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Spilogale putorius.  By Al Kinlaw

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Spilogale Gray, 1865

Spilogale Gray, 1865:150. Type species Mephitis interrupta Rafinesque.

CONTEXT AND CONTENT. Order Carnivora, Family Mustelidae, Subfamily Mephitinae (Jones et al., 1992). Hall and Kelso (1959) originally recognized four species: S. putorius, S. gracilis, S. pygmaea, and S. angustifrons. Following Van Gelder’s (1959) revision of the genus, Hall (1981) recognized two species, S. putorius and S. pygmaea. However, Jones et al. (1992) treated S. putorius and S. gracilis as distinct species, based on geographic and reproductive isolation (Mead, 1968b). Wozencraft (1995) considered S. putorius and S. gracilis to be synonymous, but commented on Mead’s (1968b) argument for recognizing each as distinct species and S. putorius leucoparia as a possible third species. This account reviews spotted skunks occurring in the central and eastern United States, from the Great Plains eastwards, that were recognized as S. putorius by Jones et al. (1992). The following key to species of Spilogale is derived from Van Gelder (1959), Mead (1968a, b), and Teska et al. (1981):

1. Size small, total length <300 mm and tail <90 mm; skull small and narrow, basilar length <38 mm and mastoid breadth <23.5 mm; nasal patch connected to shoulder stripes; forefoot and hind feet white dorsally; dorsal stripes not interrupted; gestation period 41–53 days; S. pygmaea Size small to large, total length >300 mm, or if less, tail >90 mm; skull small to large, but if basilar length <38 mm, then mastoid breadth >23.5 mm; nasal patch not connected to shoulder stripes; forefoot and hind feet not completely white dorsally; dorsal stripes interrupted posteriorly

2. Gestation period 50–65 days; parturition usually occurring in late May and June; geographic range in Northern Hemisphere east of the Continental Divide and extending south into northeastern Mexico. S. putorius Gestation period 210–230 days with delayed implantation; parturition usually occurring in April, geographic range west of Continental Divide and south into Nicaragua and Costa Rica. S. gracilis

Spilogale putorius (Linnaeus, 1758)

Eastern Spotted Skunk

[Vivera] Putorius Linnaeus, 1758:44. Type locality “South Carolina.”

Vivera Mapurita Müller, 1776:32. Based on “Le Zorillo” of Buffon.


Vivera Priata Shaw, 1800:387. Based in part on Vivera putorius Linnaeus (1758).


Mephitis interrupta Rafinesque, 1820. Type locality “Louisiana” [territory]. Restricted to Upper Missouri river valley by Lichtenstein (1838:281).


Spilogale indiana Merriam, 1890:10. Type locality “Indiana, Matagorda Bay, Texas.”

Spilogale ambarvalis Bangs, 1898:222. Type locality “Oak Lodge, opposite Micco, Brevard Co., Florida.”

CONTEXT AND CONTENT. Context same as for genus. Three subspecies of the eastern spotted skunk are recognized.

S. p. ambarvalis Bangs, 1898, see above.

S. p. interrupta Rafinesque, 1820, see above (indiana Merriam and quadrilineairis Winans are synonyms).

S. p. putorius Linnaeus 1758. See above (mapurita, zorilla, gutita, striata, bicolor, and ringeria Merriam are synonyms).

DIAGNOSIS. S. putorius is distinguished from S. gracilis by having a gestation period of 50–65 days with no known period of delayed implantation (Mead 1968a) and 64 chromosomes (Hsu and Mead, 1969); gracilis has a gestation period of 210–230 days, accompanied by delayed implantation (Mead 1968b), and 60 chromosomes (Hsu and Mead, 1969). Unlike S. pygmaea, dorsal stripes of S. putorius are not continuous from the nose to the rump (Van Gelder, 1959).

GENERAL CHARACTERS. Eastern spotted skunks have fine, dense fur and an elongated weasel-shaped body. Limb posture is plantigrade and the body is carried low to the ground (Fig. 1). There are five toes on all feet (Van Gelder, 1959). The slightly curved claws of the forefoot of S. putorius, like other members of

![Fig. 1. Photograph of Spilogale putorius ambarvalis, in handstand posture. Provided by Kevin Dawn Ward.](image-url)
the genus, are about 7 mm long, a little more than twice the length of claws of the hind feet (Van Gelder, 1959). The feet of Spilogale may be less specialized for digging and more specialized for climbing than those of Mephitis or Conepatus because the plantar pads are more distinctly subdivided into four lobes and the carpal and metatarsal pads are more reduced (Pocock, 1921). Means (in mm, ranges in parentheses) and sample sizes (n) for external measurements for male S. p. putiatorius from Alabama are: total length, 51.9-44 (50.5-596), n = 9; tail length, 201.67 (195-211), n = 6; length of hindfoot, 47.00 (43-51), n = 10 (Van Gelder, 1959). The respective measurements for females are 465.00 (403-470), n = 8; 182.00 (165-193), n = 3; and 43.88 (39-47), n = 8 (Van Gelder, 1959). Ears of four male and two female S. p. putiatorius from Louisiana averaged 18 and 23 mm, respectively (Lowery, 1974). Tail length is the most variable morphometric character of adult eastern spotted skunks (Van Gelder, 1959).

Body mass (±SD) of 94 male and 38 female S. p. ambarvalis from Florida averaged 399 ± 112 g and 283 ± 39 g, respectively (Ehrhart, 1974). In Florida, males weighed 13% more during the cooler months of October–May than during the June–September hot period (Kinlaw, 1990).

The rostrum is nearly straight in some individuals (Van Gelder, 1959) so that the skull appears flattened in dorsal profile (Hall and Kelso, 1959). Means (in mm), ranges, and sample sizes (n) for cranial measurements of male and female (in parentheses) S. p. putiatorius are: basilar length, 51.95, 49.6-54.5, n = 10 (49.11, 47.6-50.0, n = 7); condylobasal length, 58.85, 56.3-61.9, n = 10 (55.5, 53.5-66.4, n = 7); occipitonasal length, 53.35, 50.5-55.5, n = 10 (51.19, 50.3-52.5, n = 8); zygomat breadth, 36.25, 32.5-38.8, n = 7 (34.9-37.8, n = 8) mastoid breadth, 31.85, 30.1-34.2, n = 10 (30.39, 28.7-31.4, n = 7); interorbital breadth, 15.70, 14.4-16.9, n = 10 (15.31, 14.1-15.8, n = 8); postorbital breadth, 15.10, 13.8-15.5, n = 10 (14.46, 13.3-15.5, n = 7); palatal length, 21.11, 19.8-22.7, n = 11 (20.19, 19.0-20.8, n = 8); postpalatal length, 31.05, 29.4-32.1, n = 10 (29.04, 28.7-29.7, n = 7); cranium height, 18.45, 17.8-19.6, n = 10 (17.89, 16.2-18.4, n = 7); length of toothrow, 18.84, 17.3-20.5, n = 11 (17.97, 17.3-18.6, n = 9—Van Gelder, 1959). The least variable of these cranial measurements is palatal length, condylobasal length, height of cranium, length of toothrow, and occipitonasal length (Van Gelder, 1959). Extensive lists of skull and body measurements and skull drawings for subspecies can be found in Van Gelder (1959); skull photographs of subspecies can be compared in Howell (1906).

External measurements for male eastern spotted skunks are about 8% larger than females; the greatest differences are in length of head and body and length of hind foot. Like other members of the genus, skulls of males are about 7% larger, have more widely spread zygomatic arches, and show greater development of zygomatic and lambdoidal crests than those of females (Fig. 2; Van Gelder, 1959). Eastern spotted skunks show a north-south gradation in total length, with S. p. ambarvalis in the south ranging from 311–421 mm and S. p. putiatorius in the north ranging from 453–610 mm (Van Gelder, 1959).

Bacula of adult S. p. interrata weigh from 5.0 to 8.5 mg and are longer and more recurved than those of S. gracilis latifrons (Mead, 1967). Bacula of S. p. putiatorius have a small hollow core (Mead, 1970). Females have six to 10 teats, usually two pectoral pairs, one abdominal pair, and one inguinal pair (Howell, 1906).

The dental formula for S. putiatorius is i 3/3, c 1/1, p 3/3, m 1/2, total 34. The anteriormost premolar always is small and occasionally is absent (Van Gelder, 1959).

The jet-black pelage of Spilogale putiatorius and other Spilogale is marked by a white triangular nose patch and four to six broken white body stripes (Fig. 1) in an infinitely varying pattern (Van Gelder, 1959). The dorsal stripes parallel the vertebral column and extend from the back of the head posteriorly to the outer edges of the tail, joining at the tip. The shoulder stripes parallel the dorsal stripes; extend over the shoulders, and may continue anteriorly across the ears to join across the face. The lateral stripes extend from the toes of the forefoot posteriorly past the end of the shoulder stripes and then curve dorsal. Individuals may have several vertical stripes.

Fig. 2. Dorsal view of female (A) and male (B) skull of adult Spilogale putiatorius. Ventral view of male skull (C). Side view of male skull (D). Dorsal (E) and lateral (F) view of mandible. Female, number UF14379, and male, composite of numbers UF180 and UF14378. Florida Museum of Natural History. Greatest length of skull is 4.7 cm. Drawn by Wendy Zonelder.

UF14378, Florida Museum of Natural History. Greatest length of skull is 4.7 cm. Drawn by Wendy Zonelder.
connecting the dorsal and lateral stripes; stripes are divided into a pattern of spots in S. p. interrupta (Van Gelder, 1959). There are some white spots in front of each ear. Photographs of the pelts of different subspecies can be found in Howell (1906).

Eye lens mass is the variable most useful in distinguishing between juveniles, subadults, and adults. Obliquation of cranial sutures is the next best index for determining age (Mead, 1967).

**DISTRIBUTION.** Spilogale putorius has a very localized distribution within its range (Seton, 1929) and is less uniformly distributed than *Mephitis* (Howell, 1906). Eastern spotted skunks range from south-central Pennsylvania down the Appalachian chain to Florida, west to the Continental Divide, and south to Tamaulipas, Mexico (Fig. 3). The range in Florida extends as far south as Ft. Myers (Hamilton, 1941).

Increases in geographic range of eastern spotted skunks in the Great Plains may be correlated with increases in the amount of land devoted to agriculture, because agricultural practices provide outbuildings as shelter and encourage commensal house-mice (*Mus musculus*) that serve as a prey base (Choate et al., 1974). By the 1940s, eastern spotted skunks were reported in North Dakota, Wisconsin, and Minnesota, areas in which they had not previously occurred (Van Gelder, 1959).

*S. putorius interrupta* and *S. gracilis gracilis* both range into the Black Mesa area in western Oklahoma but are ecologically separated (Dalquest et al., 1990), with *gracilis* inhabiting the rimrock and *interrupta* occurring along the Cimarron River (Van Gelder, 1949). Both subspecies meet in Laramie Co., Wyoming, without intergradation (Armstrong, 1972). Patton (1974) captured three skunks he identified as *S. p. interrupta* along with 21 *S. g. gracilis* in Reeves Co., western Texas. These two species are sympatric in the Hill country of eastern Texas (Schmidtly, 1984).

**FOSSIL RECORD.** The earliest representative of the genus *Spilogale* is *Spilogale rexroadi*, from the late Pliocene of Kansas and Texas. It was approximately the size of *S. pygmaea*, regarded as the most primitive living spotted skunk (Van Gelder, 1959). *S. rexroadi* had a more trenchant dentition than extant species and probably had more predaceous habits (Kurtén and Anderson, 1980). This skunk was probably ancestral to later species and is considered to be the most primitive member of the genus (Dalquest, 1972; Hibbard, 1941; Kurtén and Anderson, 1980). The place of origin may have been central Mexico (Van Gelder, 1959).

The stratigraphic range of *S. putorius* extends from pre-Nebraskan (early Blancon) to Recent, and early representatives were slightly smaller than extant eastern spotted skunks living in the same area (Kurtén and Anderson, 1980). The north-south gradation in size of modern species also is evident in Pleistocene samples (Kurtén and Anderson, 1980). Websch (1974) documented 11 sites in Florida at which fossils of *S. putorius* were found, the earliest being the late Blancon period. These often are found in association with fossilized owl (Strigiformes) pellets (G. S. Morgan, pers. comm.).

*Spilogale* and *Mephitis* may have diverged from a common semiarboreal ancestor. Behavioral and fossil evidence suggest that selective pressures favored increased activity and arboreality in *Spilogale* (Zeiner, 1975).

**FORM AND FUNCTION.** The fur of eastern spotted skunks, like other members of the genus *Spilogale*, is finer and denser than that of *Mephitis* or *Conopatus* (Zeiner, 1975). The warning effect of the striking pelage is emphasized by the dramatic moving handstand. The pelage also may serve a cryptic function, because it is virtually impossible to distinguish *S. putorius* in moonlight shadows (Crabb, 1948; Seton, 1929).

The many small pads on the soles of the feet of eastern spotted skunks probably assist in climbing. Although not as specialized for digging as *Mephitis* or *Conopatus*, the longer front claws assist *Spilogale* in climbing and digging, allowing it to hunt in both arboreal and subterranean habitats. Eastern spotted skunks also use these longer claws to hold prey while making a killing bite (Zieker, 1975). The elongated but small body enables this weasel-like mustelid to pursue prey down smaller burrows than *Mephitis* or other larger-bodied skunks.

The carnassial P₄ is proportionately longer in *Spilogale* than *Mephitis* or *Conopatus* (Van Gelder, 1959), an adaptation correlated with the inclusion of more meat in the diet (Selko, 1937). The ears are proportionately larger than the ears of *Mephitis* or *Conopatus* (Van Gelder, 1959), perhaps to assist in heat loss or to detect movements of small mammals.

In behavioral tests between male and female eastern spotted skunks, fights were common and males rubbed their bellies and perineal regions against the cages (Zeiner, 1975) as if they were scent marking. However, physical examination of captive animals failed to locate glandular areas (Zeiner, 1975).

The paired anal glands open through nipples hidden just within the anus, and musk is discharged when the nipples protrude as the tail is raised over the back (Crabb, 1948). The musk sprayed by eastern spotted skunks and other *Spilogale* is reported to be more pungent (Hall and Kelso, 1959) than that of striped skunks (*Mephitis mephitis*). If sprayed directly in the eyes, musk causes irritation and temporary vision impairment, enabling *S. putorius* to escape.

**ONTOGENY AND REPRODUCTION.** The ovaries are lens-shaped, measure approximately 4 by 2 by 2 mm, and have a paired weight of 10–90 mg (Mead, 1968a). They are completely encapsulated by the mesosalpinx, except for a small opening near the fimbriated ostium of the oviduct. The horns of the bipartite uterus are 2.5–3.5 cm long. They fuse caudally to form a common corpus uterus that terminates at the internal os of the cervical canal (Mead, 1968a).

Mating and fertilization occur in late March–April for the eastern spotted skunk. Implantation is believed to occur 14–16 days after mating and is delayed briefly or not at all (Mead, 1968a). Females are spontaneous ovulators (Mead, 1968a). Greater ovarian activity was noted in wild-caught *S. p. interrupta* and *S. p. ambarsalis* in March and nearly all estrous females captured in late March–April were bred (Mead, 1968a). *S. p. interrupta* trapped in South Dakota and Iowa between August and March had inactive ovaries, and *S. p. ambarsalis* is in estrus from October to early March (Mead, 1968a). Estrus may recur in *S. p. ambarsalis*, with the second mating most likely occurring in July or August (Mead, 1968a). Parturition in eastern spotted skunks occurs in late May–early June after an estimated gestation period of 50–65 days; average litter size is 5.3 (Mead, 1968a).

Spermagenesis in males begins during December—early January; spermiogenesis follows in March and testicular regression occurs in late April–May (Mead, 1968a). Males have a well-developed
prostate gland that measures from 7 by 7 by 3 mm to 11 by 16 by 9 mm (length, breadth, thickness), attaining its largest size during the breeding season (Mead, 1970). The prostate urethra is 8-10 mm long, the muscular urethra about 12 mm, and the penis is 35-40 mm (Mead, 1970).

Young are born with sparse, fine fur, and have distinct white and black markings. A newborn female S. p. interrupta weighed 9.5 g, and a 14-day-old female weighed 45.5 g (Crabb, 1944). A 7-day-old male weighed 22.5 g and a 21 day-old male weighed 73.5 g. Eyes and ears are closed, but claws are well developed, and neonates are able to vocalize with distinct squealing. At 25 days of age, littersmates can elevate their tails in warning fashion when frightened. Teeth of the young are visible at 30 days; and eyes are open; by 32 days of age. At 46 days of age, eastern spotted skunks are able to discharge musk. Six juvenile males averaged 150 g after mid-July and seven juvenile males averaged 330 g at mid-August. The young are weaned at about 54 days of age (Crabb, 1944).

ECOLOGY. Eastern spotted skunks are primarily insectivorous. Insects remain occurred in feces collected during all seasons in Iowa (Crabb, 1941). During summer and fall, insects occurred in 92% and 80% of fecal droppings. When insects are unavailable, S. putorius preys on small mammals, which occurred in 90% of winter and 86% of spring feces (Crabb, 1941). Birds, carrion, and plant material also are eaten (Crabb, 1941; McCullough and Fritzele, 1984; Selko, 1937). S. putorius is preyed upon by domestic dogs (Canis familiaris) and cats (Felis catus) (Crabb, 1948), great horned owls (Bubo virginianus) (Erickson et al., 1940), and bobcats (Lynx rufus—Schwartz and Schwartz, 1981).

Potential food competitors sympatric with Spilogale are striped skunks and weasels. Morphological and behavioral evidence suggests that striped skunks occupy only the ground-level component of habitat whereas both species of spotted skunks use both ground and arboreal components, thus minimizing competition (Zenser, 1979). Eastern spotted skunks occasionally plunder weasel carcasses (Porder, 1968), but omnivorous habits of Spilogale when compared to carnivorous habits of weasels minimize potential food competition. A density of 0.8 eastern spotted skunks per km² was estimated in an agricultural area in Iowa (Crabb, 1948). However, density could have been as high as 20 S. putorius per km², depending on the method of calculation. A re-analysis of mark-recapture data collected by Ehgart (1974) in 1973-1974 at Canaserval National Seashore, Florida revealed a density of 40 skunks/km² (Klinaw et al., 1992).

Yearly home-range size of one radio-collared adult male in oak-hickory (Quercus-Carya) forest habitat in Missouri was 4,359 ha (McCullough and Fritzele, 1984). Home range size and mean nightly movement were greater in spring than in summer or fall (McCullough and Fritzele, 1984).

The sex ratio of three litters of S. p. interrupta was 1.3:1.0 (n = 16) in favor of males (Crabb, 1948). Commercial lures or catfood used as bait tend to attract more males (3.66:1.0, n = 67—Crabb, 1948; 2.5:1.0, n = 132—Ehgart, 1974), but a wider variety of natural baits reveal a more balanced ratio (1.81:1.0, n = 76—Crabb, 1948; 1.01:0, n = 63—Klinaw, 1990).

Eastern spotted skunks occur in brushy, rocky, and wooded habitats (Nowak, 1991). Although they have been reported to avoid dense forest areas (Nowak, 1991), they have been trapped in second-growth forest in Garrett Co., Maryland (Larsen, 1966). They avoid wetlands (Nowak, 1991); no spotted skunks were captured in marsh or semi-aquatic habitats during a major capture-recapture study conducted in various habitats of Kennedy Space Center, Florida (Ehgart, 1974). Eastern spotted skunks are numerous in the dense palmetto (Serenoa repens) thickets occurring on sandy soils along the east coast of Florida (Bangs, 1898; Schwartz, 1952) and they have been reported on adjacent ocean beaches (Howell, 1906). Their abundance in these thickets is probably due to availability of numerous gopher tortoise (Gopherus polyphemus) burrows used as dens. Many rodents take over abandoned gopher tortoise burrow offering protection from owl predation (Klinaw, 1990).

Eastern spotted skunks are captured in habitat with extensive vegetative cover, but rarely in open areas. A radio-telemetered S. putorius in Missouri used oak-hickory forests more than open areas such as old fields or glades; within oak-hickory forests they used sites with moderate to high levels of ground litter or slash more than sites with a clear forest floor (McCullough and Fritzele, 1984). In other studies, they were not captured in live traps placed adjacent to apparently suitable dens located in the middle of open ground 3 m (Manaro, 1961) or 25 m (Crabb, 1948) from vegetative cover.

Spatially more extensive use of habitat by eastern spotted skunks were within a portion of a Florida barrier island that had almost 100% ground cover than in an adjoining equal-sized area that was considerably more open (P < 0.025—Klinaw, 1990).

In natural landscapes, eastern spotted skunks den in any natural cavity or crevice under a rock pile, hollow log, or stumps (Seton, 1929). In the North Carolina mountains, they den along talus slopes (Lee et al., 1982). They use cavities in standing trees (Crabb, 1948); in Missouri, 10 dens with entrances 1–7 m above ground were located in seven standing hollow trees having an average diameter at breast height of 26.3 cm (McCullough and Fritzele, 1984). They can dig their own burrows (Seton, 1929), or use burrows dug by pocket gophers (Geomys bursarius) or Franklin's ground squirrels (Spermophilus franklinsi—Polder, 1968), thirteen-lined ground squirrels (Spermophilus tridecemlineatus—Crabb, 1948), woodrats (Neotoma sp.—Seton, 1929), striped skunks or long-tailed weasels (Mustela frenata—Crabb, 1948), gopher tortoises (Gopherus polyphemus—Frank and Lips, 1989), armadillos (Dasypus novemcinctus—Lowery, 1974), or burrowing owls (Speotyto curulturara—Seton, 1929).

In man-dominated landscapes, eastern spotted skunks den in haystacks, woodpiles, under and in farm buildings, strawpiles and corncribs, grain elevators, or wells with rock walls (Crabb, 1948; Seton, 1929). Requirements for den-site selection include darkness and protection from weather and natural enemies (Crabb, 1948). Eastern spotted skunks apparently were selected for their thermal suitability in Missouri. In Missouri, 58% of underground dens used in the summer faced in a northerly direction. During colder autumn months, 80% of dens faced a southerly direction, and 100% faced south in winter (McCullough and Fritzele, 1984). Ground dens in Iowa contained a nest of grass or hay and those in buildings frequently were built in hay or between hay bales (Crabb, 1948). Eastern spotted skunks move from den to den and more than one individual has been captured at the same den site in capture-recapture studies (Crabb, 1948; Manaro, 1961). Disturbance by humans or dogs around dens may cause S. putorius to abandon the site (Crabb, 1948).

S. p. interrupta has undergone a rapid decline in numbers throughout most of the Midwest where it once was quite abundant (Kaplan and Mead, 1991). It is now listed as endangered in Missouri, "species of special concern" in Montana, "species in need of conservation" in Nebraska, and rare by the states of North Dakota and Oklahoma; the status of this subspecies is presently unknown in Louisiana, South Dakota, Mississippi, Arkansas, and Texas (Kaplan and Mead, 1991). S. p. putorius was assigned a "vulnerable status" by the Penusylvanian Biological Survey in 1985 (Genoways and Benne, 1985). S. p. putorius is still abundant in southern Florida (Klinaw and Mead, 1991) and east-central Florida (Klinaw et al., 1995).

Ectoparasites reported to occur on S. p. ambardovalia include the flea Polygenis guyni (Layne, 1971; Schwartz 1952) and ticks Dermacentor variabilis and Ixodes cookei (Ehgart, 1974). Endoparasites occurring in the eastern spotted skunk include the following: tapeworms: Oochochusis pedunculata, Oochochusis wallacei (Chandler, 1952), and Oochochusis otkalhomena (Peer, 1939). Roundworms reported are Syrkaebinguis chitoswoodorum (Hill, 1939) and Capillaria hepatica (Layne and Winegarner, 1971). Two species of coccidian protozoans (Isospora spliagules and Is. sengleri) have been described from Florida eastern spotted skunks (Levine and Ivens, 1964).

Humans have been reported to be the main cause of current mortality as a result of automobile roadkills (Rosatte, 1987). Of 77 dead S. putorius found in Iowa in 1948, only three deaths were caused by automobiles (Crabb, 1948). Forty-five were killed by farmers or their dogs and 25 were trapped for fur (Crabb, 1948). Pneumonia and coccidiosis have been reported to be major causes of death in captive individuals (R. Mead, pers. comm.). Only two eastern spotted skunks captured in Missouri and W. Virginia were infected with Ehrlichia (1969), and 12 of 20 captured in Wisconsin from 1965 to 1968 were rabid (Hendricks and Seaton, 1969), and <1% of skunk rabies cases reported in Texas since 1978 were due to eastern spotted skunks (K. Clark, pers. comm.). Histoplasmosis (Histoplasma capsulatum) was isolated in cultures from S. putorius trapped in Georgia (Erickson et al., 1993). Eastern spotted skunks also probably contract microfilaria, leishmania, mastitis, tularemia, distemper, and Q fever (Howard and Marsh, 1983).

The pelts of both eastern and western spotted skunks represent
an insignificant fraction of the modern fur trade. In the 1983–1984 trapping season, 5,586 pelts described as spotted skunks were harvested in the United States (Novak et al., 1987); however, additional pelts of spotted skunk were included with Mephitis pelts and classified under the generic term "skunks" by some states. Management is done through game laws and regulations (Howard and Marsh, 1983) and involves two opposing approaches: to increase skunk population density as desirable furbearers, or to decrease their numbers by trapping when they become pests. In 1976, Colorado and Missouri were the only two states with a habitat management program that benefited eastern spotted skunks (Deems and Pursley, 1978).

BEHAVIOR. Spilogale putorius and other members of the genus are quicker, more alert and more agile than other North American skunks (Seton, 1929; Zeiner, 1975). They will readily climb into trees and attics of houses (Crabb, 1948). They are secretive and rarely seen. S. putorius has been observed "freezing in its position and elevating its tail in a defensive posture when sound is detected" (Crabb, 1948:216). Wild individuals invariably bite when removed from live traps; however, the majority of captive eastern spotted skunks become docile and do not bite when handled (R. Mead, pers. comm.).

Eastern spotted skunks are primarily nocturnal. In Missouri, four male S. putorius interrupta located by radio telemetry 127 times between 0600–1800 h were not active, but were active on 186 of 333 occasions between 1800 and 0600 h (McCullough and Fritzell, 1984). During one bright Florida night with a full moon during April, no S. putorius was captured before the moon set at 0330 h and 14 individuals were taken in darkness after the moon set between 0330 h and sunrise at 0610 h (Manaro, 1961). Also, more eastern spotted skunks were captured on cool, cloudy, dryer nights than on hot, clear, wetter nights (Kinlaw, 1990). However, Florida S. putorius has been observed hunting in daylight hours (J. N. Laster, pers. comm.; I. J. Stout, pers. comm.).

Eastern spotted skunks are inquisitive and exhibit more exploratory behavior than striped skunks when presented with novel objects (Zeiner, 1975). They sometimes open Sherman live traps and catch and kill rodents captured inside (I. J. Stout, pers. comm.) or eat pocket gophers (Geomyidae) caught in snap traps (Howell, 1920). They show more overall activity and more climbing ability than Mephitis (Zeiner, 1975). Early authors described them as "acrobats" (Howell, 1920) or "animated checkerboards" (Seton, 1929).

The behavior recognized as being most characteristic of the species is the handstand (Fig. 1) that is used in defensive situations (Howell, 1920; Johnson, 1921). In this special threat behavior, S. putorius runs at an opponent, then stops abruptly and elevates the hindquarters so that it balances on its hands with its tail turned to one side. Thisancausal opening of the sac directed toward the enemy (Johnson, 1921). The tail may twit and the animal may hiss. This handstand posture might enable the skunk to see where it aims its spray and to direct the spray into the face of a taller opponent (Johnson, 1921). Crabb (1948) reported that eastern spotted skunks could walk about a meter in this position but Manaro (1961) stated that an individual advances and retreats on its forelegs only a few centimeters to maintain balance. Manaro (1961) noted that this response was elicited when an intruder was 3–4 m away. When an intruder approaches to within 2 m, eastern spotted skunks invariably stop to all four and assume a horsehoe-shaped stance with both the anus and head directed at the aggressor, often spraying from this position (Manaro, 1961). Caged S. putorius cease to exhibit this defensive behavior toward humans after 4–5 days of exposure to people, but continue to display toward a dog, cat, or horse brought close to the cage (Manaro, 1961). Eastern spotted skunks were reported to spray musk down from trees they had climbed (Cuyler, 1924).

A second stereotyped behavior is foot-stamping, often given in association with the handstand. This is done with the forepaws and is an audible noise (Zeiner, 1975). A third ritualistic behavior pattern is the egg-opening technique (Van Gelder, 1953), somewhat similar to the technique used by some mongooses (Herpestes sp.). Initially, the animal straddles an egg with its forelegs and attempts to open it by biting. If this is unsuccessful, the skunk will press the egg backward with the forelegs; as the egg passes beneath the hind end of the animal, the skunk gives it a quick kick to the rear with one hindleg. However, captive eastern spotted skunks only occasionally use this technique; they simply begin biting the eggs after a few have been broken for them (R. Mead, pers. comm.).

Another fixed-action pattern of eastern spotted skunks is the method used to kill mice or birds. When presented with a live chick (Gallus sp.), spotted skunks made immediate kills in 21 of 22 tests (Ziener, 1975). They attacked the back first; then, after struggling with the chick for a brief time, gave a killing neck bite. Both forepaws and hindpaws are used to restrain the struggling victim, similar to the killing technique reported by Heidt (1972) for the least weasel (Mustela nivalis). The carcass was carried some distance in each test and the head was eaten first.

Eastern spotted skunks sleep with the head and forelegs tucked beneath the abdomen with the crown of the head, shoulders, hind feet, and tail in contact with the ground (Manaro, 1961). The voice includes throaty grunts and a high-pitched screech similar to that of a blue-jay (Cyanocitta cristata—Manaro, 1961).

Eastern spotted skunks do not hibernate but have seasonal periods of inactivity that vary geographically. In Iowa, they restrict their movements during winter; activity of males increases in spring (Crabb, 1948). In Florida, eastern spotted skunks, especially males, are difficult to trap and presumably are inactive during the hot summer months. However, both sexes are active and subject to trapping during the mild winter and spring (Ehrhart, 1974; Kinlaw, 1990). Zieener (1975) found no diminution of gross activity for caged S. putorius over an ambient temperature range of 7–41°C.

GENETICS. Spilogale p. ambaraivalis and S. p. interrupta have a diploid number of 64 with four pairs of biarmed autosomes (Hsu and Mead, 1969).

REMARKS. After reviewing fossil and recent distribution records, Van Gelder (1959) postulated that Spilogale may have originated in central Mexico and extended its range northward after recession of the glaciers. The Continental Divide may have constituted a barrier that restricted gene flow between populations to the east and west, resulting in two species (S. putorius and S. gracilis; Mead, 1989).

Based on morphometrics, Hall and Kelson (1959) assigned a third species, S. angustifrons, to spotted skunks occurring in southern Mexico and Central America. Recent evidence showing chromosomal differences in skunks from this region led Owen et al. (in litt.) to conclude that additional biological species may be present in the Spilogale complex.

Researchers planning to conduct ecological studies of spotted skunks should be advised of certain difficulties. Spilogale is dextrous with its claws and usually removes externally attached radiocollars or harnesses (McCullough and Fritzell, 1984; Kinlaw, 1990), thus radiotransmitters should be surgically implanted. Ear-tags frequently tear out of the pinna, especially if cinched so tightly as to pinch the ear (Crabb, 1948; Kinlaw, 1990). Eastern spotted skunks can escape through very narrow openings along the door of box traps. Live traps containing skunks should be approached by holding a blanket or piece of plastic between the person and the trap to intercept any sprayed musk. Although some researchers have anesthetized wild-caught animals in order to handle them, this is not necessary if welder's gloves are worn to protect the hands from bites.

Various agents have been recommended to remove the musk odor of skunks from humans or dogs, including organic solvents such as gasoline (Cuyler, 1924) or dibutyl naphthalene-alphalpha solution (Howard and Marsh, 1983). Water-based solutions such as ammonia (Cuyler, 1924), tomato juice (Howard and Marsh, 1983), and vinegar (Patton, 1974; R. Mead, pers. comm) have been used with success. A hot bath containing 500 ml of commercial bath oil solubilizes and removes the mercaptan odor from the body. Naphthalene crystals can be used in an attic or beneath a building to repel skunks (Howard and Marsh, 1983).

The word Spilogale is derived from the Greek spilos, meaning spot, and gale, meaning weasel. The word otus is Latin for ear odor. Common names for spotted skunks are civet cat, tree skunk, weasel skunk, polecat, hydrophoby cat, phoby cat, black marten, little spotted skunk, four-striped skunk, four-lined skunk, and sachet kitty (Hall and Kelson, 1959; Howard and Marsh, 1983; Lowry, 1974).

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