MAMMALIAN SPECIES No. 359, pp. 1–4, 4 figs.

Vampyrodes caraccioli.

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Published 23 October 1990 by The American Society of Mammalogists

Vampyrodes Thomas, 1900

Vampyrodes Thomas, 1900:270, as a subgenus of *Vampyrops*. Type species *Vampyrops Caracciolae* Thomas, by original designation.

CONTEXT AND CONTENT. Order Chiroptera, Suborder Microchiroptera, Family Phyllostomidae, Subfamily Stenodermatinae. Although some (Hall, 1981; Starrett and Casebeer, 1968) have considered the genus to contain two species, we follow Jones and Carter (1976) and Honaki et al. (1982) in regarding *Vampyrodes* as monotypic.

Vampyrodes caraccioli (Thomas, 1889)

Great Striped-faced Bat

Vampyrops Caracciolae Thomas, 1889:167. Type locality "Trinidad."

Vampyrops Caraccioli Thomas, 1893*a*:186. Corrected spelling of specific name.

Vampyrodes caracciolae: Miller, 1907:156. First use of current name combination and incorrect subsequent spelling.

Vampyrodes major G. M. Allen, 1908:38. Type locality "San Pablo, Isthmus of Panama."

Vampyrodes ornatus Thomas, 1924:532. Type locality "San Lorenzo, Río Marañon, nearly opposite mouth of Huallaga," Loreto, Perú.

Vampyrodes caracciloi: Pittier and Tate, 1932:273. An incorrect subsequent spelling.

CONTEXT AND CONTENT. Context same as in generic account above. *Vampyrodes caraccioli* contains two subspecies:

V. c. caraccioli (Thomas, 1889:167), see above.

V. c. major Allen, 1908:38, see above (*ornatus* Thomas is a synonym).

DIAGNOSIS. *Vampyrodes caraccioli* is a large (length of forearm, 46.8–57.3 mm) and robust bat, with a broadly V-shaped interfemoral membrane, whitish facial stripes and a dorsal stripe, and a strongly developed noseleaf. Although externally similar, *Vampyrodes* can be distinguished from *Vampyrops* in having only two pair of upper molars, rather than three, and the metacone is reduced to a trace on the second upper molar. The dental formula for *Vampyrodes* is i 2/2, c 1/1, p 2/2, m 2/3, total 30 (Goodwin and Greenhall, 1961; Hall, 1981; Miller, 1907).

GENERAL CHARACTERS. As its vernacular name implies, *V. caraccioli* (Fig. 1) is a large stenodermatine with two pair of white facial stripes. A superorbital stripe extends from the nose to above the ear and a suborbital stripe begins near the corner of the mouth and ends near the base of the ear. A white mid-dorsal stripe extends from the top of the head to the base of the interfemoral membrane; the dorsum is otherwise brownish to grayish brown, paler on the head and shoulders; the venter is slightly paler than the back. There is no external tail. The noseleaf is strongly developed, the forearm, hind limbs, and feet are hairy, and there is a distinct fringe of hairs medially on the posterior border of the uropatagium (Goodwin and Greenhall, 1961; Nowak and Paradiso, 1983; Villa-R., 1967).

The skull (Fig. 2) is relatively large and strong. Upper incisors have complete cutting edges, the outer pair of teeth are much smaller than the inner pair, and a small space separates adjacent teeth. Lower incisors, with bifid cutting edges, form a straight line so that space between the canines is completely occupied. In contrast to *Vampyrops*, the metacone of the second upper molar is much reduced (Miller, 1907).

Ranges (in mm) of representative morphometric characters from throughout the range of the species are: length of forearm, 46.8–57.3; greatest length of skull, 24.7–28.9; condylobasal length, 22.4–25.3; zygomatic breadth, 15.2–17.8; breadth of braincase, 10.8–13.0; postorbital breadth, 6.0–7.0; length of maxillary toothrow, 8.5–10.1; breadth across upper molars, 11.2–12.8 (Albuja, 1983; Gardner et al., 1970; Genoways et al., 1981; Goodwin and Greenhall, 1961; Sanborn, 1936; Starrett and Casebeer, 1968; Swanepoel and Genoways, 1979). Weight usually ranges from 30 to 40 g (Albuja, 1983; Bonaccorso, 1979).

DISTRIBUTION. *Vampyrodes caraccioli* occurs (Fig. 3) from southern México southward to northern Bolivia (Hall, 1981; Koopman, 1982). Of the two subspecies, *V. c. caraccioli* occurs on Trinidad and Tobago and on the mainland of northeastern South America, whereas the somewhat larger *V. c. major* is found in southern México (Oaxaca and Chiapas), Central America, northwestern South America, and from western Amazonas to Bolivia. There is no known fossil record.

FORM AND FUNCTION. The cerebral hemispheres of the brain are large and blunt anteriorly, with poorly developed sulci (McDaniel, 1976). The stomach is characterized by an enlarged fundic caecum, a reduced cardiac vestibule, and a distinct constriction between them (Forman et al., 1979). Sperm cells have an unusually long head with a narrow apex and narrow and flattened base; the acrosome is symmetrical (Forman and Genoways, 1979).

Milk produced by *V. caraccioli* has a higher fat concentration than that of *Glossophaga*, *Leptonycteris*, *Carollia*, *Artibeus*, *Myotis*, and *Tadarida*; as a result, the energy content of the milk is also higher than that of the other taxa. Moreover, the milk fat of *V. caraccioli* contains high concentrations of linoleic and linolenic acids, and a low concentration of palmitoleic acid (Jenness and Studier, 1976). This species maintains body temperature independently of ambient temperature to at least 10°C; optimal body temperature is between 34 and 38°C (McManus, 1977).

ONTOGENY AND REPRODUCTION. Although data from Colombia are few, they suggest a pattern of two sequential breeding periods followed by a quiescent period from July to September (Thomas, 1972). Postpartum estrous is suggested by the presence of simultaneously pregnant and lactating specimens mid-

FIG. 1. Photograph of a *Vampyrodes caraccioli* from Surinam. Photograph by R. J. Baker.

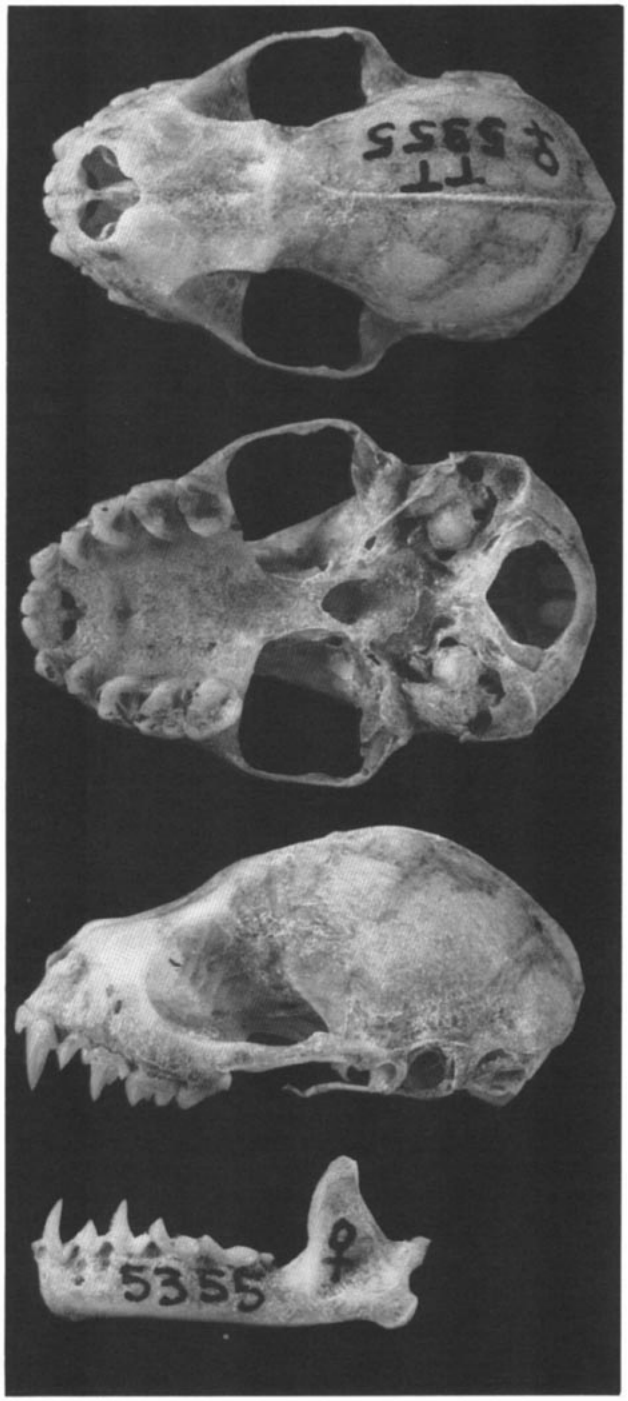

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of lower jaw of *Vampyrodes caraccioli caraccioli* from Trinidad (The Museum, Texas Tech University, 5535, adult female). Greatest length of skull is 26.3 mm.

way through the breeding period. Throughout the range of this species, pregnant females have been captured in all months except May, September, and December (Wilson, 1979). Testes of adult males from Nicaragua had the following measurements (in mm) of length by month (Jones et al., 1971): February, 10; March, 8; June, 3–4; July, 4–6; August, 3–4.

ECOLOGY. Little is known about the ecology of *V. caraccioli*. Distributional records indicate that the species occurs in a variety of wet habitats and elevations. Gardner et al. (1970) obtained specimens in Costa Rican tropical wet forest (15 m), Davis et al. (1964) reported individuals from an airstrip in México (525 m), and

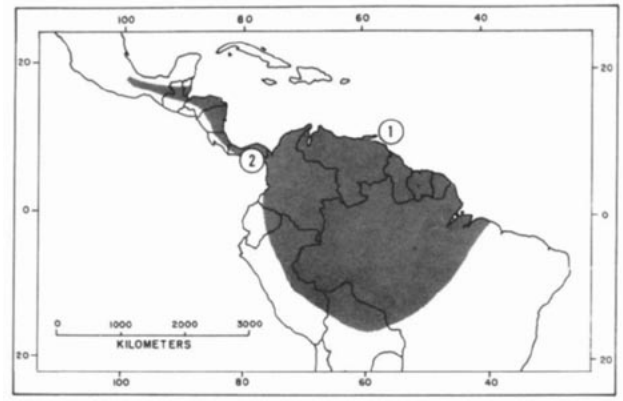

FIG. 3. Geographic distribution of *Vampyrodes caraccioli*. The type localities of *V. c. caraccioli* (1) and *V. c. major* (2) are plotted. The paucity of records from north-central South America makes it impossible to accurately delineate the distributional limits of the two recognized subspecies.

as taken over a small stream in a heavily forested area in Honduras (280 m), and Thomas (1972) captured this species in lowland tropical rain forest along the Pacific coastal plain (75 m) in Colombia. Individuals were netted (Handley, 1976) in tropical moist, tropical wet, and subtropical wet forest habitats in Venezuela, most frequently below 500 m, but occasionally up to 1,000 m. Koopman (1978) considered *V. caraccioli* to be a mesic-adapted Amazonian lowland species in South America. In the Caribbean versant of Nicaragua, Jones et al. (1971) netted specimens over streams bordered by riparian woodland (300–330 m) and in a banana grove (25 m). This species is common at medium elevations (500 to 850 m) in Panamá, but less numerous at lower elevations (Handley, 1966).

Vampyrodes caraccioli is a frugivore (Fleming et al., 1972; Gardner, 1977), and individuals have been observed foraging in close proximity to papaya, banana, and fig trees (Tuttle, 1970). Bonaccorso (1979) noted that feces of this species contained fig (*Ficus*) seeds >75% of the time in Panamá, and characterized it as a common fig specialist of the canopy frugivore guild. Using radio telemetry, Morrison (1980) studied foraging behavior of four females and two males on Barro Colorado Island in the Panama Canal Zone. The bats left their day-roost approximately 45 min after sunset and normally flew directly to a fruiting tree, usually a fig; a fruit was removed and taken to a feeding roost <100 m away where it was consumed. Although individuals would only visit or revisit two to three trees in the course of a night, broken by periods of inactivity, occasional prolonged flights lasting from 10 to 33 min occurred between 2000 and 0100 h, possibly for the purpose of finding new fruit trees. Moonlight appears to have an inhibitory effect on foraging, thereby potentially reducing vulnerability to visual predators such

FIG. 4. Standard karyotype of a male *Vampyrodes caraccioli* from Surinam. Karyotype courtesy R. J. Baker; photograph courtesy C. A. Porter.

as owls and opossums. Also on Barro Colorado Island, *V. caraccioli* had a flight activity pattern at night that differed from those of other large fig specialists, probably "to minimize interspecific interference from crowding at resource trees" (Bonaccorso, 1979:376).

These bats have been observed roosting in and under large leaves and palm fronds, as well as in foliage and under branches (Tuttle, 1976). Clusters of two and four individuals were reported by Goodwin and Greenhall (1961) as roosting in a palm frond and in the branches of a shrub, respectively. Morrison (1980) found that these bats rarely used the same day-roost for more than 2 consecutive days, but individuals remained within the same area (0.5 ha) throughout a 12-day study period, suggesting that a limited number of roosting sites exist and that remaining in a familiar area may insure finding a suitable roost. During the day, radio-tracked adults roosted in two groups of three and four adults, consisting of two and three females with young, respectively, and another bat that may have been a male. This species favors day-roosts in areas near shorelines or along ridge tops where the forest canopy is generally lower than elsewhere and the subcanopy trees are more numerous, making the roost inconspicuous from the ground (Morrison, 1980).

Three species of ectoparasites (*Chirnyssoides caparti*, *Parichoronyssus* sp. and *Periglischrus iheringi*) have been obtained from Panamanian specimens (Webb and Loomis, 1977). In South America, *P. inheringi* and *Paratrichobius* sp. (*salvina* complex) have been reported from Venezuela (Herrin and Tipton, 1975; Wenzel, 1976), and *Speleochir brasiliensis* has been reported from Brazil (Webb and Loomis, 1977).

A number of other species of bats have been netted along with *V. caraccioli*, including representatives of the families Emballonuridae, Noctilionidae, Mormoopidae, Phyllostomidae, Thyropteridae, Vespertilionidae, and Molossidae (Anderson et al., 1982; Genoways et al., 1981; Jones et al., 1971; Thomas, 1972). Some typical associates are *Rhynchonycteris naso*, *Noctilio leporinus*, *Cormura brevirostris*, *Pteronotus parnellii*, *Lonchorhina aurita*, *Micronycteris minuta*, *Glossophaga soricina*, *Anoura caudifer*, *Lonchophylla thomasi*, *Carollia perspicillata*, *Sturnira lilium*, *Uroderma bilobatum*, *Vampyrops helleri*, *Artibeus anderseni*, *A. cinereus*, *A. jamaicensis*, *A. lituratus*, *Desmodus rotundus*, *Thyroptera discifera*, *Myotis nigricans*, *Lasiurus ega*, *Molossus molossus*, and *M. sinaloae*.

GENETICS. The karyotype (Fig. 4) of *V. caraccioli* is similar to that of *Vampyrops* in that 2n = 30, fn = 52. In addition, the X chromosome is subteleocentric and the Y chromosome is submetacentric (Baker, 1979).

REMARKS. This species was originally described as *Vampyrops Caracciolae* by Thomas (1889); he later (1893*a*, 1893*b*) corrected the spelling to *V. Caraccioli*. Thomas (1900) eventually regarded *caraccioli* as representing the distinct subgenus *Vampyrodes*, which Miller (1907) elevated to generic rank. Pittier and Tate (1932) erroneously emended *caraccioli* to *caraccioloi*; Cabrera (1958) and Goodwin and Greenhall (1961) also used the latter name. Carter and Dolan (1978) clearly showed that *caraccioli* is the proper spelling of the specific epithet for this taxon.

Preparation of this account was supported by The Museum and Department of Biological Sciences of Texas Tech University and contract number DE-AC09-76SR00-819 between the University of Georgia and the United States Department of Energy.

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Editors of this account were TROY L. BEST and ALFRED L. GARDNER. Managing editor was DON E. WILSON.

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