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## LONG-TAILED WEASEL OBSERVATIONS IN SOUTH-CENTRAL FLORIDA

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**Abstract.**—Forty-one specimens and sighting records of the long-tailed weasel (*Mustela frenata peninsulæ*) from south-central Florida were analyzed. External measurements were not significantly different from those of *M. f. olivacea*, and the two subspecies agreed in having a relatively low degree of sexual dimorphism. Five of 13 specimens had white facial markings. In the most intensively monitored area, frequencies of records during 8-year periods from 1968 to 1991 suggested a low but stable population. Weasels were recorded from ten natural and man-modified habitats. Observed refuge sites included a ground burrow and crevices in rocks. Diurnal sightings were generally distributed throughout the day and were most frequent in winter and spring. The sex ratio was 1.3 males to each female. The reproductive status of two females in January suggested birth of young in fall to early winter and small litter size. Causes of mortality included traps, vehicles, dogs, house cats, and unknown predators, probably bobcats. Small mammals predominated among recorded prey. One specimen of the flea *Polygenis gwyni*, one of three species of ectoparasites known from weasels in Florida, was collected.

The long-tailed weasel (*Mustela frenata*) is one of the most poorly-known Florida mammals (Brown 1972a) and is classified as rare by the Florida Committee on Rare and Endangered Plants and Animals (Humphrey 1992). Two subspecies are currently recognized from the state, *M. f. olivacea* in the panhandle and north-central region and *M. f. peninsulæ* to the south in the peninsula (Hall 1981). Although Bailey (1930) stated that the range included the entire peninsula, the southernmost confirmed record is of a road-killed specimen from Collier County (Brown 1972b, Hovis 1993). A sighting also was reported from the Fakahatchee Strand State Preserve, Collier County, in 1991 (C. DuToit, pers. comm.). The limited data for the species in Florida are mainly from the northern half of the peninsula, primarily from the area in which intergradation between the two subspecies has been reported (Hall 1951). Layne (1984) suggested that weasels might be relatively more common in the northern than southern part of the state. This paper provides information on the ecology and life history of the long-tailed weasel in south-central Florida near the southern limits of the known range. Based on the current taxonomy, this population is clearly referable to the subspecies *peninsulæ*.

## MATERIALS AND METHODS

Forty-one records of weasels were accumulated over the period 1968-1992. These included 13 dead specimens, 2 skeletal remains, 3 individuals captured alive, 1 reported killed, and 22 sightings of live weasels. With the exception of a dead specimen from Hardee County, a partial skeleton and a sighting from Polk County, and reports of one killed in Sarasota County, all records were from Highlands County. The Archbold Biological Station and surrounding area was most intensively monitored for weasel occurrences. Dead weasels were necropsied and prepared as skins, skulls, or partial skeletons. Preserved specimens are deposited in the collections of the Archbold Biological Station or American Museum of Natural History. Of the three weasels captured alive, one was caught by the tail in a large Sherman trap, one was taken in a wire-mesh box trap, and the third was captured by chasing it into a bucket. A live-trapped adult female was observed in captivity for 62 months, then ear-tagged and released at the site of capture. The other two weasels caught alive were ear-tagged and released following examination.

## RESULTS AND DISCUSSION

Measurements and Mass.—Means ( $\pm$  SE) and ranges (in parentheses) of mass (g) and standard measurements (mm) of 5 adult males from Highlands County were: mass,  $275.2 \pm 25.9$  (215.5-351.7); total length,  $420.3 \pm 13.7$  (379-458); tail,  $135.7 \pm 4.3$  (123-148); hind foot,  $47.3 \pm 1.2$  (44-51). Comparable values for 7 adult females from Highlands County and 1 from Hardee County were: mass,  $202.1 \pm 11.6$  (152.9-246.0); total length,  $370.6 \pm 8.6$  (333-410); tail,  $115.1 \pm 2.8$  (102-126); hind foot,  $42.0 \pm 0.8$  (39-45). The differences in means of mass and all linear measurements of males and females were significant ( $t$  tests,  $P < 0.01$ ). The means of total length, tail, and hind foot of the Florida males and females did not differ significantly ( $t$  tests,  $P > 0.05$ ) from those of corresponding sexes ( $n = 7$  males, 2 females) of *olivacea* from Georgia (Hall 1951). The southern Florida *peninsulae* also agree with *olivacea* in the degree of sexual dimorphism. Mean percentages by which males of the two subspecies exceed females in external measurements are as follows (values for *olivacea*, based on specimens noted above, in parentheses): total length, 13(13); tail length, 18(15); hind foot length, 13(13). Both subspecies fall into a major central North American regional group characterized by low sexual dimorphism (Ralls and Harvey 1985).

Pelage.—Dorsal coloration varied from darker to lighter brown, probably reflecting degree of wear and fading. Several individuals had scattered white hairs on the dorsum. In 12 specimens, ventral coloration ranged from pale to bright yellow, shading to white on the chin and lower jaw; while in 1 specimen the venter was entirely whitish. Most specimens had a small brown spot a short distance behind the angle of the jaws. One of the 13 specimens had the white of the throat and lower jaw extending high on the sides of the head between the eye and ear, 3 had

a small patch of white on the snout, and 1 had a few white hairs in the same area. Hall (1951) noted that white facial markings occur in two isolated geographic areas: Florida and adjacent parts of Georgia and Alabama and the southwestern United States, Mexico, and Central America. Two specimens collected in March and April were undergoing molt, which corresponds with the timing of the spring molt in other parts of the range (Hall 1951).

Abundance.—The only quantitative data on weasel numbers in Florida are those of Ross Allen (cited by Moore 1945) who took 9 weasels in 8 years (1934-42) by trapping in Ocala National Forest, Marion County, and Rand and Host (1942) who reported that 2 weasels were caught in 9.5 years of "vermin" trapping on the original 432-hectare area of the Archbold Biological Station. The area cited by Rand and Host has been monitored for weasels with about the same intensity of effort from 1968 to the present. The number of records during 8-year intervals from 1968 to 1991 were: 1968-75, 4; 1976-83, 5; and 1984-91, 4. This crude index of relative abundance suggests that the population was low but stable over the 24-year period.

Habitats.—Weasels occurred in a wide range of natural and man-modified habitats both on and off the Lake Wales Ridge, the major topographic feature of the region. All of the areas in which weasels were recorded were characterized by a mosaic of habitat types, almost always including fencerows, roads, ditches or canals, or houses, barns, or other buildings. For 33 records with reasonably specific habitat data, the predominant habitat types of sites where weasels were recorded included (frequency of occurrence in parentheses): xeric uplands, including sandhill, scrubby flatwoods, and sand pine scrub (13); pine flatwoods (6); wetlands, including bayheads, swamp thickets, and open grassy swale (4); and agricultural, including cropland, improved pasture, and citrus grove (10). These data support Moore's (1945) contention that the Florida weasel displays no strong habitat preferences and that its ecological distribution probably largely reflects that of its prey.

Home Sites.—A burrow being used by a weasel was discovered on the Archbold Biological Station in May 1977 by G. E. Woolfenden and J. W. Fitzpatrick. It was located in an ecotone between a dense grassy seasonal pond, which was dry at the time, and more elevated scrubby flatwoods. The vegetative cover in the immediate vicinity was fairly dense, consisting of saw palmetto (*Serenoa repens*), shrubs (*Ilex opaca*, *Lyonia lucida*, *Quercus geminata*), and wire-grass (*Aristida stricta*). The entrance was in a small, open patch of sand with sparse litter about 0.3 m from a palmetto clump. There appeared to be faint pathways leading to the burrow from two directions. The entrance was 8 cm high and 10 cm wide and led vertically to a horizontal tunnel about 15 cm below ground. The main tunnel appeared to have two branches.

Another possible den site was reported by G. Birge (pers. comm.), who observed weasels coming out of crevices between large rocks lining the sides of an inlet to a water control structure on Lake Istokpoga, Highlands County.

The only previously well documented den site of weasels in Florida are gopher tortoise (*Gopherus polyphemus*) burrows (Frank and Lips 1989). Weasels captured in pocket gopher (*Geomys pinetis*) burrows in Florida (Moore 1945, Sherman 1929) were probably using them as den sites, although they may only have been hunting in them. Neill (1957) mentions dens in tree holes, hollow logs, and ground burrows but gives no specifics.

Activity.—Of 18 sightings in which time of day was recorded, 12 were during the day and 6 at night. Daytime sightings were about equally divided between early morning, midday, and just before dark. Four of the daytime sightings were of weasels engaging in hunting activity (chasing, attacking, or carrying prey).

Seventeen (55%) of 31 records with known dates were in winter (December-February), 9 (29%) in spring (March-May), and the remainder in June (1), July (1), and August (3). This distribution suggests increased diurnal activity during the winter and spring months. Neill (1957) reported an increase in weasel activity in February in central Florida. Moore (1945) concluded that in Florida young are born in late fall or early winter, and young are dependent on the mother for more than 7 weeks (Hamilton 1933). Thus, elevated daytime activity in winter might reflect increased hunting by females to provide food for young. Mating behavior also might contribute to the higher level of diurnal activity in winter and spring. Hall (1951) speculated that males become unusually active during the breeding season. Assuming parturition in late fall-early winter in Florida and an average gestation period (including delayed implantation) of about 9 months (Wright 1948) places the mating season in late winter to early spring.

Reproduction.—The sex ratio of 16 living and dead weasels examined was 1.3 males to each female. A male-biased sex ratio has been found in most studies of long-tailed weasels in other parts of the range (Hall 1951, Svendsen 1982). The testes of five males collected in January (1), February (3), and March (1) ranged from 4.0 by 3.5 mm in length and width, respectively, to 11.0 by 8.0 mm ( $\bar{x}$  = 6.6 by 4.5 mm), and all were in non-breeding condition based on the absence of sperm in the cauda epididymis. None of five females collected in January (2), February (1), March (1), and April (1) was pregnant. Both January specimens had enlarged teats indicative of recent lactation, which is consistent with parturition in late fall or early winter. In addition, the only obviously immature individual among the 16 dead and living weasels examined was a female weighing only 127 g captured by hand in January. The two

female specimens from January had one and three faint placental scars. If these accurately reflected the number of young produced, average litter size in Florida may be lower than the usual number (6-9) in northern populations (Svendsen 1982).

Mortality.—Of known causes of death of nine weasels, one was captured in a steel trap, one was killed by dog, two were killed by house cats, and five were run over on roads. Six individuals were found dead of unknown causes lying in the open. Five of these, found on paths or road-shoulders, had puncture wounds; the sixth specimen was not examined at the time of discovery and was decomposed when later collected. The type of wounds suggested that the animals had been killed and discarded, probably because of the musk odor, by a bobcat (*Lynx rufus*) or other mammalian predator. Similar instances have been reported in other parts of the species' range (Errington 1935, Young 1958). In addition to road-kills, previously reported causes of death of weasels in Florida include one killed by a house cat (Rhoads 1895) and one that died from an apparent cottonmouth (*Agkistrodon piscivorous*) bite (Moore 1945).

Food Habits.—Sightings of live weasels included five cases involving feeding behavior. I watched one pursuing an adult cotton rat (*Sigmodon hispidus*) on a grassy road shoulder at the edge of rank vegetation bordering a ditch during midday in January. H. Higgins (pers. comm.) saw one attacking an adult cottontail (*Sylvilagus floridanus*) in the yard of his home during the day. G. E. Woolfenden (pers. comm.) observed one carrying a freshly-killed Florida mouse (*Peromyscus floridanus*) along a trail on the Archbold Biological Station at 0705 h in December. On two occasions G. Birge (pers. comm.) observed a weasel feeding at night on small dead fish discarded by fishermen at an inlet to a canal leading from Lake Istokpoga. In addition, Myakka River State Park files contain a record from Sarasota County of a weasel killed by a dog while stealing eggs from a hen house in early afternoon.

Four of 12 stomachs examined were empty and 8 contained mammal hair and bone fragments. The species represented and frequency of occurrence in the 8 stomachs included cotton mouse (*Peromyscus gossypinus*) 5, oldfield mouse (*Peromyscus polionotus*) 1, cotton rat (*Sigmodon hispidus*) 1, and black rat (*Rattus rattus*) 1. Scats of weasels collected in a palmetto flatwoods habitat in March and in a seasonally-wet swale (dry at the time) with muck soil in April contained hair of Florida mouse (*Peromyscus floridanus*) and round-tailed muskrat (*Neofiber alleni*), respectively. Round-tailed muskrats inhabiting ponds and marshes with muck bottoms abandon their houses when the habitats become dry and begin burrowing, at which time they probably become more vulnerable to weasel predation.

These data suggest that weasels in south-central Florida feed primarily on small mammals. The only previous documented information on

foods of weasels in Florida appears to be an instance of possible predation on beach mice (*Peromyscus polionotus*) cited by Bowen (1968) and the report by Frank and Lips (1989) of weasels killing and caching radio-equipped cotton mice. Bangs (1899) stated that Florida weasels fed largely on cotton rats, but did not provide any evidence; and lists of prey in various general accounts are apparently based on studies in other parts of the range or on the list of animals fed to a captive (Moore 1945).

Parasites.—Three species of ectoparasites are known from weasels in Florida. These include larvae of the gopher tortoise tick (*Amblyomma tuberculatum*) reported by Moore (1957) and the fleas *Echidnophaga gallinacea* and *Polygenis gwyni* cited by Layne (1971). I collected an additional specimen of *P. gwyni*, the common flea of small rodents in Florida, from a weasel captured alive in January in Highlands County. No endoparasites have been recorded from Florida weasels (Forrester 1992).

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## EDITORIAL

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