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Chaerephon nigeriae.

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Chaerephon nigeriae Thomas, 1913

Nigerian Free-Tailed Bat

Chaerephon nigeriae Thomas, 1913:319. Type locality "Zaria Province, Northern Nigeria."
Nyctinomus spillmanni Monard, 1932:51. Type locality "Vila de Ponte, Angola."
Tadarida nigeriae Rosevear, 1965:334. Type species *Chaerephon nigeriae*, Thomas.

CONTEXT AND CONTENT. Order Chiroptera, suborder Microchiroptera, family Molossidae, genus *Chaerephon*. Generic classification of molossid bats is somewhat controversial. Historically, authors referred to *Chaerephon* as a subgenus of *Tadarida* (Bates and Harrison 1997; Hayman and Hill 1971; Meester et al. 1986; Peterson et al. 1995; Rosevear 1965; Skinner and Smithers 1990). Phenetic relationships among 80 species of Molossidae, determined using multivariate analysis of 76 discrete characters, demonstrated that *Chaerephon*, and other subgenera of *Tadarida*, should be elevated to generic status (Freeman 1981). However, on the Indian subcontinent some characters used to differentiate these genera are variable even within species and are therefore unreliable (Bates and Harrison 1997). Peterson et al. (1995) refer to *Chaerephon* as a subgenus of *Tadarida*, but they focus on representatives of the family that occur in Madagascar and less so on Molossidae in general. We follow Freeman (1981) because her study remains the most exhaustive of the family.

Two subspecies of Nigerian free-tailed bat are recognized (Hayman and Hill 1971; Meester et al. 1986).

C. n. nigeriae Thomas, 1913:319, see above.
C. n. spillmanni (Monard, 1932:51), see above.

DIAGNOSIS. A notch between upper incisors (the anterior palatal emargination) differentiates *Chaerephon*, *Mops*, and *Tadarida*. This notch is absent or poorly developed in *Chaerephon* (Rosevear 1965; Skinner and Smithers 1990). The posterior upper molar is not fully developed in *Chaerephon*, *Mops*, or *Tadarida*, but the standard W-pattern of the crown of this tooth is a reliable character for differentiating the genera (Rosevear 1965). Third leg of W-pattern is much shorter than 2nd in *Mops*, characterized by Rosevear (1965) as a basal stub, and is equal in length to 2nd in *Tadarida*. *Chaerephon* is intermediate between *Mops* and *Tadarida* for this character (Rosevear 1965).

Chaerephon nigeriae (Fig. 1) is distinguishable from sympatric molossids in the southern part of its range based on the combination of size (length of forearm and greatest length of skull: 44–50 and 18–19 mm, respectively—Taylor 1999); color (very dark brown body); conspicuous bands of long white hairs at junction of wings and body on the ventral surface; and translucent, white wings (Rosevear 1965; Taylor 1999; Thomas 1913). *C. pumilus* is smaller (length of forearm and greatest length of skull, 37–42 and 15–18 mm, respectively—Taylor 1999), and although it may have a narrow band of white or off-white hair along each flank, the band does not extend onto wing membrane as it does in *C. nigeriae* (Hayman and Hill 1971). The relatively flat skull of *C. nigeriae* is diagnostic (Kingdon 1974; Thomas 1913) but may not reliably distinguish it from *C. pumilus* in southern Africa (Taylor 1999). In northern parts of its range, *C. nigeriae* can be distinguished from sympatric species by the characters above in combination with features of the interaural region. In contrast to the more or less detached flap of skin between bases of ears in *C. major*, *C. nigeriae* has a broad connecting band of skin between inner margins of ears, rolled back at its top edge to form a deep cleft. This band of skin conceals a tuft of hairs in males, called the interaural crest.

GENERAL CHARACTERS. *Chaerephon nigeriae* is a large representative of the genus, characterized by dark pelage and presence of bands of long white hair on the ventral surface at junction of body and wings (Fig. 1; Hayman and Hill 1971; Rosevear 1965). Wings and interfemoral membranes are white, especially in *C. n. spillmanni* (Kingdon 1974). Ears are large and rounded, with a large anterior fold and notched tragus (Happold 1987; Skinner and Smithers 1990). In males, interaural crest can be erected, presumably for sexual display (Rosevear 1965). Tragus of ear is small and squarish, with superior margin slightly notched or bilobed (Rosevear 1965; Skinner and Smithers 1990). Skull has a well-developed supraoccipital crest, but sagittal crest is poorly developed (Fig. 2; Skinner and Smithers 1990).

Skull and body measurements (average, in mm) and *SD* (in parentheses) of 4 males and 2 females, respectively, from Ethiopia are: length of skull, 20.39 (0.16), 19.65 (0.21); zygomatic breadth, 12.69 (0.17), 12.43 (0.06); length of maxillary toothrow, 5.74 (0.19), 5.64 (0.14); palatal length, 8.13 (0.34), 7.93 (0.35); palatal breadth, 3.94 (0.21), 4.00 (0.18); length of body, 117.0 (4.2), 110.0 (1.4); length of tail, 39.5 (4.7), 39.5 (0.71); length of ear, 20.0 (1.6), 19.0 (0); length of forearm, 47.6 (0.12), 47.3 (1.7); length of hind foot with claw, 11.3 (0.5), 11.0 (0). The same measurements from 5 males and 3 females, respectively, from Sudan are: length of skull, 19.73 (0.30), 19.07 (0.21); zygomatic breadth, 12.53 (0.34), 12.11 (0.30); length of maxillary toothrow, 5.43 (0.25), 5.33 (0.06); palatal length, 7.34 (0.48), 7.24 (0.10); palatal breadth, 3.82 (0.28), 3.67 (0.17); length of body, 104.4 (2.0), 103.3 (3.8); length of tail, 33.4

FIG. 1. Photographs of *Chaerephon nigeriae*, lateral view of adult from Sengwa, northwestern Zimbabwe and ventral view of adult female from Zimbabwe. Photographs by M. Brock Fenton. Used with permission.

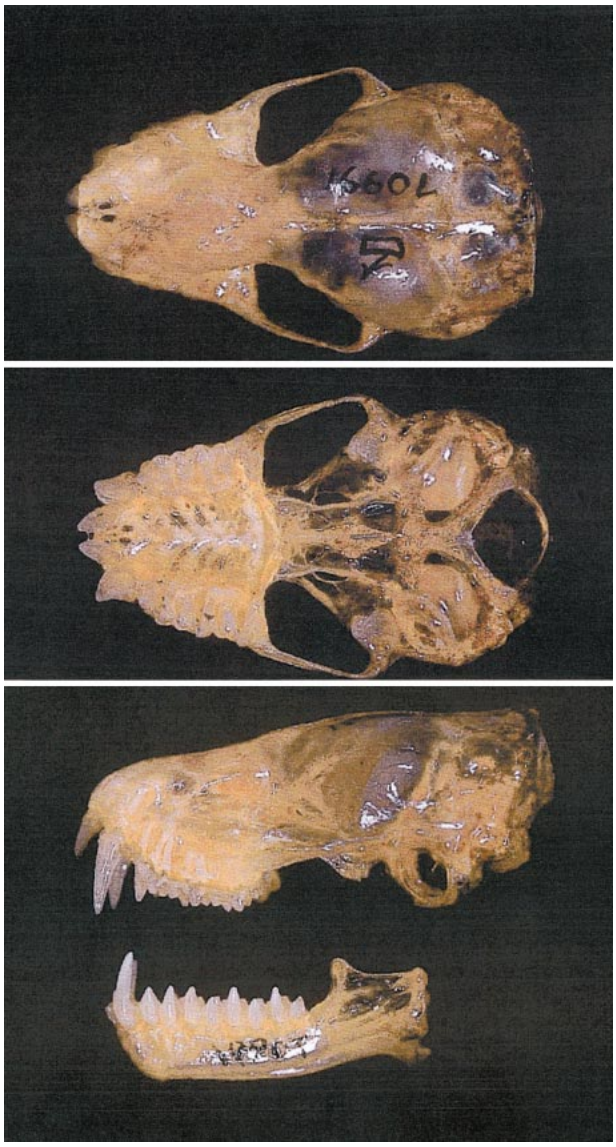

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of an adult male *Chaerephon nigeriae* (Royal Ontario Museum #70991) from Sengwa, northwestern Zimbabwe. Occipitonasal length is 20.08 mm. Photographs by M. Brock Fenton. Used with permission.

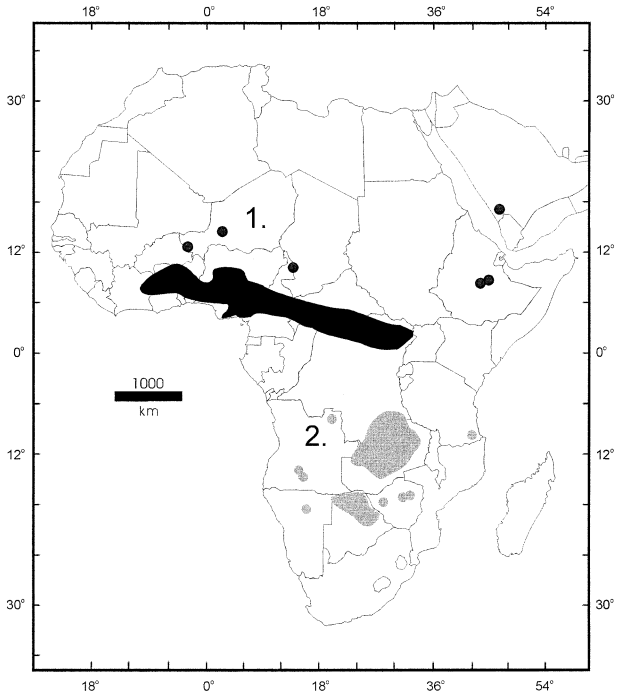

FIG. 3. Geographic distribution of *Chaerephon nigeriae* (1) *C. n. nigeriae* and (2) *C. n. spillmanni*. Map redrawn from Skinner and Smithers (1990).

(1.7), 33.0 (2.0); length of ear, 20.0 (0), 19.0 (1.7); length of forearm, 46.9 (0.9), 46.3 (1.4); length of hind foot with claw, 10.6 (1.1), 10.3 (0.6).

DISTRIBUTION. The 2 subspecies of *C. nigeriae* occur in nonoverlapping regions, *C. n. spillmanni* in the south and *C. n. nigeriae* in the north (Fig. 3; Kingdon 1974). *C. nigeriae* occurs from Niger and Ghana east to Ethiopia and from northeastern and southeastern Zaire, Zambia, Angola, Tanzania, Namibia, and Zimbabwe and is widely distributed in northern Botswana (Skinner and Smithers 1990). Extensive bat surveys of Kruger National Park in South Africa failed to locate it (Rautenbach et al. 1985). The capture of *C. nigeriae* in 1 report, from the Arabian Peninsula, is considerably northeast of most previous captures and 1,000 km due north of the previous easternmost capture in Ethiopia (Nader and Kock 1979). No fossils are known.

FORM AND FUNCTION. Dental formula is i 1/2, c 1/1, p 2/2, m 3/3, total 30 (Rosevear 1965). Upper incisors are conspicuous and of moderate size, whereas lower incisors are smaller and may be crowded between enlarged canines. Flat skull of *C. nigeriae* may represent an adaptation to roosting in small crevices in rocks and under bark (Kingdon 1974; Skinner and Smithers 1990).

Esophagus of *C. nigeriae* averages 35 mm, with relatively thick, stratified squamous epithelium, which likely reflects the abrasive nature of an insectivorous diet (Okon 1977). Stomach is unremarkable but peculiarities of small intestine include an external duodenal gland in proximal duodenal region. This gland merges with the duodenum where secretions pass into the lumen through interglandular canals. This gland may serve to enhance neutralization of acid chyme by Brunner's glands (Okon 1977). Duodenum between this gland and pyloric sphincter has thicker muscular and epithelial layers. A thickening of muscular layers in this region may reflect the fact that chyme may not completely liquefy in the stomach, requiring greater than usual peristaltic force. Colon is absent in *C. nigeriae*, and rectum is relatively short. Transition from small intestine to rectum is abrupt, with pronounced villi of intestinal epithelium replaced by smaller villus-like projections containing many goblet cells for secretion of mucous to facilitate passage of hard feces (Okon 1977).

ONTOGENY AND REPRODUCTION. In southern Africa, copulation occurs at onset of rainy season (Anciaux de Faveaux 1972). Young are born from June to August in Nigeria (Kock 1978). Very young *C. n. spillmanni* occur in December, and pups <4 weeks old and juveniles occur in January (Anciaux de Faveaux 1972; Ansell 1960). No reproduction occurs in April and August (Anciaux de Faveaux 1972). For both subspecies, sex ratios are ca. 60% female to 40% male (Anciaux de Faveaux 1972; Kock 1978).

ECOLOGY AND BEHAVIOR. *Chaerephon nigeriae* is a savannah woodland species associated with *Brachystegia* woodlands in the southern portion of its range (Skinner and Smithers 1990) and with cleared rainforest in northern parts of its range in Nigeria (Happold 1987). The species is insectivorous and nocturnal. Roosting is gregarious, and roosts include roofs and eaves of houses (Cozens and Marchant 1952; Skinner and Smithers 1990), hollow trees, and under bark (Anciaux de Faveaux 1972). Ten *C. nigeriae* used bungalows as day roosts in Owerri Province, Nigeria (Cozens and Marchant 1952). In Zimbabwe, a small colony emerged from beneath the bark of a dead tree (Skinner and Smithers 1990). Roosting *C. nigeriae* becomes active in its roost, squeaking and moving for ca. 10–20 min before emergence at dusk (Cozens and Marchant 1952). Animals have not lived in captivity beyond 1 week (Okon 1977).

CONSERVATION STATUS. Some of the woodlands with which *C. nigeriae* has been associated in southern Africa have been at risk for many years (Rosevear 1965). However, the ability of *C. nigeriae* to exploit buildings for roosting, and its association with cleared rainforest in Nigeria, suggests that *C. nigeriae* may be relatively resistant to anthropogenic impacts.

REMARKS. The species name for *C. nigeriae* refers to the country from which the bat was 1st described.

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