Geomys personatus. By Stephen L. Williams

Published 25 May 1982 by The American Society of Mammalogists

**Geomys personatus True, 1889**
Texas Pocket Gopher

**Geomys personatus** True, 1889:159. Type locality Padre Island, Texas; restricted to Padre Island, 6.1 mi S Nueces County Park (27°32'N, 97°15'W), Kleberg Co., Texas (Williams and Genoways, 1981).

**CONTEXT AND CONTENT.** Order Rodentia, Family Geomyidae, Subfamily Geomyinae. The genus Geomys contains six species. Seven subspecies of Geomys personatus are recognized as follows:

- G. *p. davisi* Williams and Genoways, 1981. Type locality 3 mi N, 2.8 mi W Zapata, Zapata Co., Texas.
- G. *p. fuscus* Davis, 1940:30. Type locality Fort Clark (Bracketville), Kinney Co., Texas.
- G. *p. personatus* True, 1889:159, see above.

**DIAGNOSIS.** Geomys personatus closely resembles *G. arenarius* and *G. tropicalis* (Alvarez, 1963; Goldman, 1915). These three species differ from other *Geomys* by having a rostrum width that exceeds the length of the basioccipital (Baker and Williams, 1974; Blair et al., 1968; Davis, 1940; Hall, 1961; Hall and Kelson, 1959). Geomys personatus differs from *G. arenarius* and *G. tropicalis* by having a sagittal crest, a U-shaped mesopterygoid fossa, and lacking a squamosal knob. Differences in zygomatic arches, interparietal shape, ratio of zygomatic breadth to basal length, ratio of mastoid breadth to basal length, and shape of border of premaxilla are additional characteristics that may be used to separate either *G. arenarius* or *G. tropicalis* (Alvarez, 1963). Pelage color has been described as being “Broccoli brown” according to Ridgway’s Nomenclature of Colors (True, 1889). Karyotypically *G. personatus* may be further differentiated from these two species by having a lower fundamental number (FN = 70–76) than *G. arenarius* (FN = 102) and a higher diploid number (2n = 68–72) than *G. tropicalis* (2n = 38) (Davis et al., 1971). Geographical races of *G. personatus* are highly variable. Much of the variation may be attributed to size; *G. p. personatus* is the largest, followed by *G. p. maritimus, G. p. megagotatus, G. p. fallax, G. p. davisi, G. p. streckeri,* and *G. p. fuscus.* Davis (1940) differentiated most of the types by using average total length, average length of foot, and coloration. Williams and Genoways (1981) discussed in detail univariate and multivariate analyses of cranial dimensions of *G. personatus.*

**GENERAL CHARACTERS.** Geomys personatus is a medium-sized to large-sized fossorial rodent having typical generic features such as thick-set body, external fur-lined cheek pouches, reduced eyes, receded pinnae, strong-clawed forelimbs, medium-sized and sparsely-haired tail (Fig. 1); and bisulcate upper incisors, evergrowing teeth, enamel on the anterior surface of incisors, and dental formula of i 1/1, c 0/0, p 1/1, m 3/3, total 20 (Fig. 2).

The dimensions of different subspecies of *G. personatus* vary enough to justify listing a few standard measurements of each taxa for comparative purposes. Means and extremes (in parentheses) for external and cranial measurements (in mm) of adult individuals of subspecies of *G. personatus* (males followed by females) are as follows (from Williams and Genoways, 1981):

- G. *p. davisi* (11 males, 13 females)—total length, 275.0 (248 to 314), 252.9 (229 to 269); length of tail, 88.4 (62 to 105), 80.0 (68 to 89); length of hindfoot, 35.5 (31.4 to 38), 33.1 (31 to 35); greatest length of skull, 49.9 (47.1 to 55.4), 44.1 (41.9 to 46.4); condylar basis of the skull, 46.4 (46.1 to 54.2), 42.9 (40.5 to 45.0); basal length, 45.6 (43.0 to 51.5), 40.1 (37.5 to 41.8); palatal length, 32.0 (30.5 to 35.7), 27.6 (25.6 to 28.8); zygomatic breadth, 30.3 (28.3 to 33.5), 26.4 (24.0 to 28.5); mastoid breadth, 28.6 (26.8 to 31.0), 25.2 (22.5 to 27.3); squamosal breadth, 21.4 (20.6 to 23.0), 19.9 (18.2 to 21.7); G. *p. fallax* (16 males, 13 females)—total length, 271.5 (242 to 304), 241.3 (228 to 252); length of tail, 81.4 (59 to 94), 76.7 (66 to 89); length of hindfoot, 33.4 (30 to 36), 30.0 (27.5 to 32.6); greatest length of skull, 50.7 (46.8 to 55.7), 43.3 (41.0 to 45.8); condylar basis of the skull, 49.7 (45.3 to 55.1), 42.7 (39.7 to 45.0); basal length, 46.8 (42.5 to 51.8), 40.1 (37.6 to 42.7); palatal length, 32.6 (28.7 to 36.7), 27.4 (25.8 to 29.4); zygomatic breadth, 31.5 (29.5 to 33.8), 25.9 (24.1 to 27.5); mastoid breadth, 29.1 (27.5 to 32.0), 24.9 (23.3 to 26.3); squamosal breadth, 22.0 (20.4 to 24.2), 19.4 (17.8 to 20.6); G. *p. fuscus* (two males)—total length, 235 (220, 250); length of tail, 72.5 (72, 73); length of hindfoot, 28.5 (27, 30); greatest length of skull, 41.4 (38.5, 44.3); condylar basis of the skull, 40.8 (38.1, 43.5); basal length, 38.2 (35.4, 41.0); palatal length, 26.3 (24.1, 28.4); zygomatic breadth, 24.5 (22.7, 26.4); mastoid breadth, 22.7 (20.7, 24.6); squamosal breadth, 17.1 (16.4, 17.7); G. *p. maritimus* (four males, 11 females)—total length, 299.3 (282 to 310), 265.7 (242 to 284); length of tail, 96.5 (92 to 100), 83.8 (74 to 99); length of hindfoot, 38.5 (36 to 41), 33.2 (30 to 36); greatest length of skull, 55.3 (52.2 to 58.4), 49.5 (46.4 to 52.3); condylar basis of the skull, 53.8 (52.1 to 56.4), 48.4 (45.6 to 50.8); basal length, 51.1 (49.6 to 53.5), 45.5 (42.6 to 48.1); palatal length, 36.1 (34.9 to 37.8), 31.6 (29.9 to 33.6); zygomatic breadth, 33.7 (32.0 to 35.2), 30.1 (28.4 to 32.6); mastoid breadth, 31.1 (28.5 to 32.7), 28.2 (27.3 to 30.5); squamosal breadth, 23.1 (21.4 to 24.1), 21.4 (20.4 to 23.2); G. *p. megagotatus* (23 males, 18 females)—total length, 288.7 (269 to 310), 257.9 (240 to 274); length of hindfoot, 33.4 (30 to 36), 30.0 (27.5 to 32.6); greatest length of skull, 50.7 (46.8 to 55.7), 43.3 (41.0 to 45.8); condylar basis of the skull, 49.7 (45.3 to 55.1), 42.7 (39.7 to 45.0); basal length, 46.8 (42.5 to 51.8), 40.1 (37.6 to 42.7); palatal length, 32.6 (28.7 to 36.7), 27.4 (25.8 to 29.4); zygomatic breadth, 31.5 (29.5 to 33.8), 25.9 (24.1 to 27.5); mastoid breadth, 29.1 (27.5 to 32.0), 24.9 (23.3 to 26.3); squamosal breadth, 22.0 (20.4 to 24.2), 19.4 (17.8 to 20.6).
of tail, 87.5 (69 to 103), 76.1 (59 to 88); length of hindfoot, 36.5 (32.8 to 40), 33.5 (31 to 35); greatest length of skull, 51.7 (48.7 to 56.1), 46.3 (44.3 to 48.1); condylobasal length, 39.7 (48.0 to 55.1), 45.3 (43.3 to 46.9); basal length, 47.9 (44.6 to 52.3), 42.7 (40.6 to 44.6); palatal length, 33.4 (31.0 to 36.4), 29.5 (28.1 to 32.9); zygomatic breadth, 31.7 (28.7 to 35.5), 27.9 (26.7 to 28.9); mastoid breadth, 29.7 (26.9 to 32.9), 26.5 (25.5 to 30.0); zygomatic breadth, 22.4 (20.5 to 24.4), 20.8 (19.6 to 23.4). *G. p. personatus* (37 males, 30 females)—total length, 315.3 (264 to 360), 286.9 (263 to 312); length of tail, 105.0 (86 to 125), 95.7 (80 to 110); length of hindfoot, 39.5 (33 to 43), 36.7 (32 to 39); greatest length of skull, 57.9 (54.1 to 62.5), 52.9 (50.2 to 55.3); condylobasal length, 56.8 (53.0 to 60.8), 51.7 (49.0 to 54.5); basal length, 53.6 (50.2 to 57.4), 48.2 (41.9 to 51.5); palatal length, 37.6 (34.9 to 40.2), 35.5 (32.2 to 35.9); zygomatic breadth, 35.5 (32.3 to 38.0), 31.4 (29.5 to 33.6); mastoid breadth, 32.6 (29.4 to 35.9), 29.4 (27.4 to 31.3); zygomatic breadth, 23.8 (22.3 to 26.0), 22.4 (21.0 to 23.6). *G. p. streckeri* (10 males, 16 females)—total length, 249.9 (226 to 280), 225.7 (216 to 254); length of tail, 79.1 (64 to 90), 70.1 (62 to 80); length of hindfoot, 30.8 (27 to 34.4), 27.7 (24 to 30); greatest length of skull, 45.1 (42.5 to 48.4), 40.0 (37.8 to 42.3); condylobasal length, 43.7 (39.5 to 48.2), 39.2 (36.8 to 41.4); basal length, 41.4 (37.1 to 45.7), 36.9 (34.8 to 38.7); palatal length, 28.6 (25.6 to 32.2), 25.1 (23.4 to 26.7); zygomatic breadth, 27.0 (24.5 to 30.2), 23.9 (23.0 to 24.5); mastoid breadth, 25.2 (23.0 to 28.1), 22.8 (21.5 to 24.1); zygomatic breadth, 19.3 (17.7 to 21.2), 18.2 (17.4 to 19.0).

**DISTRIBUTION.** *Geomyos personatus* is generally restricted to soils in the Tamaulipan Biotic Province (Blair, 1952), specifically in southern Texas and Tamaulipas and on the mainland in sandy soils left by a series of Eocene and post-Eocene beaches that now run along the Lower Rio Grande Plains and more or less parallel to the present coastline (Davis, 1940; Selander et al., 1962). Deviations of this distributional pattern are probably the result of emigrations along fluvial deposits of the Rio Grande and Neches rivers (Davis, 1940). The Rio Grande River served as an effective barrier to southern dispersal of this species, except near the mouth of the river where dispersal was probably made possible during the Wisconsin time. During this time the course of the river could have changed regularly over a long, low coastal plain (Selander et al., 1962).

Subspecies of *G. personatus* have disjunct geographical ranges. *G. p. sidei* is known from the Rio Grande River Valley of Texas, in western Webb and Zapata counties. *G. p. fallax* occurs near Nueces Bay, northwestward along the Nueces River and north as far as the vicinity of Falls City (collecting localities include Bee, Goliad, Jim Wells, Karnes, Live Oak, Nueces, and San Patricio counties, Texas). *G. p. fuscus* occurs near the Rio Grande River in Kinney and Val Verde counties, Texas. *G. p. maritimus* is restricted to sandy soils of the mainland in Kleberg and Nueces counties, between Baffin Bay and Flour Bluff. *G. p. megapomatus* has the largest range of all the subspecies. The northernmost record is 6 mi W Cotulla, La Salle Co., Texas, and the southernmost record is Boca Santa Maria (barrier island), Tamaulipas (collecting localities in Texas include Brooks, Cameron, southern Duval, northern Hidalgo, Jim Hogg, Kenedy, southern Kleberg, eastern Starr, eastern Webb and Willacy counties). *G. p. personatus* is restricted to Mustang Island and Padre Island in Kleberg and Nueces counties, Texas. *G. p. streckeri* is restricted to northern Dimmit and southern Zavala counties, Texas (Williams and Genoways, 1981).

The recognized subspecies of *G. personatus* are generally separated by barriers of unfavorable soils. Only *G. p. megapomatus* and *G. p. streckeri* could be in contact; such a contact would probably be along fluvial deposits of the Nueces River (Davis, 1940; Williams and Genoways, 1981).

**FOSSIL RECORD.** The tribe Geomyini, consisting of the living genera *Geomyos, Pappogeomys, Orthogeomys,* and *Zygoeomys,* probably differentiated from ancestors of the tribe Thomomys, during early Pliocene. The genus *Geomyos* subsequently separated from other living genera of the tribe Geomyini during late Pliocene (Russell,
Russell (1968a) suggested that *Geomyys* was less primitive than *Orthogeomyx* and *Zygogeomyx*, but not as specialized as *Pogonomys*.

Russell (1968a) stated that by Sangamon time the genus *Geomyys* had differentiated into the *G. bursarius* and *G. pinetis* species groups, and that *G. personatus* and *G. arenarius* probably developed independently as species groups either in the Wisconsin or post-Wisconsin glacial period. *Geomyx tropicalis* supposedly differentiated from *G. personatus* since the Wisconsin glacial period (Baker and Williams, 1974; Selander et al., 1962). Based on genetic variation, Penzey and Zimmerman (1976) suggested that *G. pinetis* diverged from *G. bursarius* during the Illinoian glacial or Yarmouth interglacial periods, followed by *G. arenarius* and later *G. personatus* during the lower Illinoian glacial and Sangamon interglacial periods. However, similar studies of genetic variation by Selander et al. (1975) indicated a closer relationship between *G. arenarius* and *G. tropicalis* to *G. personatus* than to *G. bursarius*. Such a relationship is in agreement with morphological similarities observed by Alvarez (1965).

Martin (1974a, 1974b) suggested that *G. pinetis* was closely related to *G. personatus* and speculated that both could be conspecific. However, Williams and Genoways (1975) showed that these species were distinct karyotypically and that *G. personatus* was probably more closely related to the western species of *Geomyx*.

Selander et al. (1962) reported finding skeletal remains and "fossilized" burrow systems of *G. personatus* on the barrier islands of the Long Island Sound. However, it is likely that these remains are not very old. Raun and Eck (1967) reported *Geomyx* skeletal material occurring in archeological sites in Val Verde County, Texas; although this material was not identified to species, records of *G. personatus* in the immediate area and the lack of recent or fossil records of other species of *Geomyx* there, suggest that *G. personatus* may have existed in the area 4,000 to 5,000 years ago.

**FORM AND FUNCTION.** Measurements given by Williams and Genoways (1981) clearly indicate that sexual dimorphism occurs in *G. personatus*. Males consistently average larger in all external and cranial measurements.

Davis (1940) and Kennerly (1954) noted a climatic variation in size among populations of *G. personatus*, with individuals tending to be smaller with increasing distance from the coast. They suggested that the smaller size was the result of more inductive soils and related selective factors.

Kennerly (1959) reported that *G. personatus* molted at least twice a year. Observations suggested that a winter pelage may at least be maintained between late October and mid-March. Individual pelages were observed starting to molt into summer pelage of early as late February (Kennerly, 1958a). Kennerly (1958a) discussed the progression of one individual molting from winter to summer pelage.

Kennerly (1954) suggested that pelage color of *G. personatus* was generally adaptive to soil color. However, abnormalities to this trend were noted (Kennerly, 1954). Some individuals possessed variations such as white spots, a middorsal stripe, or a pelage with lighter coloration. One albino female was observed in Zapata County, Texas. Kennerly (1954) also discussed other abnormalities associated with the dentition and appendicular skeleton.

Descriptions of the phallic (Williams, 1982) and baculum (Kennerly, 1958b; Williams, 1982) were reported. The phallic is typical of the genus, having a glans that is about half the length of the distal tract and expanded apically to a collar. The collar encircles the protractile tip and ventral urethral processes. Other features such as a midventral raphe, middorsal groove, dorsal protuberances, and minute epidermal projections are normally present (Williams, 1982). The baculum is completely ossuous, slightly curved, and consists of a bulbous base that narrows to the main shaft, which is tapered and terminates with a distinctive tip (Kennerly, 1958b; Williams, 1982).

**ONTOGENY AND REPRODUCTION.** Davis (1974) suggested that mating begins as early as February based on the capture of young pocket gophers. Specimens collected in February by Allen (1981) included a 7 to 10-day-old individual, indicating an earlier breeding season. On two occasions, Kennerly (1958a) found an adult male and adult female sharing a burrow system in January. In both instances, the female was pregnant. Pregnant individuals were collected by Kennerly (1958a) during December, January, February, March, and April from 11 gravid specimens averaged 3.18 and ranged from 2 to 4 (Kennerly, 1958a). There are probably no more than two litters produced each year by a single female (Davis, 1974). Kennerly (1958b) estimated that the life span of *G. personatus* was about 2 years.

Williams and Genoways (1977, 1981) characterized different age groups of pocket gophers. Juveniles typically possessed a gap between the basiocipitai and basiphenoid, undeveloped sagittal crest, zygomatic breadth nearly equal to or less than mastoid breadth, and juvenile pelage. In subadults the basiocipital and basiphenoid were connected but not fused, the sagittal crests were separated by a gap, and the zygomatic breadth was more than 1 mm greater than the mastoid breadth. Adults were characterized by a fused basiocipital plate and basiphenoid, well-developed sagittal crests that joined at the top of the cranium, and a zygomatic breadth that was always more than 1 mm greater than the mastoid breadth.

Kennerly (1958b) noted differences in the bacula of immature and mature *G. personatus*. In young individuals the tip of the baculum was dorsoventrally "decurred." With maturity the baculum became more massive and less decurred.

**ECOLOGY.** *Geomyx personatus* is endemic to the Tamalipan Bioregion, which includes Mexico and the southernmost United States.

*Geomyx personatus* is generally restricted to deep, sandy soils. Rocky, silt loam, or clay soils serve as formidable barriers to this species (Davis, 1940, 1974; Kennerly, 1958b). Davis (1940) and Kennerly (1954) suggested that soil was an important factor in the geographical variation of this species. There is a strong negative correlation between body size and duggability of soil (Davis, 1940; Kennerly, 1954).

Although *G. personatus* may have several predators, the only documented predators are the marsh hawk (*Circus cyaneus*) and domestic cat (*Felis catus*) (Merriam, 1895). Baker and Lay (1938) reported collecting species of *Dipodomys*, *Onychomys*, *Spermophilus*, and *Tateoidea* with *G. personatus*. Blair (1952) and Kennerly (1958b) discussed additional faunal relationships. Generally, there are no major competitors of *G. personatus* in their fossorial habitat. However, the range of *Geomyx attuator* comes into contact with the range of *G. p. fallax* (Kennerly, 1958b; Williams and Genoways, 1981) and competition may occur in this area. Kennerly (1958b) found that both species had similar ecological requirements and that there were no ecological changes in areas where they occur near each other. Williams and Genoways (1981) detected possible hybridization through comparison analysis. Further investigation of the ecological relationship of these species is needed. Hall (1981), Hall and Kelson (1959), and Russell (1968b) indicated that the geographical range of *G. personatus* may overlap with that of the yellow pocket gopher (*Pappogeomyx castanopus*) in the vicinity of Kinney and Val Verde counties, Texas. Russell (1968b) suggested that *G. personatus* may have replaced *P. castanopus* in agricultural areas around Eagle Pass. There are no reports of these two species occurring together.

Three species of lice (Mallophaga: Trichodectidae) have been reported from different populations of *G. personatus*. *Geomyodesus texanus* was initially described as occurring on *G. p. fallax* from Flour Bluff, Nueces Co., Texas (Ewing, 1936). Revision of *G. personatus* by Davis (1940) resulted in taxonomic changes that make *G. p. maritimus* the actual host of *Geomyodesus texanus*. Price and Emerson (1971) subsequently reported this louse also occurred on *G. p. fallax*, *G. p. megapontatus*, *G. p. personatus*, and *G. tropicalis*. Price and Hellenthal (1975) gave subspecific designations to *Geomyodesus texanus*, with *G. t. texanus* occurring on subspecies of *G. personatus* and *G. t. tropicalis* occurring on *G. tropicalis*. A second species of lice, *Geomyodesus truncatus*, described by Wiernek (1950), was initially reported on pocket gophers from Padre Island, making *G. p. personatus* the type host. However, Price and Emerson (1971) found *G. truncatus* on *G. p. steeinki* in Mexico. The species of louse, *Deltalopthus dalileshiki*, is restricted to *G. p. fusces* (Timm and Price, 1979).

The economical importance of *G. personatus* is negligible except in cultivated fields and along roads (Davis, 1974). In some situations they are pests of cultivated areas, burrowing activity near and below pavement contributes to the collapse and subsequent erosion of road surfaces (Davis, 1974).
BEHAVIOR. Documentation of burrowing behavior is limited to observations on Padre Island. Davis (1974) excavated a burrow system that was over 30 m in length with many short branches leading from the primary tunnel. The burrow itself had an average horizontal diameter of 100 mm, average vertical diameter of 125 mm, and average depth of 250 mm (Davis, 1974).

Kennedy (1955) commented that burrow diameter and depth is dependent on soil texture and body size of the pocket gopher. Davis (1940) verified the importance of body size on burrow diameter when he reported that the average diameter of burrows of G. p. maritimus was 100 mm, whereas the burrows of G. p. streckeri averaged 65 mm in diameter. On Padre Island burrow systems occasionally reach the water table at a depth of 50 cm (Bailey, 1895, 1905; Davis, 1974).

Most foraging is done from the burrow system where plants are pulled down into the burrow (Davis, 1974). On occasion, foraging takes place on the surface. After the burrow system has been opened, it is plugged from the inside, leaving a characteristic mound on the surface. Davis (1974) reported that a typical mound had a horizontal diameter of 45 by 60 cm, a height of 12 cm, and a weight of 6 kg. Below the mound the burrow is plugged for 1 to 2 m (Bailey, 1895, 1905; Davis, 1974; Merriam, 1895). Except for breeding periods only one individual occupies a burrow system. On Padre Island individuals are reported to form colonies that are several miles or more apart (Bailey, 1895; Merriam, 1895).

Geomys personatus has capsule-shaped feces that are about 19 mm long and 7 mm in diameter. This species ingests its own fecal pellets. Individual pellets may be discarded or completely channeled (Davis, 1974).

Davis (1974) characterized Texas pocket gophers as “ferocious isolationists.” When perturbed they typically grasp their teeth and emit a wheezy sound.

GENETICS. The karyotype of G. personatus is highly variable among populations. Although other karyotypes are possible, the described diploid numbers and fundamental numbers (in parentheses) of the subspecies are as follows: G. p. fallax—68 (70), G. p. maritimus—70 (70); G. p. megapodion—70 (70); G. p. personatus—70 (70); G. p. streckeri—72 (72). The X and Y chromosomes are a large biarmed element and a small acrocentric element, respectively (Davis et al., 1971).

Selander et al. (1975) examined electromicroscopic data of G. personatus and closely related species, and found that karyotypic and genetic variation have evolved independently in geomyids. Analysis of 22 proteins encoded by 25 loci indicated that for five populations of G. personatus sampled the mean polymorphism per population was 0.185 (range 0.09 to 0.26). Only one protein locus, EstrW, was polymorphic for the populations sampled. Heterozygosity per individual ranged from 0.02 to 0.08 (mean 0.044) (Selander et al., 1975). Subsequent studies by Penney and Penney (1976), using 22 proteins, 22 loci, and five populations, strongly agree with the results of Selander et al. (1975). Penney and Zimmerman (1976) found mean polymorphism per population to be 0.166 (range 0.09 to 0.23), and mean heterozygosity per individual to be 0.054 (range 0.04 to 0.07).

REMARKS. The generic name Geomys is derived from the Greek words geo-, meaning “ground,” and mys, meaning “muss.” In Latin the species name, personatus, means “having a mask,” which refers to “a well-defined dusky band” that occurs “between the eyes and extends thence to the nostrils,” as mentioned in the original description (True, 1889). The subspecific name davisi is in honor of Dr. William B. Davis for his contributions to the knowledge of G. personatus as well as other geomyid species (Williams and Genoway, 1981); the name fallax means “deceptive” in Latin, and refers to the atypical characteristics of the subspecies (Merriam, 1895); the Latin meaning of “dusky” or “dark” or “gray” and refers to the short coloration of the subspecies; maritimus in Latin means “belonging to the sea,” referring to the coastal geographical location of the subspecies; megapodion is derived from the Greek word mega-, meaning “great,” and podion, meaning “rearing,” and refers to its occurrence along the lower Rio Grande River; and streckeri is used in memory of the Texas naturalist Mr. J. K. Strecke (Davis, 1943).

Williams and Genoway (1981) found G. p. streckeri and G. p. fuscus to be more similar to each other than to other subspecies of G. personatus. Furthermore, differences in cranial dimensions (Williams and Genoway, 1981), karyotypes (Davis et al., 1971), parasites (Price and Emerson, 1971; Timm and Price, 1979), phalic and baculur dimensions (Williams, 1982) make the taxonomic status of G. p. streckeri questionable. Further investigations may prove that streckeri is a distinct species. If this should happen, G. p. fuscus will probably follow as a subspecies of streckeri. However, determination of the exact relationship of G. p. fuscus will be difficult because very few museum specimens are available and recent investigations made to documented collecting localities have failed to provide additional specimens for analyses.

LITERATURE CITED


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