotoe Brass, 1911:532. Type locality forested region of Minnesota.
Mephitis dentata Brass, 1911:533. Type locality from the Alleghenies to Connecticut.

CONTEXT AND CONTENT. Context same as for genus. Thirteen subspecies are recognized as follows (Hall, 1981; Miller and Kellogg, 1955):

M. m. avia Bangs, 1898:32, see above (*newtonensis* Brown a synonym).
M. m. elongata Bangs, 1895:531. Type locality Micco, Brevard County, Florida.
M. m. estor Merriam, 1890:81, see above.
M. m. holzerni Mearns, 1897:4. Type locality San Isidro Ranch, within 2 mi United States-Mexico border, 19 mi E Pacific seacoast, Baja California, Mexico.
M. m. hudsonica Richardson, 1829:55. Type locality, plains of the Saskatchewan, Canada (*minnesotoe* Brass a synonym).
M. m. major (Howell, 1901:37). Type locality Fort Klamath, Klamath County, Oregon.
M. m. mephitis (Schreber, 1776), see above (*mephitica* Shaw and *americana* Desmarest are synonyms).
M. m. mesomelas Lichtenstein, 1832:pl. 45 + text, see above (*scrutator* Bangs a synonym).
M. m. nigra (Peale and Palisot de Beauvois, 1796:37), see above (*bivirgata* Hamilton-Smith, *putida* Boitard, *olida* Boitard, *fetidissima* Boitard, *frontata* Coues, and *dentata* Brass are synonyms).
M. m. notata (Howell, 1901:36). Type locality Trout Lake, Skamania County, Washington.
M. m. occidentalis Baird, 1858:195, see above (*platyrhina* Howell a synonym).
M. m. spissigrada Bangs, 1898:31, see above (*foetulenta* Elliot a synonym).
M. m. varians Gray, 1837:581, see above.

DIAGNOSIS. *Mephitis mephitis* is usually distinguishable by the presence of a bifurcate white dorsal stripe and less inflated auditory bulla (Findley et al., 1975; Hall, 1981; Howell, 1901). *M. macroura* may have lateral stripes but they usually do not converge to form a "V" as in striped skunks (Findley et al., 1975).

GENERAL CHARACTERS. Striped skunks are about the size of domestic cats (*Felis catus*), with triangular-shaped heads that taper anteriorly to nearly spherical nose pads. The ears are small and rounded, and the beady black eyes have no nictitating membranes (Smythe, 1961). The legs are stocky and the pentadactyl plantigrade feet have long curved claws (forefeet) or shorter and straighter claws (hindfeet). Usually, there are 12 mammae (range 10 to 15) (Burt, 1946; Verts, 1967).

Typically, the pelage of striped skunks is entirely black except for a white stripe on the nose and forehead and a round white patch on the pate that extends to the rump as two white stripes of various widths (Fig. 1). Occasionally, white markings occur elsewhere on the body (Stains and Stuckey, 1960). The tail is long, bushy, and may contain white hairs or hairs with white bases; in some areas, skunks with least amounts of white have the greatest likelihood of having a tuft of white hairs extending

FIGURE 1. Juvenile striped skunk in typical defensive pose. Note that white stripes extend only about half way to rump, a less common marking pattern. (Photo by W. E. Clark, from Illinois Natural History Survey files.)

FIGURE 2. Dorsal, ventral, and lateral views of cranium and lateral and occlusal views of lower jaw of *Mephitis mephitis* (OSUFW 6206, adult female from Portal, Chiricahua Mountains, Cochise County, Arizona). Condylobasal length of skull is 66.5 mm.

beyond the black hairs of the tail (Verts, 1967). Color morphs, including seal brown, white, and yellow, are known to occur (Detlefsen and Holbrook, 1921).

The skull is heavy, angular, and widest near the posterior attachment of the zygomata. The lateral margins of the mastoid regions are slightly concave posterior to the mastoidal processes; the skull is squarish at the posterior margin. The frontal region is inflated, producing a convex forehead; the narial opening is nearly perpendicular to the ventral plane of the skull. The posterior margin of the palate is about even with the posterior margin of M1 and may be equipped with spines, notches, or both. Older animals possess prominent sagittal and lambdoidal crests (Fig. 2).

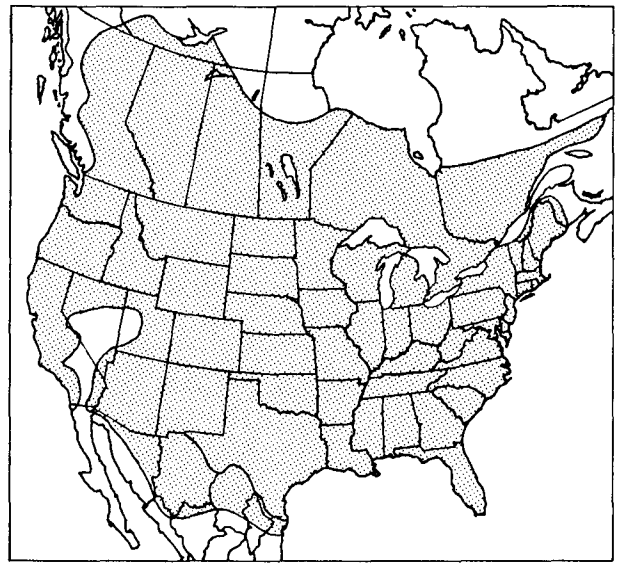

FIGURE 3. Geographic distribution of *Mephitis mephitis*. (Map redrawn after Hall, 1981.)

DISTRIBUTION. Striped skunks occur throughout southern Canada, the United States (except for some arid areas of the Southwest), and nothern Mexico (Fig. 3). Although recorded from 4,200 m (Nelson, 1930), skunks usually are found from sea level to 1,800 m (Grinnell et al., 1937).

FOSSIL RECORD. Skunks likely had their origin in the Paleocene-Eocene family Miacidae although no fossils assignable to Mephitinae were found in deposits earlier than Upper Miocene (Romer, 1966; Simpson, 1945). Fossil Mephitinae are known from Upper Miocene to Upper Pliocene deposits in Europe, Lower Pliocene in Asia, Lower Pliocene to Recent in North America, and Pleistocene to Recent in South America (Romer, 1966; Simpson, 1945). The earliest record of *Mephitis* is from the Broadwater (Nebraska) fauna of late Blancan age, and occurrences from the Irvingtonian age are from Conard Fissure (Arkansas), Inglis IA (Florida), and Coleman IIA (Florida) faunas (Kurtén and Anderson, 1980). Striped skunks were widely distributed in the United States by the end of the Wisconsinan glaciation (Kurtén and Anderson, 1980).

FORM AND FUNCTION. Some striped skunks exhibit considerable individual variation from the typical black and white color pattern, particularly in the length and width of the dorsal stripes. Proportions of samples with different amounts of white show significant geographic variation (Verts, 1967).

Maximum and minimum external measurements (in mm) for adult striped skunks of both sexes throughout the geographic range were: total length, 575 to 800; length of tail, 184 to 393; length of hindfoot, 60 to 90 (Hall, 1981). A large sample of adults of both sexes from northwestern Illinois exhibited nearly as much variation: total length, 520 to 765; length of tail, 173 to 307; length of hindfoot, 59 to 85 (Verts, 1967). Significant geographic variation and significant sexual dimorphism in body measurements were reported (Verts, 1967); females average about 15% smaller than males (Hall, 1981). Cranial measurements also exhibited significant geographic variation and sexual dimorphism; however, overlap in ranges of skull measurements precluded separation of sexes by skull characters (Verts, 1967).

Adult striped skunks of both sexes in the wild range in weight from 1.2 to 5.3 kg (Verts, 1967). Weight losses over winter ranged from 31.6 to 55.1% for females, whereas losses for males ranged from 13.8 to 47.7% (Allen, 1939; Hamilton, 1937; Verts, 1967). Seemingly, most of the losses in weight were from metabolism of stored fat as 32% of the autumn weight was fat, but only 10% was fat in spring (Mutch and Aleksiuk, 1977).

The dentition of striped skunks retains the primitive carnivore characteristic of trenchant, sectorial P4 and m1, but M1 and m2 are modified as crushing teeth (Vaughan, 1978). The dental formula is i 3/3, c 1/1, p 3/3, m 1/2, total 34.

Striped skunks possess paired anal glands encapsulated in strong muscles capable of propelling pungent yellowish musk sev-

eral meters through papillae extruded through the partially everted anus (Blackman, 1911). The musk can be discharged either as an atomized spray or as a short stream of "rain-sized drops" with the latter more common (Verts, 1967). The volatile portion of the musk contains *trans*-2-butene-1-thiol, 3-methyl-1-butanethiol, and *trans*-2-butenyl methyl disulfide (Andersen and Bernstein, 1975) and can be detected by humans at a dilution of 5.8×10^{-9} mg/ml of air (Aldrich, 1896). Musk is an intense irritant to the eyes (Verts, 1967) and acts as a depressant to the central nervous system (Aldrich, 1896); ingestion may cause severe discomfort or death in other mammals.

Female reproductive organs consist of paired ovaries, oviducts, bipartite uteri, and a single vagina. Placentation is endotheliochorial zonary, and a highly vascular, sac-like haemophagous organ that seemingly functions in phagocytosis of maternal blood cells is present (Creed and Biggers, 1964). The male has scrotal testes, epididymides, vasa deferentia, a prostate gland, and a baculum. Seemingly, the occurrence of other male accessory glands was not investigated in *Mephitis*; however, in *Spilogale* the prostate is the only accessory gland present (Mead, 1970). Information concerning seasonal changes in reproductive organs of both sexes is limited (Verts, 1967) although histology of the organs during specific portions of the reproductive cycle was studied (Hagedoorn, 1966; Leach and Conaway, 1963; Verts, 1967; Wade-Smith and Richmond, 1978*a*).

Body temperatures of active striped skunks in winter ranged from 36.2° to 39.0°C ($\bar{X}$ = 37.7°C, n = 264 readings). However, in Manitoba in winter, the body temperature of captive skunks in underground dens was 28.4° to 34.6°C ($\bar{X}$ = 34.4°C, n = 840 readings) and the animals were mildly lethargic (Mutch and Aleksiuk, 1977).

Within the range of body temperatures in active striped skunks, respiration rates were about 36 breaths/min, heart rates about 160 beats/min, and blood sugar about 0.105% (Ellis and Barlow, 1925).

ONTOGENY AND REPRODUCTION. Wild striped skunks throughout their range usually breed during February or March (Bailey, 1971; Hagedoorn, 1966; Hamilton, 1937; Seton, 1929; Verts, 1967; Wight, 1931). In captivity in central New York, skunks bred from mid-February to mid-April, but the greatest number conceived from 15 to 21 March (Wade-Smith and Richmond, 1978*b*). Loss of the first litter, pseudopregnancy after the first mating, or failure to lactate may stimulate onset of a second breeding period in May (Parks, 1967; Seton, 1929; Shadle, 1953; Verts, 1967; Wade-Smith and Richmond, 1978*b*).

Female striped skunks, after attaining the estrous condition, remain receptive until ovulation. Skunks are induced ovulators with ovulation occurring about 42 h (range = 40 to 50 h) postcoitus (Wade-Smith and Richmond, 1978*b*). The first polar body is extruded at ovulation, the second at fertilization. Pronuclear stages are predominant 42 to 48 h after copulation and 3- to 8-cell stages predominate at 72 to 96 h. Morulae (95 or fewer cells) enter the uterus at about 7 days and blastocysts were first observed at 11 days (Wade-Smith and Richmond, 1978*b*). Embryonic spacing, including transuterine migration (Llewellyn and Enders, 1955), and enlargement of uterine swellings begin when blastocysts are formed (Verts, 1967; Wade-Smith and Richmond, 1978*b*). Implantation occurs by 19 days postcoitus (Wade-Smith and Richmond, 1978*b*), but is commonly earlier (Verts, 1967).

Gestation in striped skunks ranges from 59 to 77 days (Seton, 1929; Shadle, 1953, 1956; Verts, 1967; Wight, 1931), with an inverse relationship between the date of mating and the length of gestation (Wade-Smith and Richmond, 1978*b*; Wade-Smith et al., 1980). Captive females mated before 15 March had mean gestations (69.1 ± 4.1 days; n = 33) significantly longer than mean gestations (63.2 ± 2.2 days; n = 26) of females mated after 15 March (Wade-Smith and Richmond, 1978*b*).

Captive females bred on 2 March had progesterone levels that increased more slowly and peaked (32.3 ng/ml) 27 days postcoitus, but females bred on 22 March exhibited relatively rapid increases in progesterone levels that peaked (31.1 ng/ml) 19 days postcoitus. Unmated controls sampled throughout the year had <1 ng/ml progesterone (Wade-Smith et al., 1980). Thus, females that mated early possibly underwent a brief obligate delay in implantation.

Parturition usually occurs in May and early June. Mean litter sizes for wild striped skunks were 5.8 to 7.8 young with individual litters ranging from 2 to 10 young (Bailey, 1971; Hamilton, 1963; Verts, 1967). Among captive striped skunks in New York, mean litter size was 4.2 (n = 118) with a range of 1 to 10 (Wade-Smith and Richmond, 1978*b*). Experienced breeders had larger litters than females that bred for the first time, and second litters were larger than subsequent litters; however, differences were not statistically significant (Wade-Smith and Richmond, 1975).

At birth, striped skunks weigh about 32 to 35 g; in captivity in Illinois they averaged approximately 210 g at 40 days of age (Verts, 1967), whereas in New York they attained that average weight by about day 26 (Shaw, 1928; Wade-Smith and Richmond, 1975). Among neonates, the skin is wrinkled, pinkish, and sparsely covered with hair 2 to 3 mm long; the skin is sufficiently pigmented that the future black and white color pattern is discernable even before birth. Sexes are distinguishable readily at birth by the position of the genital papillae.

Young striped skunks open their eyes at about day 22 (range =17 to 35) (Seton, 1929; Verts, 1967; Wade-Smith and Richmond, 1975). The external auditory meatuses open and young skunks begin to respond to sounds between 24 and 27 days (Verts, 1967). Musk is present at birth (Verts, 1967) and emission can occur as early as day 8; however, musk is not directed toward specific objects until the eyes open (Wade-Smith and Richmond, 1975). Tooth eruption begins at 34 to 40 days and is complete by day 52 (Stegeman, 1937; Verts, 1967) but only the permanent teeth are functional (Verts, 1967). Weaning usually is completed by 8 weeks (Verts, 1967; Wade-Smith and Richmond, 1975). Growth continues at least through November (Verts, 1967) and probably continues at a reduced rate until the first breeding season (about 10 months) if food is available and foraging is possible.

Milk collected during mid-lactation from five striped skunks contained 30.6% dry matter, 13.8% fat, 9.9% protein, 3.0% sugar, and 197 kcal/100 g (Oftedal, 1981). Average intake of milk for 31-day-old young was 26.9 g/day (n = 19) and the average production for lactating females was 151 g/day (n = 5). Estimates of protein and energy requirements for 31-day-old young were 1.5 g/day and 47 kcal/day, respectively (Oftedal, 1981).

ECOLOGY. Density estimates for striped skunk populations ranged from 0.7 to 18.5/km^2 but most were 1.8 to 4.8/km^2 (Allen and Shapton, 1942; Bailey, 1971; Bennitt and Nagel, 1937; Burt, 1946; Jones, 1939; Scott and Selko, 1939; Stout and Sonenshine, 1974; Verts, 1967). Density levels reportedly fluctuated widely between years, possibly in response to outbreaks of diseases (Allen and Shapton, 1942; Brown and Yeager, 1943; Verts, 1967). Skunk populations seemingly have high recruitment and turnover rates because 50 to 71% of striped skunks do not attain an age of 1 year (Bailey, 1971; Casey and Webster, 1975; Verts, 1967). Striped skunks live as long as 10 years in captivity (Schwartz and Schwartz, 1959), but rarely as long as 5 to 6 years in the wild (Casey and Webster, 1975). Of 321 young born in captivity, only 192 (59.8%) survived to weaning (Wade-Smith and Richmond, 1975); most mortality was related to females killing their entire litters.

Great horned owls (*Bubo virginianus*), mountain lions (*Felis concolor*), eagles (*Aquila chrysaetos* and *Haliaeetus leucocephalus*), coyotes (*Canis latrans*), badgers (*Taxidea taxus*), foxes (*Vulpes vulpes* and *Urocyon cinereoargenteus*), and bobcats (*Felis rufus*) are known to prey on skunks (Bent, 1938; Cahalane, 1947; Hall, 1955; Young, 1958). Most mammalian predators likely do not prey on skunks except when near starvation; however, avian predators seemingly are not repelled by musk (Hamilton, 1943) but they may be blinded by musk or otherwise deleteriously affected in encounters with skunks (Garcelon, 1981). Skunks commonly are pests on farmsteads because they raid beehives, inhabit farm buildings, and expel musk when encountered by dogs or humans. Therefore, they sometimes are poisoned, shot, gassed, trapped, or given antifertility agents (Storm and Sanderson, 1969; Verts, 1967) to reduce their numbers. Also, epizootics of diseases, such as pneumonia, distemper, leptospirosis, and rabies, take a toll; diseases may be among the greatest inimical factors (Verts, 1967). Skunks are hosts to a wide variety of parasites (Verts, 1967) that may contribute indirectly to deaths from diseases or starvation. Striped skunks usually flee from vehicles, but assume a defensive pose and are struck when they find they cannot outrun speeding automobiles or farm machinery; many are killed on highways (Case, 1978) and in hay and small-grain fields (Verts, 1967).

Striped skunk pelts were considered valuable commodities in the fur trade in the first half of the 20th century, but their value and the number of skunks harvested for fur declined dramatically in the 1950's and 1960's as fashions shifted away from long-haired furs (Verts, 1967). Long-haired furs returned to vogue, but striped skunks were not harvested in substantial numbers (G. C. Sanderson, pers. comm.); certainly the harvest could contribute to mortality significantly.

Males outnumbered females among samples of striped skunks obtained by trapping (Bennitt and Nagel, 1937; Casey and Webster, 1975; Hamilton, 1937, 1963; Jones, 1950; Stout and Sonenshine, 1974). However, in a captive colony, more males than females were recorded at birth although differences did not deviate significantly from 1:1 (Verts, 1967). Verts (1967) found significant differences between years in sex ratios of wild skunks; he suggested that the differences possibly were related to differential mortality between sexes among juveniles.

Striped skunks are primarily insectivorous, but they are sufficiently opportunistic to take advantage of food supplies that occur as windfalls or to shift to other foods of either plant or animal origin during seasons that insects are not available in sufficient quantities (Dearborn, 1932; Dixon, 1925; Hamilton, 1929, 1936; Lantz, 1923; Llewellyn and Uhler, 1952; Selko, 1937; Verts, 1967). Typical insects in the diet of striped skunks are grasshoppers, carabid and scarab beetles, crickets, and lepidopteran larvae. During winter and spring, skunks consume considerable numbers of vertebrates, especially white-footed mice (*Peromyscus* spp.), voles (*Microtus* spp.), and eggs and young of ground-nesting birds. Fruits such as apples (*Malus pumila*), blueberries (*Vaccinium* spp.), black cherries (*Prunus serotina*), and ground cherries (*Physalis heterophylla*), and other vegetable matter such as corn (*Zea mays*) and various nightshades (*Solanum* spp.), are eaten in season (Verts, 1967). Data published by Dearborn (1932), Dixon (1925), Lantz (1923), and Selko (1937) tend to support Llewellyn and Uhler's (1952) conclusions that about 80 to 90% of the food of skunks was of animal origin. Hamilton (1936) believed that skunks relied more heavily on fruits, especially in fall and winter, but his conclusion possibly was influenced by his classification of food items and his extensive reliance on analysis by frequency of occurrence of food remains in fecal droppings.

Many authorities, especially in older reports, proclaimed that habitats that supported the most striped skunks consisted of a mixture of woodlands, brushy corners, and open fields broken by wooded ravines and rocky outcrops (Bailey, 1936; Burt, 1946; Hamilton, 1943; Schwartz and Schwartz, 1959). In northwestern Illinois, striped skunks were most abundant in intensively cultivated areas rather than where woodlands, brushlands, and cultivated areas were intermixed (Verts, 1967). Storm (1972) found that striped skunks used pasture and hay crops more frequently than expected on the basis of the availability for both foraging at night and for daytime retreats; other crops and uncultivated areas were used less than expected.

Striped skunks use underground dens exclusively during late fall, winter, and early spring (Houseknecht, 1969; Houseknecht and Tester, 1978; Storm, 1972; Verts, 1967) and females with unweaned young use underground dens in late spring and summer (Houseknecht and Tester, 1978). Striped skunks likely do not dig their own dens where they are sympatric with woodchucks (*Marmota monax*), badgers, and other large semifossorial species (Allen and Shapton, 1942; Jones, 1950; Selko, 1938*a*; Verts, 1967); where these species or their ecological equivalents are absent or uncommon, skunks excavate their own dens (Bailey, 1936). Most underground dens have a single entrance, but mean numbers of entrances reportedly ranged from 1.3 to 2.2 (Allen and Shapton, 1942; Selko, 1938*a*; Storm, 1972; Verts, 1967). Verts (1967) reported a significant deviation in distribution of dens in relation to slope with more dens than expected on slopes and fewer than expected on ridge tops and in valleys. Storm (1972), working on the same area, found no relationship between distribution of underground dens and slope. In intensively cultivated areas, most underground dens were in fencerows (Storm, 1972; Verts, 1967), probably because such dens were destroyed by livestock and farm machinery less frequently. Natal dens tended to be shallow and relatively simple (Verts, 1967).

In winter, communal denning of females or of females with a single male is common (Allen, 1939; Allen and Shapton, 1942; Houseknecht, 1969; Seton, 1929; Verts, 1967); however, the frequency of communal denning is low at other seasons and rare among males at all seasons. Striped skunks commonly remain in a single underground den for extended periods during winter (Allen and Shapton, 1942; Dean, 1965; Hamilton, 1937; Selko, 1938*a*; Storm, 1972; Verts, 1967).

At seasons other than winter, striped skunks except lactating females commonly use aboveground retreats during the day at least 50% of the time (Houseknecht, 1969; Houseknecht and Tester, 1978; Storm, 1972; Verts, 1967). Skunks do not seem to exhibit strong fidelity to specific aboveground daytime retreats (Houseknecht, 1969; Storm, 1972). Houseknecht and Tester (1978) reported that most underground dens on their study area in Minnesota were on upland sites, whereas aboveground daytime retreats tended to be in lowland areas; seasonal changes in use of the different rest sites were responsible for seasonal shifts in dispersion of their skunk population.

Free-ranging striped skunks become inactive during winter in the northern part of their range (Hamilton, 1937; Selko, 1938*b*; Sunquist, 1974; Verts, 1967), but may remain active all year in the southern portions of their range (Cuyler, 1924; Davis, 1951; Stout and Sonenshine, 1974). To survive northern winters, striped skunks store body fat and reduce aboveground activity; retreat to warmer microenvironments in dens or den communally for as long as 118 days (Sunquist, 1974); and undergo mild hypothermia (Mutch and Aleksiuk, 1977). The stimulus for onset and cessation of the lethargic state is unknown. Verts (1967) believed that a combination of temperature, snow cover, tunnels blocked by crusted snow, rapid temperature changes, hunger, and sexual urges was responsible for times and durations of periods of inactivity, but Storm (1972) sometimes found skunks to be active irrespective of snow cover or season when temperatures were above −12°C. Based on the sex ratio of striped skunks sold as fur, males were active at lower temperatures than females (Hamilton, 1937).

Except in winter, striped skunks usually leave their daytime retreats within 1 h of sunset and remain active throughout the night; they retire to their dens or aboveground retreats about dawn (Storm, 1972; Verts, 1967). Female skunks with young often make two or three short sorties each night and gradually increase the duration of nighttime activity after parturition (Verts, 1967).

Seton (1929) believed that striped skunks confine their activities to areas within a radius of about 0.8 km. Juveniles in late summer and autumn spend more than 90% of nighttime activity within a radius of 640 m (Verts, 1967), but during late winter skunks move as far as 2.9 km in a single night, the increase likely attributable to reproductive activities (Allen, 1939; Allen and Shapton, 1942). Storm (1972) calculated average minimum-area home ranges for striped skunks he radio-tracked as 283.7 ha for juvenile males, 234.3 ha for juvenile females, 511.5 ha for adult males, and 378.0 ha for adult females. Home ranges of striped skunks tend to be linear and commonly the den or daytime retreat is on or near the periphery of the home range (Storm, 1972; Verts, 1967). Skunks that move to a new den or use two or more dens alternately, usually continue to forage over the same hunting ground (Storm, 1972; Verts, 1967).

The reported incidence of rabies in skunks (probably mostly *M. mephitis*) in the United States increased from 319 (3.6% of the total reported cases) in 1953 to 2,095 (47.3% of the total reported cases) in 1972; since 1961 the reported incidence in skunks has exceeded that for any domestic or wild species (Parker, 1975). However, samples of skunks collected during an epizootic indicated that the actual prevalence of the disease was considerably greater than indicated by the reported incidence (Verts and Storm, 1966). Peak numbers of infected skunks usually occur in the second quarter of the year (Parker, 1962; Verts, 1967), usually during gestation and lactation (Verts, 1967). Thus, epizootics of rabies in skunks may be associated with contact during the breeding season 30 to 60 days earlier (Parker, 1975); reactivation of latent infections by stresses associated with overwintering, pregnancy, and lactation (Verts, 1967); or with aerosol transmission of the virus (Constantine, 1962) in communal dens during winter (Parker, 1975). Rabies epizootics likely are density-dependent in skunk populations (Verts, 1967); considerable effort has been devoted to eliminate epizootics or reduce their intensity by reducing numbers of skunks through trapping and poisoning campaigns (Lewis, 1975). Because of the rapid turnover of skunk populations and because of mortality caused by rabies itself, the effectiveness of such campaigns is problematical (Lewis, 1975).

Early in the 20th century, raising striped skunks for their pelts on fur farms was a widespread, although not particularly profitable, industry (Ashbrook, 1928; Holbrook, 1915; Jones, 1914). Much information is available concerning husbandry (Wade-Smith and Richmond, 1975), use of anesthetics (Ramsden et al., 1976; Verts, 1960), descenting (Bailey, 1937; Enders and Paxson, 1946; Holbrook, 1915; Wade-Smith and Richmond, 1975), selective breeding (Detlefsen, 1917; Detlefsen and Holbrook, 1921), and preventative medication (Fisher, 1968; Hamann, 1969). Striped skunks, especially juveniles, adapt readily to captivity (Hume, 1957), but, as pets, may be threats to public health because of their potential as reservoirs of rabies (Parker, 1975).

BEHAVIOR. Striped skunks usually are unobtrusive and docile; they are not belligerent or aggressive, even toward con-

specifics, except during the breeding season. Indeed, they frequently seem oblivious to conspecifics and other animals, possibly because of poor perceptive abilities.

Threat postures and defensive behaviors are usually in response to the sudden appearance of an intruder or to being "cornered" by an intruder. In such situations, the usual behavioral sequence for skunks is to face the intruders, arch their backs, elevate their tails, erect the hairs on their tails, stamp the ground with their front feet, and shuffle backwards after stamping (Cahalane, 1947; Seton, 1929; Verts, 1967). Sometimes foot stamping and shuffling backwards are so vigorous that the skunk assumes a handstand temporarily (Seton, 1920). If the approach of the intruders is too rapid to permit threats or if defensive behaviors fail to deter intruders, striped skunks face their pursuers, twist their bodies into a "U" shape, evert the anus to expose the scent-gland papillae, and discharge musk toward the intruders. Skunks usually discharge musk with a slight turning motion to disperse droplets over 30 to 45°, thereby greatly increasing the probability of hitting an intruder (Verts, 1967). Skunks can hit human-sized targets with musk from distances of 6 m, but their accuracy is best at distances of less than 3 m.

Striped skunks usually are silent, but can make squeals, low churrings, growls, dove-like cooings, shrill screeches, bird-like twitters, and hissing noises (Laun, 1962; Seton, 1929; Verts, 1967). Pregnant and lactating females hiss if they are disturbed and utter loud and persistent screeches and squeals if adult males are caged with them (Verts, 1967). Extremely frightened animals make cooing or bird-like twitters when handled.

Skunks can swim, but usually avoid water (Cole, 1921; Verts, 1967). While swimming, skunks leave only the head and tail visible above the surface; they were reported to swim for more than 7.5 h in water at 22°C by Wilber and Weidenbacher (1961).

Striped skunks gallop, canter, or pace. They gallop when speed is necessary and they can attain about 16.5 km/h (MacLulich, 1936; Verts, 1967); tracks made during the gallop indicate that the hindfeet strike the ground in front of where the forefeet struck (Murie, 1954). The canter, characterized by easy bounds, produces sets of tracks oblique to the direction of travel (Murie, 1954); skunks canter when moving to and from feeding areas (Verts, 1967). The pace is a slow gait used while foraging; as the limbs move in alternate right and left pairs, the pace produces an exaggerated waddle.

Foraging behavior differs with prey item taken: striped skunks catch bees at hives after disturbing them by scratching on the hive (Storer and Vansell, 1935); they break eggs by propelling them between their hind legs until the shell is shattered on a hard object (King, 1944); and they capture insects, small mammals, and other rapidly-moving prey by pouncing on them with their front feet. In laboratory tests, striped skunks deprived of visual cues were able to detect prey (crickets) at greater distances and in significantly less time than skunks deprived of auditory cues; skunks deprived of both visual and auditory cues still detected prey from olfactory and tactile cues, but with reduced efficiency (Langley, 1979). Captured prey is consumed immediately except caterpillars and toads are rolled on the ground to remove chitinous spines and skin toxins, respectively (Carr, 1974; Schmidt, 1936).

During anestrus, adult male and female striped skunks are tolerant, if not indifferent, to one another; one male and several females may be housed together and all may use the same nest box (Wight, 1931). At proestrus, sexual advances begin; the male approaches the female from the rear, smells and licks her vulva, moves alongside, grasps her nape, and attempts to mount (Verts, 1967; Wight, 1931). The female struggles, attempts to bite, and utters complaintive calls as the male alternately makes copulatory thrusts and attempts to titillate her by scratching her vulva with his hindfoot (Wight, 1931). Upon becoming receptive at estrus, the female assumes a lordotic posture and usually becomes passive as the male mounts and makes rapid copulatory movements until intromission. Separation usually occurs within 1 min of several vigorous pelvic thrusts (Verts, 1967). Wight (1931) observed a male to turn a female on her side after copulation, and Verts (1967) saw males unsuccessfully attempt to turn females during coitus. Wade-Smith (1974) found no evidence of this behavior during 35 copulatory sequences. Males exhibit no immediate interest in females with which they have just copulated, but show renewed sexual interest in other estrous females (Verts, 1967). Females permit copulation for about 2 to 3 days (Shadle, 1953; Wight, 1931), but pregnant and pseudopregnant females become aggressive toward males. They vocalize and stamp their feet at an approaching male, and fight viciously if the male attempts to mount. Wight (1931) observed a captive female to permit a male to sleep with her during early pregnancy after an initial postcoitus period of aggression. Female aggression toward males commonly continues and sometimes increases during pregnancy and lactation (Verts, 1967; Wade-Smith, 1974).

Female striped skunks commonly build nests during pregnancy; shortly before parturition, some females remove part or all of the material from dens or nest boxes (Verts, 1967; Wade-Smith, 1974). Possibly, nesting material is removed to prevent neonates from becoming entangled (Verts, 1967). At birth, young are expelled almost explosively from the vagina still enveloped in embryonic membranes (Shadle, 1956; Verts, 1967); apparently, females remove the membranes and clean neonates between successive births as only wet, clean young were found when parturient females were interrupted (Wade-Smith, 1974). Postpartum females sometimes kill and devour one or more of their offspring if disturbed immediately after parturition (Wade-Smith and Richmond, 1975). Family units, consisting solely of the female and her young, may be maintained until autumn when juveniles are 3 to 5 months old (Burt, 1946; Cahalane, 1947; Schwartz and Schwartz, 1959), but some may be dissolved when young are 2 months old or less (Verts, 1967).

Striped skunks infected with rabies commonly exhibit furious symptoms (Verts, 1967) and are aggressive and persistent in attacks on humans and other animals (Richards, 1957). Parker (1975) reported a wide range of behavioral manifestations of rabies in laboratory infected skunks. Activity of infected skunks may shift from primarily crepuscular and nocturnal to diurnal (Parker, 1962), but movements of rabid skunks may be no greater than for healthy skunks of the same age (Storm and Verts, 1966).

GENETICS. Striped skunks have a diploid chromosome number of 50, more than other mustelids (Fredga, 1967). From our inspection of published karyograms (Fredga, 1966), FN appears to be 92 with one pair of chromosomes possessing a secondary constriction similar to that found in many mustelids. The X chromosome is medium-sized and metacentric whereas the Y is tiny and likely submetacentric (Fredga, 1966).

Detlefsen (1917) described 11 mutant skunks that were either albinotic or animals with brown fur. Detlefsen and Holbrook (1921) classified 15 albinotic skunks into five types; three types were believed to result from changes in single genes as matings with wild types gave monohybrid ratios. Two other albinotic types possibly were multiple allelic. Detlefsen and Holbrook (1921) suggested that mutations were common among *Mephitis* and that self black, blue or silver types might be expected.

From immunological studies on serum albumins, Seal et al. (1970) hypothesized that *Mephitis* evolved more rapidly than other mustelids.

REMARKS. The generic and specific names, *mephitis*, were derived from the Latin, *mephit*, meaning "bad odor" or "damp of the earth" (Jaeger, 1955), in reference to the odoriferous musk. The word "skunk" is from "segankw" or "segongw" of Abenaki Indian (Algonquin linguistic family) origin; however, variants of the name occur in other Indian dialects (Philological Society, 1933).

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