

*Nyctinomops aurispinosus*. By J. Knox Jones, Jr., and Joaquín Arroyo-Cabrales

Published 26 April 1990 by The American Society of Mammalogists

*Nyctinomops aurispinosus* (Peale, 1848)

Peale's Free-tailed Bat

*Dysops aurispinosus* Peale (1848:21). Type specimen obtained at sea on board U.S.S. Peacock, "about one hundred miles from land, south of Cape St. Roque," Brazil.

[*Nyctinomops*]. *aurispinosus*: Miller, 1902:393. First use of current name combination.

*Tadarida similis* Sanborn (1941:386). Type locality "Bogota, Colombia."

**CONTEXT AND CONTENT.** Order Chiroptera, Suborder Microchiroptera, Family Molossidae, Genus *Nyctinomops*. A key to the four species of *Nyctinomops* is presented in Kumirai and Jones (1990). *Nyctinomops aurispinosus* is a monotypic species (Jones et al., 1988).

**DIAGNOSIS.** Size medium for species of genus *Nyctinomops*, much smaller than *Nyctinomops macrotis*, but larger than *N. femorosaccus* and *N. laticaudatus*. Most closely resembles *N. femorosaccus* from which it differs cranially, in addition to larger size, in having a proportionately larger braincase, more inflated frontal region, better developed sagittal crest, broader rostral area, heavier teeth, palate terminating about at level of, rather than posterior to, third molars, and in that the posteroventral cingula of m1 and m2 are rounded, not quadrangular (Gardner, 1963; Jones et al., 1972). Length of forearm usually is 48 to 52 mm.

**GENERAL CHARACTERS.** Dorsal coloration usually is dark brown, but varies from reddish brown to grayish brown (Sanborn, 1941), individual dorsal hairs about 4 mm long, tricolored, nearly white at their bases (Ochoa G., 1984); venter somewhat paler than dorsum. Ears are large, rugose, and joined at their bases as in other members of genus. The dental formula is  $i\ 1/2, c\ 1/1, p\ 2/2, m\ 3/3$ , total 30.

External measurements (in mm) of a male from Nayarit (Gardner, 1963), followed by those of a female from Zacatecas (Baker et al., 1967) and two males from Sonora (Baker and Jones, 1972), all Mexican states, are, respectively: total length, 111, 109, 111, 112; length of tail, 42, 43, 41, 49; length of hind foot, 9, 9, 8, 11; length of ear from notch, 24, 25, 21, 21; length of forearm, 48.8, 47.7, 48.2, 48.3; weight of first two specimens (in g), 17.0, 18.9. Extremes in cranial measurements (in mm) of five specimens (two males, three females) from Tamaulipas, México (Carter and Davis, 1961), followed by those of 15 specimens (seven males, eight females) from Colima, México (Gardner, 1963), are: greatest length, 20.5-21.6, 19.6-20.9; zygomatic breadth, 11.4-12.0, 11.0-11.9; postorbital breadth, 3.7-4.0, 3.6-3.9; breadth of braincase, 9.2-9.7, 9.0-9.5; breadth across third upper molars, 8.1-8.6, 8.0-8.5; length of maxillary tooththrow, 7.8-8.2, ———; breadth across canines, 4.4-4.9, ———. The same cranial measurements for a male from Brazil (Taddei and Garutti, 1981), and a male from Colombia and a female from Perú (Carter and Davis, 1961), and range in measurements of a male and two females from Venezuela (Ochoa G., 1984) are, respectively: 21.6, 20.7, 20.8, 21.4-21.7; 11.9, 11.6, 11.7, 12.0-12.7; 3.6, 3.9, 3.6, ———; 9.3, 9.3, 9.5, 9.5-10.4; 8.2, 8.5, 8.4, 9.1-9.4; 8.1, 7.8, 7.8, 8.3-8.5; 4.7, 4.7, 4.8, 5.1-5.3. The Brazilian specimen weighed 22.7 g. Measurements of four males and four females recently reported from southern Bolivia (Ibáñez and Ochoa G., 1989) are, respectively, as follows (ranges in parentheses): length of forearm, 51.0 (50.3-52.8), 49.7 (48.7-50.3); greatest length of skull, 20.6 (20.2-20.8), 20.1 (20.0-20.3); condylobasal length, 19.6 (19.0-20.5), 18.9 (18.7-19.2); zygomatic breadth, 12.0 (11.7-12.1), 11.7 (11.5-11.8); postorbital constriction, 3.9 (3.9-4.0), 3.8 (3.7-3.9); length of maxillary tooththrow, 8.0 (7.9-8.1), 7.9 (7.8-8.0); breadth across upper molars, 8.7 (8.6-8.7), 8.4 (8.3-8.6). The cranium and lower

jaw of a specimen from Sonora, México, are figured (Fig. 1). Freeman (1981) figured the crania and lower jaws of *N. aurispinosus* and those of the three other species of the New World genus *Nyctinomops* (*femorosaccus*, *laticaudatus*, and *macrotis*) in comparison with those of other molossidids.

**DISTRIBUTION.** This species is found (Fig. 2) from western (Sonora) and eastern (Tamaulipas) México, presumably southward, mostly at low to moderate elevations, through Middle America to South America as far as southern Bolivia, southeastern Brazil, and southern Perú (Hall, 1981; Ibáñez and Ochoa G., 1989; Koopman,



FIG. 1. Dorsal, ventral, and lateral views of skull, and lateral view of left lower jaw of *Nyctinomops aurispinosus* (male, Texas Tech University 6269) from Sonora, México. Greatest length of skull is 20.3 mm.



FIG. 2. Probable distribution of *Nyctinomops aurispinosus* (after Hall, 1981, and Koopman, 1982).

1982). There are few published records of this bat (Taddei and Garutti, 1981), none from Central America, and its distribution thus is poorly understood. Known altitudinal range is from sea level to 3,150 m. The species inhabits five of the nine South American faunal provinces recognized by Koopman (1982).

**FOSSIL RECORD.** *Nyctinomops aurispinosus* is known from late Pleistocene deposits in Cueva del Abra, Tamaulipas (Dalquest and Roth, 1970). It also has been recovered as a subfossil from a cave in Venezuela (Linares, 1969).

**FORM AND FUNCTION.** The baculum of *N. aurispinosus* resembles the drumstick of a chicken in outline. "The bone flares outward from the narrowly rounded base to the greatest breadth in one-quarter to two fifths the total length. A short, steep constriction is followed by a gentle taper to the narrow distal tip, sometimes slightly bulbous . . . , more often rounded . . ." The bone is broader as viewed laterally than in dorsal aspect. It "flares sharply outward from a somewhat pointed base, continues a short distance without tapering, becomes constricted by a shallow concavity on the ventral surface and sometimes on the dorsal surface, then flares to its greatest width near the distal end. The tip tilts abruptly upward and is broadly rounded" (Brown, 1967:648). There is a ventral notch at the base in some bacula. In five specimens from Colima, the baculum averaged 0.76 mm (0.66 to 0.83) in greatest length and 0.18 mm (0.16 to 0.20) in greatest breadth at base (Brown, 1967).

**REPRODUCTION AND ONTOGENY.** Little is known of reproduction in this species and there are no data on growth and development. Females presumably bear one offspring annually, as do those of related species, in spring. Three of four females taken in late September in Bolivia (Ibáñez and Ochoa G., 1989) were pregnant (fetuses were 8 to 11 mm in crown-rump length). A lactating female was captured in southern Zacatecas in late July (Baker et al., 1967). The testes of a male from the state of São Paulo, Brazil, measured 3.1 by 2.3 mm in April (Taddei and Garutti, 1981). In Jalisco, México, a March-taken male had scrotal testes 4 mm long, whereas the testes were abdominal in one taken there in April; three females collected in those months were nonpregnant (Núñez Garduño et al., 1981).

**ECOLOGY.** Recent and subfossil remains of this relatively rare bat have been recovered from caves (Jones and Alvarez, 1964; Linares, 1969; Ochoa G., 1984). At Cueva del Abra, Tamaulipas, *N. aurispinosus* was collected along with the more common *N. laticaudatus* "either from the walls and ceiling of the cave or from the evening flight as bats left the cave" (Carter and Davis, 1961: 161). The majority of *Nyctinomops*, presumably including *N. aurispinosus*, spend the day at Cueva del Abra in the numerous crevices within the cave. A specimen from Perú was taken in a cave along

with *N. macrotis* (Sanborn, 1951), whereas a male from southeastern Brazil was found roosting in the attic of a house (Taddei and Garutti, 1981).

*Nyctinomops aurispinosus* has been regarded as a lowland species (Alvarez and Aviña, 1964; Matson and Baker, 1986), especially within the North American range, because most known records are from below 1,000 m elevation. A male from Nayarit was netted over a wide arroyo "en el bosque espinoso de la Costa del Pacifico" (Gardner, 1963:42), whereas one from southern Zacatecas was captured "in tropical growth along the Río Juchipila" (Matson and Baker, 1986:38). Two males were taken in nets over the Río Cuchahaqui, Sonora, the northernmost record of the species, along with *N. femorosaccus*, where large deciduous trees, principally cypress (*Taxodium*), lined the banks of the river (Baker and Jones, 1972). In Jalisco, *Artibeus jamaicensis*, *A. lituratus*, and *N. femorosaccus* were netted along with Peale's free-tailed bat (Núñez Garduño et al., 1981). In Bolivia, *N. aurispinosus* has been captured in nets set over pools bordered by thorn forest (Ibáñez and Ochoa G., 1989); *Phyllostomus discolor*, *Desmodus rotundus*, *Myotis albescens*, *M. nigricans*, *Nyctinomops macrotis*, *N. laticaudatus*, *Eumops bonariensis*, *E. glaucinus*, *Molossus molossus*, *Promops nasutus*, and *Molossops temminckii* were netted at the same place.

The diet presumably is mostly of soft-bodied insects as has been reported for related species of *Nyctinomops*. Alvarez (1963) recorded skulls of this species found in owl pellets at Cueva del Abra, Tamaulipas, and Jones and Alvarez (1964) opined that the partial cranium they examined from a cave in San Luis Potosí might have come from an owl pellet.

**GENETICS.** The diploid chromosomal complement of *N. aurispinosus* is 48 and the fundamental number is 58. The autosomes, described as identical with those of *N. femorosaccus*, consist of one pair of large metacentrics, three pair of medium-sized submetacentrics, one pair of medium-sized subtelocentrics, one pair of small subtelocentrics, and 17 pair of acrocentrics. The X chromosome is a medium-sized submetacentric and the Y is acrocentric (Warner et al., 1974).

**REMARKS.** The specific name *aurispinosus* is derived from the Latin *auris* (ear) and *spinosus* (thorny). The true identity and characteristics of *Nyctinomops aurispinosus* were poorly known for many years (Carter and Davis, 1961), resulting in various misidentifications in the literature involving it, *N. femorosaccus*, *N. macrotis*, and *N. laticaudatus*.

Shamel (1931:11) placed *N. aurispinosus* in his "macrotis group" of the genus *Tadarida*. Freeman (1981) regarded *aurispinosus*, along with the species *femorosaccus*, *laticaudatus*, and *macrotis*, as representing a distinct genus, *Nyctinomops*. Some recent authors have followed her, as we do, but others have chosen to recognize *Nyctinomops* as a subgenus. Miller (1907) and other authors placed *aurispinosus* and other *Nyctinomops* in the genus *Nyctinomus*.

#### LITERATURE CITED

- ALVAREZ, T. 1963. The Recent mammals of Tamaulipas, México. University of Kansas Publications, Museum of Natural History, 14:363-473.
- ALVAREZ, T., AND C. E. AVIÑA. 1964. Nuevos registros en México de la familia Molossidae. *Revista de la Sociedad Mexicana de Historia Natural*, 25:243-254.
- BAKER, R. H., R. G. WEBB., AND P. DALBY. 1967. Notes on reptiles and mammals from southern Zacatecas. *The American Midland Naturalist*, 77:223-226.
- BAKER, R. J., AND J. K. JONES, JR. 1972. *Tadarida aurispinosus* in Sonora, Mexico. *The Southwestern Naturalist*, 17:308-309.
- BROWN, R. E. 1967. Bacula of some New World molossid bats. *Mammalia*, 31:645-667.
- CARTER, D. C., AND W. B. DAVIS. 1961. *Tadarida aurispinosus* (Peale) (Chiroptera: Molossidae) in North America. *Proceedings of the Biological Society of Washington*, 74:161-165.
- DALQUEST, W. W., AND E. ROTH. 1970. Late Pleistocene mammals from a cave in Tamaulipas, Mexico. *The Southwestern Naturalist*, 15:217-230.
- FREEMAN, P. W. 1981. A multivariate study of the family Molossidae (Mammalia: Chiroptera): morphology, ecology, evolution. *Fieldiana Zoology*, new series, 7:vii + 1-173.
- GARDNER, A. L. 1963. Nota acerca de la distribución de los

- murciélagos en Mexico. *Revista de la Sociedad Mexicana de Historia Natural*, 24:41-44.
- HALL, E. R. 1981. *Mammals of North America*. Second ed. John Wiley and Sons, New York, 1:xv + 1-600 + 90.
- IBÁÑEZ, C., AND J. OCHOA G. 1989. New records of bats from Bolivia. *Journal of Mammalogy*, 70:216-219.
- JONES, J. K., JR., AND T. ALVAREZ. 1964. Additional records of mammals from the Mexican state of San Luis Potosi. *Journal of Mammalogy*, 45:302-303.
- JONES, J. K., JR., J. ARROYO-CABRALES, AND R. W. OWEN. 1988. Revised checklist of bats (Chiroptera) of Mexico and Central America. Occasional Papers, The Museum, Texas Tech University, 120:1-34.
- JONES, J. K., JR., J. R. CHOATE, AND A. CADENA. 1972. Mammals of the Mexican state of Sinaloa. II. Chiroptera. Occasional Papers, Museum of Natural History, University of Kansas, 6: 1-29.
- KOOPMAN, K. F. 1982. Biogeography of the bats of South America. Pp. 273-302, in *Mammalian biology in South America* (M. A. Mares and H. H. Genoways, eds.). Special Publications Series, Pymatuning Laboratory of Ecology, University of Pittsburgh, 6:xii + 1-539.
- KUMIRAI, A., AND J. K. JONES, JR. 1990. *Nyctinomops femorosaccus*. *Mammalian Species*, 349:1-5.
- LINARES, O. J. 1969. Quirópteros subfósiles encontrados en las cuevas Venezolanas. Parte II. *Tadarida aurispinosa* (Peale) en la Cueva de los Carraos (MI.14), Miranda. *Boletín de la Sociedad Venezolana de Espeleología*, 2:45-48.
- MATSON, J. O., AND R. J. BAKER. 1986. *Mammals of Zacatecas*. Special Publications, The Museum, Texas Tech University, 24: 1-88.
- MILLER, G. S., JR. 1902. Twenty new American bats. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 54:389-412.
- . 1907. The families and genera of bats. *Bulletin of the United States National Museum*, 57:xvii + 1-282, 14 pls.
- NÚÑEZ GARDUÑO, A., C. B. CHÁVEZ-T., AND C. SÁNCHEZ-H. 1981. Mamíferos silvestres de la region de El Tuito, Jalisco, México. *Anales del Instituto de Biología, Universidad Nacional Autónoma de México*, 51:647-668.
- OCHOA G., J. 1984. Presencia de *Nyctinomops aurispinosa* en Venezuela (Chiroptera: Molossidae). *Acta Científica Venezolana*, 35:147-150.
- PEALE, T. R. 1848. *Mammalogy and ornithology*. Pp. xxvi + 17-338, in *United States exploring expedition during the years 1838, 1839, 1840, 1841, 1842 under the command of Charles Wilkes, U.S.N., vol. 8, C. Sherman, Philadelphia*.
- SANBORN, C. C. 1941. Descriptions and records of neotropical bats. *Field Museum of Natural History, Zoology Series*, 27: 371-387.
- . 1951. Mammals from Marcapata, southeastern Peru. *Publicaciones del Museo de Historia Natural "Javier Prado," Lima*, 6:1-26.
- SHAMEL, H. H. 1931. Notes on American bats of the genus *Tadarida*. *Proceedings of the United States National Museum*, 78:1-27.
- TADDEI, V. A., AND V. GARUTTI. 1981. The southernmost record of the free-tailed bat, *Tadarida aurispinosa*. *Journal of Mammalogy*, 62:851-852.
- WARNER, J. W., J. L. PATTON, A. L. GARDNER, AND R. J. BAKER. 1974. Karyotypic analysis of twenty-one species of molossid bats (Molossidae: Chiroptera). *Canadian Journal of Genetics and Cytology*, 16:165-176.

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

J. K. JONES, JR., AND J. ARROYO-CABRALES, THE MUSEUM AND DEPARTMENT OF BIOLOGICAL SCIENCES, TEXAS TECH UNIVERSITY, LUBBOCK 79409.