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Perognathus fasciatus.

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Perognathus fasciatus Wied, 1839

Olive-backed Pocket Mouse

Perognathus fasciatus Wied, 1839:369. Type locality Missouri River near junction with the Yellowstone River; restricted by designation of a neotype to near Buford, Williams Co., North Dakota, by Williams and Genoways (1979:95).

Perognathus infraluteus Thomas, 1893:406. Type locality Loveland, Larimer Co., Colorado.

Perognathus callistus Osgood, 1900:28. Type locality, Kinney Ranch, near Bitter Creek, Sweetwater Co., Wyoming.

CONTEXT AND CONTENTS. Order Rodentia, Suborder Sciurognathi (Carleton, 1984), Infraorder Myomorpha, Superfamily Geomyoidea, Family Heteromyidae, Subfamily Perognathinae. The genus *Perognathus*, restricted to the temperate parts of western North America, contains about nine species in the strict sense (if *Chaetodipus* is regarded as a genus distinct from *Perognathus*).

Depending on the authority consulted, two (Williams and Genoways, 1979) to five (Hall, 1981; Jones, 1953) races are recognized. According to the former authors, who generally disregarded color as a potential subspecific characteristic, the two recognized taxa in the species are:

P. f. callistus Osgood, 1900:28, see above.

P. f. fasciatus Wied, 1839:369, see above (*infraluteus*, *litus*, and *olivaceogriseus* considered synonyms).

DIAGNOSIS. *Perognathus fasciatus* is a small to medium-sized pocket mouse (Fig. 1); dorsal coloration ranges from dark, sometimes almost blackish, olivaceous in the northeast to pale buff in *P. f. callistus*; buffy, usually bright, lateral line present; venter usually white, occasionally buff; postauricular spot buffy. Skull relatively small (Fig. 2); braincase slightly vaulted; interparietal variable in shape but usually pentagonal and of moderate width; mastoids well developed and slightly projecting; auditory bullae not meeting anteriorly or only barely so; coronoid processes of mandible relatively long and slender; lower premolar subequal to last molar (Hall, 1981; Williams and Genoways, 1979).

GENERAL CHARACTERISTICS. Among congeners, *P. fasciatus* most closely resembles *P. flavescens*, from which it can be distinguished by a combination of characteristics listed herein. As in other heteromyids, the dental formula is: i 1/1, c 0/0, p 1/1, m 3/3, total 20.

Ranges in external and cranial measurements (in mm) of 18 adults from southwestern North Dakota (Genoways and Jones, 1972) are: total length, 125 to 143; length of tail, 56 to 68; length of hind foot, 16 to 19; length of ear, 7 to 8; greatest length of skull, 21.8 to 23.6; interorbital constriction, 4.5 to 5.1; mastoid breadth, 11.4 to 12.8; depth of cranium, 8.1 to 8.9; length of maxillary toothrow, 2.9 to 3.4. Weights of 12 of these mice ranged from 10.0 to 13.1 g. Williams and Genoways (1979) provided additional measurements and analysis of nongeographic and geographic variation therein, illustrations of crania of the two subspecies they recognized, and comparisons with *P. flavescens*.

Size varies in *P. f. fasciatus* on the Northern Great Plains from north (larger) to south; color varies from east (darker) to west. *P. f. callistus* is larger and paler than *P. f. fasciatus* (Williams and Genoways, 1979). Specimens from North Dakota with unusually blackish dorsal pelage have been reported by Blair (1940) and Williams and Genoways (1979).

DISTRIBUTION. This species occurs from southeastern Alberta, south-central Saskatchewan, and southwestern Manitoba southward in the east through much of North and South Dakota and northwestern Nebraska, and southward in the west through the eastern half of Montana and much of Wyoming to the Uintah, Bridger, and Great Divide basins of the three-corners region of Colorado, Utah, and Wyoming, and to southern Colorado east of the Rockies (Fig. 3). The altitudinal range reaches about 2,500 m in the Wet Mountains of Colorado (Armstrong et al., 1973). We know of no recorded fossils of this pocket mouse.

FORM AND FUNCTION. The baculum of *P. fasciatus* was described by Burt (1960:40) as "typical of the silky pocket mice. The basal end is less bulbous than in *P. merriami* or *P. parvus*, but the general configuration is the same—gently curving shaft that tapers gradually to the upturned distal end. It measures 7.5 mm in length and 1.0 mm in dorsoventral diameter of the base."

Female olive-backed pocket mice have six mammae, two inguinal pair and one pectoral pair (Banfield, 1974).

Molt patterns have not been described in detail. An adult taken in June in North Dakota was reported by Genoways and Jones (1972: 18) to have molt "in progress from just behind the ears to the middle of the back, and lateral slightly onto sides and cheeks." These authors also reported three animals molting from subadult to adult pelage in late July.

ONTOGENY AND REPRODUCTION. Asdell (1964) recorded four to six young per litter, a gestation period of about 1 month, with probably only one litter per season. However, Turner and Bowles (1967) reported that the breeding season extends from May to July with a lull in reproductive activity in mid-June, suggesting more than one litter per season. Andersen and Jones (1971) reported that none of five females taken in northwestern South Dakota in June was pregnant or lactating. Genoways and Jones (1972) tabulated reproductive data for 24 female *P. fasciatus* from southwestern North Dakota and reported pregnant mice from 16 June to 1 August. Pefaur and Hoffmann (1974) summarized the reproductive data from females captured on the Northern Great Plains as follows: mean number of embryos 5.42 (range two to nine), mean number of placental scars 5.64 (range two to 12), and mean number of corpora lutea 6.0 (range four to nine); adult males were considered by them to be reproductively active if the seminal vesicles and epididymides were visibly convoluted and the testes were longer than 6 mm. Lampe et al. (1974) reported females taken in Carter County, Montana, in July as having both embryos and placental scars, further supporting the concept of multiple litters per season. We are unaware of any studies of growth and development involving this species.

ECOLOGY. This heteromyid occupies a variety of arid and semiarid (usually relatively sparsely vegetated) upland habitats, with loose sandy to clayey soils. In south-central Canada, for example, Banfield (1974:153) noted that it occurs "on arid, open, thin grasslands . . . though it may be found on the edge of aspen parklands." Farther south, *P. fasciatus* has been taken in the following habitats: southeastern Montana—grazed and ungrazed areas with sandy soils

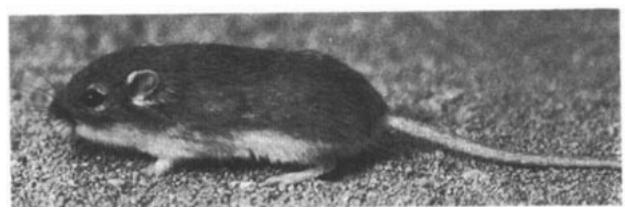

FIG. 1. Olive-backed pocket mouse, *Perognathus fasciatus* (photograph by R. E. Wrigley).

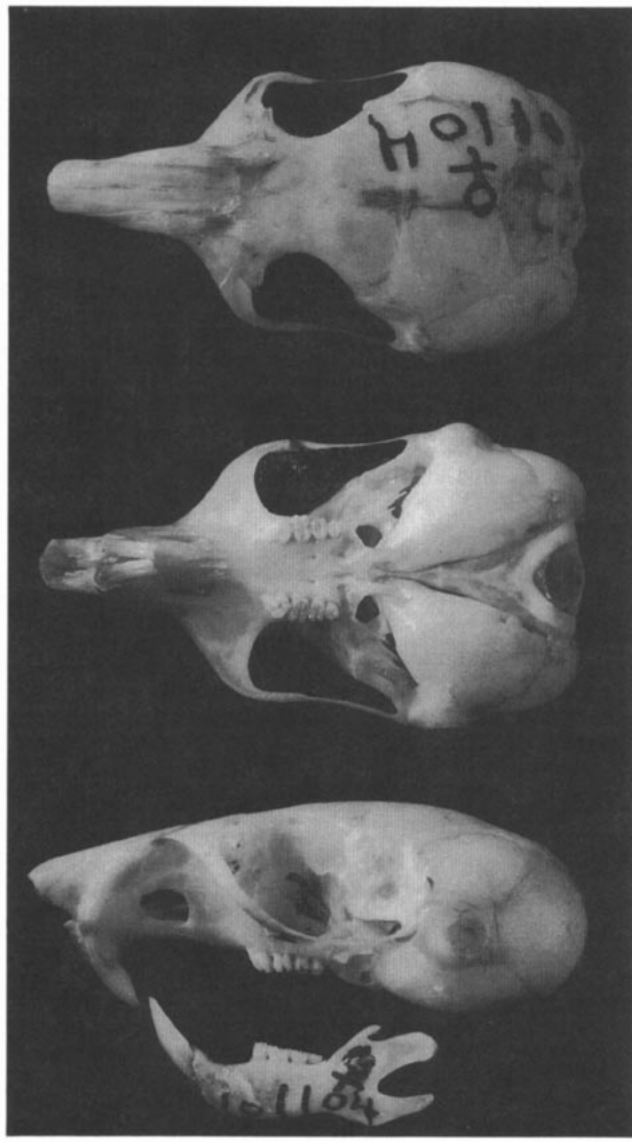

FIG. 2. Dorsal, ventral, and lateral views of cranium, and lateral view of mandible of *Perognathus fasciatus* (female, KU 101104, from Billings Co., North Dakota). Greatest length of skull is 22.5 mm. Photograph by N. L. Olson.

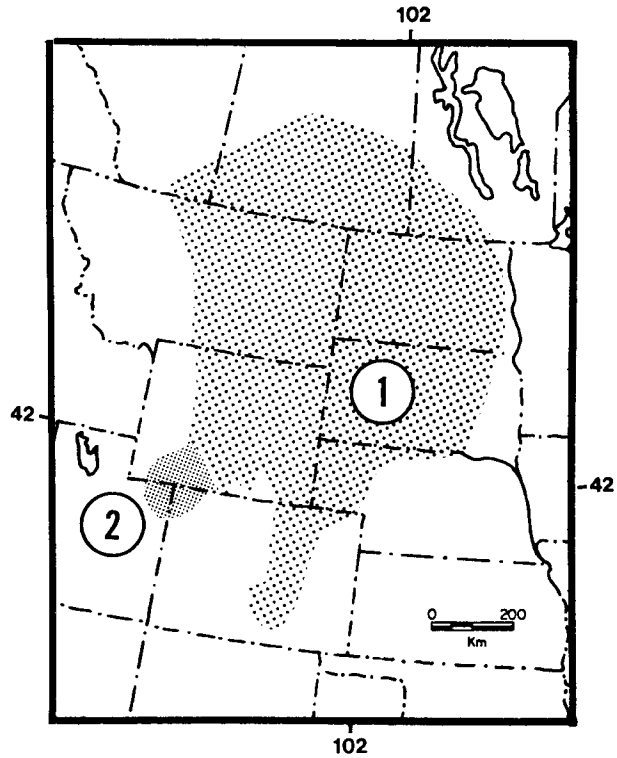

FIG. 3. Geographic distribution of *Perognathus fasciatus*: 1, *P. f. fasciatus*; 2, *P. f. callistus* (after Williams and Genoways, 1979).

and some sage (Lampe et al., 1974); southwestern North Dakota—Turner and Bowles (1967:266) collected a series of 23 of these rodents "on the sandy floodplain within 100 yards of the river [Little Missouri] where sparse vegetation consisted mostly of scattered cottonwood trees (*Populus*) and grasses (*Bromus* and *Poa*), numerous thickets of rose (*Rosa multiflora*), and clumps of sage (*Artemisia frigida*)," and one specimen was trapped on a nearby grassy hillside among rocky outcroppings; south-central south Dakota—olive-backed pocket mice have been trapped in transitional upland grassy habitats with bare soils between clumps of vegetation, where the "soil was not as sandy as that in habitats farther south, where *P. flavescens* was trapped" (Wilhelm et al., 1981:16); northwestern Nebraska—Jones (1964) collected these mice on dry hillsides, frequently with scattered, rocky outcroppings, that supported yucca (*Yucca glauca*), sparse grasses, and occasionally ponderosa pine (*Pinus ponderosa*); northeastern Utah—Hayward and Killpack (1956:451) reported trapping *P. fasciatus* "on sandy soil or sand mixed with fine gravel where the predominant vegetation was sagebrush (*Artemisia tridentata*), shadscale (*Atriplex*) and *Tetrademia*."

Pefaur and Hoffmann (1975) studied small mammal populations on the Northern Great Plains. One site, Dickinson (southwestern North Dakota) was described as a *Stipa-Bouteloua-Carex* community, whereas another on the Long Pine Hills (southeastern Montana) was a *Carex-Bouteloua-Agropyron* community; both areas were ungrazed at the time of the study. Results indicated that *P. fasciatus* had a relatively higher biomass density at the Dickinson site than at the Long Pine Hills site during the live-trap part of the study, but relative biomass density was higher in the Long Pine Hills area in the snap-trap part. Four times as many olive-backed pocket mice were captured in snap-traps than in live-traps, 28 and 7, respectively. Estimates of biomass density (g/ha) for this species were given by Hoffmann et al. (1971) as 22.2 g/ha (from 16 and 25 June) and 5.4 g/ha (from 2 to 11 August) at the Dickinson site. During the live-trap portion of a study on the Long Pine Hills, the greatest distance observed between capture and recapture locations on two mice was 26.5 m and 65.7 m (Pefaur and Hoffmann, 1975). Maxell and Brown (1968) took only 0.9 animals per 1,000 trap nights in southeastern Wyoming, and caught them in areas with less than 40% bare soil.

Population estimates for *P. fasciatus* have been given as follows in North Dakota (Genoways and Jones, 1972): 1.23/ha on a 3.24-ha grid of snap-traps in dry, moderately grazed upland habitat; and 1.81/ha on a smaller (1.1 ha), ungrazed, live-trap grid. Pefaur and Hoffmann (1974) gave population estimates for this pocket mouse that ranged from 0.62/ha to 4.0/ha on grids in Montana and North Dakota; their surveys were conducted in June, July, and August.

Williams (1978*b*:12–13) reported that "*Perognathus* [*flavescens*] *apache* and *P. fasciatus* occur in similar habitats and are nearly the same size, and it is possible that competitive exclusion limits their ranges along a line formed by the White and Duchesne rivers. Certainly the rivers are not barriers to these mice, as they are shallow, and meander through broad floodplains near their confluence with the Green River. The geographic ranges of both species may be limited on the west by competition with *P. parvus*."

Food items reported from cheek pouches of olive-backed pocket mice include: knotweed, *Polygonum exsertum* (Nero, 1957*a*), June grass, *Koeleria gracilis* (Moore, 1952; Soper, 1965), and "seeds of foxtail grass, bugseed, knotweed, Russian thistle, blue-eyed grass, and tumbleweed" (Banfield, 1974:153) in Canada; and *Gaura, Stipa, Croton, Polygonum, Colima*, plus other unidentified grasses, and pieces of leaves and stems in North Dakota (Turner and Bowles,

1967). Bailey (1927) also provided a summary list by vernacular name of plant seeds eaten, and reported that a captive individual preferred mealworms to seeds.

The mean weight of stomach contents of *P. fasciatus* collected in North Dakota was reported as 56 mg for females, and 58 mg for males. The caloric value (cal/g) of the contents measured 4,734 (females) and 4,841 (males). Assimilation efficiency was calculated to be 95.2 for females and 93.2 for males (Johnson and Groepper, 1970).

Ectoparasites identified from these pocket mice include the following: mites (Fain and Whitaker, 1980; Genoways and Jones, 1972; Lampe et al., 1974; Whitaker and Wilson, 1974), *Androlaelaps fahrenholzi, Geomylichus perognathi, Hirstionyssus* sp., and *Haemogamasus* sp.; fleas (Genoways and Jones, 1972; Lampe et al., 1974), *Megabothris lucifer, Opisocrostis bruneri,* and *Meringis jamesoni*; and a tick (Genoways and Jones, 1972), *Dermacentor andersoni.* We know of no endoparasites reported from this species.

BEHAVIOR. Little is known about the behavior of this mouse in the wild. Moore (1952) reported that he found burrows in areas of clayey soils covered with scattered growth of grasses and sage. These active burrowers construct a tunnel system, sometimes extending to a depth of 2 m, that may cover an area of up to about 6 m. The entrance to the network often is located on slightly elevated ground. Food is cached in chambers off the main tunnel, and there may be separate winter and summer chambers. This species is not known to hibernate (Jones et al., 1983). Nero (1958) observed and caught these nocturnal rodents as they foraged for seeds along roads in Saskatchewan.

Nero (1957*b*), who studied captive mice, reported that they cached seeds and seemed to find them later by pushing their nose in the sand and smelling for them. Captives rarely sand-bathed; however, these animals periodically emptied their cheek pouches and cleaned them by rubbing them in the sand. He also noted that the mice often became torpid in the early morning, especially in September and October, but the condition (characterized by a slow rate of breathing) disappeared after several minutes if the mice were disturbed.

GENETICS. The diploid number of chromosomes in *P. fasciatus* is 44, the fundamental number, 48. Of the autosomal pairs, three are biarmed and 18 are acrocentric (as many as 10 of these may contain a minute second arm). The X chromosome is the largest acrocentric; the Y chromosome also is an acrocentric. The karyotype of *P. flavescens* (also 2N = 44, FN = 48) differs from that of *P. fasciatus* in that the X chromosome is a large subtelocentric and the Y is a small subtelocentric. *P. flavescens* also lacks the minute second arms on the acrocentric chromosomes (Williams, 1978*a*).

REMARKS. The generic name *Perognathus* is derived from the Greek *pera* meaning "pouch" and *gnathus* meaning "mouth" or "jaw," referring to the external fur-lined pouches of these mice. The specific epithet (*fasciatus*) is a Latin word meaning "banded," in reference to the lateral color pattern of the pelage.

Until Merriam's (1889) revision of the genus *Perognathus*, the specific name *fasciatus* long had been misapplied to the hispid pocket mouse (*Chaetodipus hispidus*). Merriam provided a useful historic summary of nomenclature. We follow Williams and Genoways (1979) in referring to the authority of *P. fasciatus* (and also for the genus *Perognathus*) as Wied rather than Wied-Neuwied.

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