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Centurio senex.

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Centurio Gray, 1842

Centurio Gray, 1842:259. Type species *Centurio senex*.
Trichocoryes Allen, 1861:359. Type species *Centurio mcmurtrii*.
Trichocorytes Gray, 1866:118, an emendation.
Trichocoryctes Trouessart, 1897:164, a misspelling.

CONTEXT AND CONTENT. Order Chiroptera, Family Phyllostomidae, Subfamily Stenodermatinae. *Centurio* is a monotypic genus.

Centurio senex Gray, 1842

Wrinkle-faced Bat

Centurio senex Gray, 1842:259. Type locality fixed by Goodwin (1946:327) at Realejo, Nicaragua.
Centurio flavogularis Lichtenstein and Peters, 1854:335. Type locality erroneously listed as Cuba.
Centurio mexicanus Saussure, 1860:381. Type locality warm regions of México.
Centurio mcmurtrii Allen, 1861:359. Type locality Mirador, Veracruz.
Centurio minor Ward, 1891:750. Type locality Cerro de los Pájaros, Las Vigas, Veracruz.

CONTEXT AND CONTENT. Context same as for genus. Two subspecies are recognized (Paradiso, 1967):

C. s. senex Gray, see above (other names above are synonyms).
C. s. greenhalli Paradiso, 1967:601. Type locality Port of Spain, St. George Parish, Trinidad.

DIAGNOSIS. *Centurio senex* (Fig. 1) is a tailless, medium-sized bat, generally with drab brownish to yellowish-brown pelage. There is a small white patch over each shoulder, and a series of pale transverse striations on the wing membrane between the fourth and fifth digits and to a lesser extent between the fifth digit and the forearm. A true nose-leaf is absent and the face, which is broad and naked, is covered by convoluted dermal outgrowths. The skull is characterized by the position of the external nares, which are located directly above the roots of the upper incisors. *Centurio* can be distinguished cranially from all other stenodermatines in that the upper dental arcade is semicircular and the rostrum is much reduced (Jones and Carter, 1976).

GENERAL CHARACTERS. The pelage is variable in color, but generally yellowish-brown, paler ventrally; hairs of the dorsum are tricolored—dark brown basally, buffy medially, and yellowish-brown distally. Males, in addition to having more prominent dermal outgrowths on the face than females, possess furred chin folds that "enclose a skin mask which can be extended up and over the face" (Paradiso, 1967). Females have only rudimentary chin folds and lack the facial mask. The ears have a conspicuous flap of skin at the inner base and moderately long tragus. For a more extensive discussion of the facial characteristics, see Goodwin and Greenhall (1961) and Paradiso (1967).

The skull of *Centurio* (Fig. 2) was described by Goodwin and Greenhall (1961) as "short and broad, with a high, rather narrow braincase, moderately well-developed sagittal crest, virtually no rostrum, palate short and very wide . . . ." Miller (1907) noted that the auditory bullae are relatively small, covering less than half the cochlear surface.

Centurio senex greenhalli differs from *C. s. senex* in being somewhat larger, both externally and cranially, and in having a more domed braincase, better developed sagittal crest, and relatively shorter maxillary toothrow. Cranial measurements (Paradiso, 1967) of a series of *greenhalli* from Trinidad, followed by those of a series of *senex* from Panamá, are (mm): greatest length of skull, 18.6 (18.2 to 18.9), 18.0 (17.3 to 18.4); condylobasal length, 15.5 (15.3 to 15.8), 14.8 (14.4 to 15.1); zygomatic breadth, 15.7 (holotype only), 15.0 (14.4 to 15.5); interorbital breadth, 5.2 (5.1 to 5.6), 5.2 (4.9 to 5.4); breadth across upper molars, 11.1 (10.9 to 11.2), 10.8 (10.4 to 11.0); length of maxillary toothrow,

FIGURE 1. Male *Centurio senex* photographed on Trinidad by R. J. Baker.

FIGURE 2. Dorsal, ventral, and lateral views of skull, and lateral view of lower jaw (♀, TTU 24332) of *Centurio senex* from Hidalgo. Greatest length of skull is 18.7 mm.

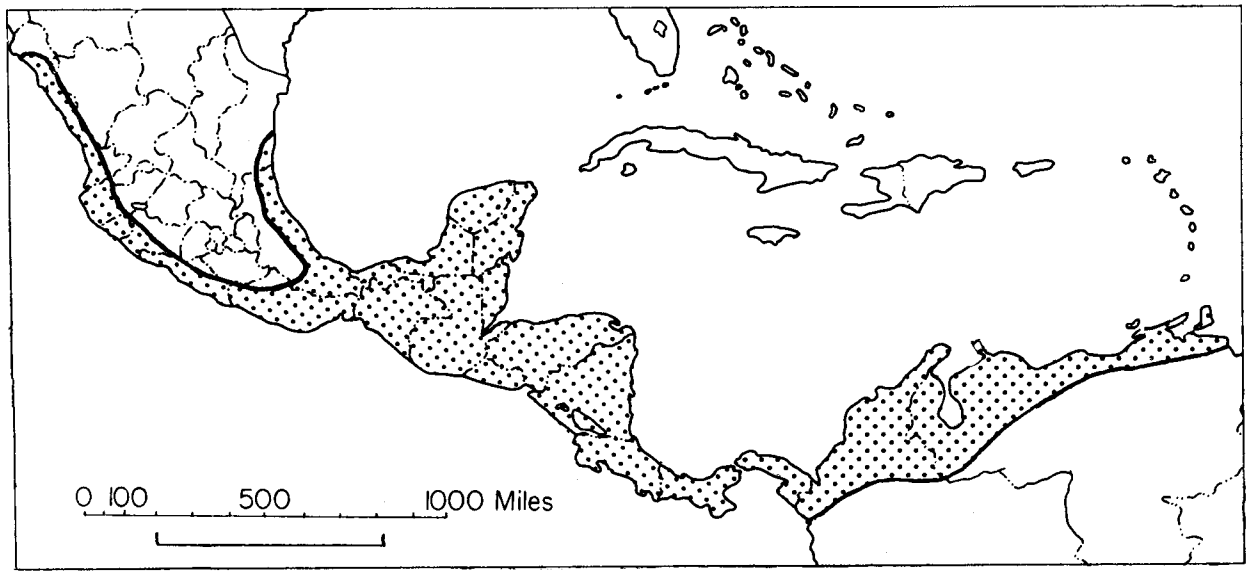

FIGURE 3. Geographic distribution of *Centurio senex*. The nominate subspecies occurs throughout the mainland distribution of the species, whereas *C. s. greenhalli* is known from Trinidad and possibly Tobago. The line below the scale of miles equals 1000 km.

5.3 (5.2 to 5.5), 5.4 (5.1 to 5.6); mastoid breadth, 12.3 (12.1 to 12.6), 11.8 (11.2 to 12.1); depth of braincase, 12.7 (12.3 to 13.0), 12.1 (11.5 to 12.5).

The length of forearm averaged 45.4 (44.3 to 47.0) mm in a series of *greenhalli* and 42.9 (42.1 to 43.8) in Panamanian *senex*. Representative external measurements (mm) of two females from Hidalgo are: total length, 60, 60; length of hind foot, 12, 13; length of ear, 17, 17; weight (both lactating), 19.4, 21.0 g. Six males from Nicaragua weighed an average of 22.9 (20.7 to 25.1) g and one nonpregnant female weighed 17.1 (Jones et al., 1971), but females from there otherwise averaged slightly larger than males in size. Three nonpregnant Jaliscan females weighed 19.1, 19.5, and 23.2 g (Watkins et al., 1972).

DISTRIBUTION. *Centurio senex* (Fig. 3) is known from western (Sinaloa) and eastern (Tamaulipas) México southeastward through Middle America to western Venezuela, and is known also from Trinidad and Tobago. No specimens presently are on record from Colombia, but the species probably occurs in much of the northern coastal region of South America.

The nominate subspecies occurs over most of the recorded distribution of the species, *C. s. greenhalli* being known only from Trinidad. However, the latter may occur also on Tobago (Jones, 1951) and on the adjacent mainland (Paradiso, 1967).

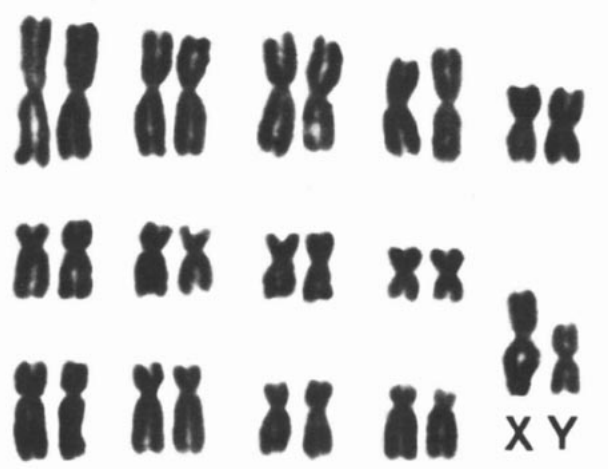

FIGURE 4. Karotype of male *Centurio senex* (TTU 13072) from Honduras (courtesy of R. J. Baker).

FOSSIL RECORD. One cranium has been reported from subfossil owl pellets collected at Inferno, Tamaulipas (Koopman and Martin, 1959).

FORM. The hair of *C. senex* has a length of about 12 mm middorsally and has melanin granules located in the proximal and distal thirds of the filament (Benedict, 1957). Measurements and description of wing structure are in Smith and Starrett (1979). The dental formula is i 2/2, c 1/1, p 2/2, m 2/2, total 28. A detailed description of the dentition was given by Miller (1907). The brain of this species (McDaniel, 1976) is externally similar to that of *Ametrida* and *Stenoderma*, and is characterized chiefly by anteroposterior compression.

Goodwin and Greenhall (1961) found the throat of *C. senex* to be extremely narrow (1.3 to 1.4 mm in diameter) and, based on observations of captive specimens, reported that the animals appeared to suck, rather than bite or lick, fruit pulp. The alimentary tract is modified in size, shape, and distribution of glands for consumption and temporary storage of large amounts of food, presumably resulting in increased digestive efficiency (Forman et al., 1979). Sperm morphology is unique in that the sperm head has a rounded nucleus and extremely pointed acrosome (Forman and Genoways, 1979).

Collectors have likened the flight pattern of *Centurio* to that of a large butterfly. Males emit a strong, musky odor from the chin area.

ONTOGENY AND REPRODUCTION. Scattered reports indicate that females probably are polyestrous or asynchronous (Wilson, 1979). Pregnant females have been taken in every month from January through August, except May. Lactating females have been collected in February, March, and August. March-taken males from Nicaragua averaged larger in length of testes (5.6 mm) than a July-taken individual (4.0 mm) (Jones et al., 1971).

ECOLOGY. Specimens of *C. senex* have been captured in a variety of habitats including deciduous forests (Watkins et al., 1972) and xeric to humid tropical forests (Handley, 1976), frequently in nets stretched over water. Individuals have been collected from sea level up to 4,700 ft in elevation. Jones et al. (1971) captured bats in Nicaragua that were hanging during daylight hours in small "cubicles" in a thick growth of vines.

Centurio senex is frugivorous, but little is known of the specific fruits upon which it subsists. Felten (1956) recorded an individual of this species circling a fig tree; Goodwin and Greenhall (1961) found yellow fruit pulp in the stomach of a bat from Trinidad; and Ramírez-Pulido and López-Forment (1979) netted specimens in Guerrero that were carrying fruits from an azulillo tree in their mouths. Walker et al. (1964) reported that *C. senex* gen-

erally feeds on soft mushy fruits and Gardner (1977) indicated that it may be an obligate frugivore.

Centurio senex has no known endoparasites (Ubelaker et al., 1977) and only one reported ectoparasite, *Basilia*, a wingless, hematophagous fly (Webb and Loomis, 1977). Goodwin and Greenhall (1961) found specimens taken in Trinidad to be negative in tests for rabies.

GENETICS. As shown in Fig. 4, the karyotype of *Centurio* (2N = 28, FN = 52) contains three pairs of metacentric, six pairs of submetacentric, and four pairs of subtelocentric chromosomes (Baker, 1967). Additionally, the X-chromosome is subtelocentric and the Y-chromosome is submetacentric (Baker and Hsu, 1970). Karyotypic data (Baker, 1973) indicate that *Centurio* is most closely related to *Sphaeronycteris* (2n = 28, FN = 52) and next to *Ametrida*, *Stenoderma*, and *Artibeus* (2n = 30–31, FN = 56).

REMARKS. There has been some confusion regarding the geographic origin of the type specimen of *C. senex* (see Paradiso, 1967, for discussion); Goodwin (1946) restricted the type locality to Realejo, Nicaragua. Paradiso (1967) suggested that an erroneous measurement listed by Dobson (1878) was the probable reason that *C. s. greenhalli* went unrecognized as a distinct subspecies until 1967.

Centurio is Latin, meaning division into hundreds, and *senex* (also Latin) refers to an old person. The name was chosen because the wrinkled face of this bat was likened to that of a "hundred-year-old man." The subspecies *greenhalli* was named by Paradiso (1967) for Arthur M. Greenhall, who collected the holotype.

LITERATURE CITED

Allen, H. 1861. Description of a new Mexican bat. Proc. Acad. Nat. Sci. Philadelphia, pp. 359–361.

Baker, R. J. 1967. Karyotypes of bats of the family Phyllostomatidae and their taxonomic implications. Southwestern Nat., 12:407–428.

— 1973. Comparative cytogenetics of the New World leaf-nosed bats (Phyllostomatidae). Periodicum Biol., 75:37–45.

Baker, R. J., and T. C. Hsu. 1970. Further studies of the sex-chromosome systems of the American leaf-nosed bats (Chiroptera, Phyllostomatidae). Cytogenetics, 9:131–138.

Benedict, F. A. 1957. Hair structure as a generic character in bats. Univ. California Publ. Zool., 59:285–548.

Dobson, G. E. 1878. Catalogue of the Chiroptera in the collection of the British Museum. British Museum, London, xlii + 1–567 pp.

Felten, H. 1956. Fledermäuse (Mammalia, Chiroptera) aus El Salvador. Teil 4. Senckenbergiana Biol., 37:341–367.

Forman, G. L., and H. H. Genoways. 1979. Sperm morphology. Pp. 177–204, *in* Biology of bats of the New World family Phyllostomatidae. Part III (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 16:1–441.

Forman, G. L., C. J. Phillips, and C. S. Rouk. 1979. Alimentary tract. Pp. 205–227, *in* Biology of bats of the New World family Phyllostomatidae. Part III (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 16:1–441.

Gardner, A. L. 1977. Feeding habits. Pp. 293–350, *in* Biology of bats of the New World family Phyllostomatidae. Part II (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 13:1–364.

Goodwin, G. G. 1946. Mammals of Costa Rica. Bull. Amer. Mus. Nat. Hist., 87:275–473.

Goodwin, G. G., and A. M. Greenhall. 1961. A review of the bats of Trinidad and Tobago . . . . Bull. Amer. Mus. Nat. Hist., 122:191–301.

Gray, J. E. 1842. Descriptions of some new genera and fifty unrecorded species of Mammalia. Ann. Mag. Nat. Hist., ser. 1, 10:255–267.

— 1866. Revision of the genera of Phyllostomidae, or leaf-nosed bats. Proc. Zool. Soc. London, pp. 111–118.

Handley, C. O., Jr. 1976. Mammals of the Smithsonian Venezuelan project. Brigham Young Univ. Sci. Bull., Biol. Ser., 22:1–89.

Jones, J. K., Jr., and D. C. Carter. 1976. Annotated checklist, with keys to subfamilies and genera. Pp. 7–38, *in* Biology of bats of the New World family Phyllostomatidae. Part I (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 10:1–218.

Jones, J. K., Jr., J. D. Smith, and R. W. Turner. 1971. Noteworthy records of bats from Nicaragua, with a checklist of the chiropteran fauna of the country. Occas. Papers Mus. Nat. Hist., Univ. Kansas, 2:1–35.

Jones, T. S. 1951. Bat records from the islands of Grenada and Tobago, British West Indies. J. Mamm., 32:223–224.

Koopman, K. F., and P. S. Martin. 1959. Subfossil mammals from the Gómez Farías region and the tropical gradient of eastern México. J. Mamm., 40:1–12.

Lichtenstein, H., and W. Peters. 1854. Ueber neue merkwürdige Säugethiere des Königlichen Zoologischen Museums . . . . Monatsber preuss. Akad. Wiss., Berlin, pp. 334–337.

McDaniel, V. R. 1976. Brain anatomy. Pp. 147–200, *in* Biology of bats of the New World family Phyllostomatidae. Part I (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 10:1–218.

Miller, G. S., Jr. 1907. The families and genera of bats. Bull. U.S. Natl. Mus., 57:xvii + 1–282.

Paradiso, J. L. 1967. A review of the wrinkle-faced bats (*Centurio senex* Gray) with a description of a new subspecies. Mammalia, 31:595–604.

Ramírez-Pulido, J., and W. López-Forment. 1979. Additional records of some Mexican bats. Southwestern Nat., 24:541–544.

Saussure, H. de. 1860. Note sur quelques mammifères du Mexique. Revue Mag. Zool., Paris, ser. 2, 12:3–11.

Smith, J. D., and A. Starrett. 1979. Morphometric analysis of chiropteran wings. Pp. 229–316, *in* Biology of bats of the New World family Phyllostomatidae. Part III (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 16:1–441.

Trouessart, E. L. 1897. Catalogus Mammalium . . . . Berlin, 2nd ed., 664 pp.

Ubelaker, J. E., R. D. Specian, and D. W. Duszynski. 1977. Endoparasites. Pp. 7–56, *in* Biology of bats of the New World family Phyllostomatidae. Part II (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 13:1–364.

Walker, E. P., et al. 1964. Mammals of the World. Johns Hopkins Press, Baltimore, 1:xlviii + 1–644.

Ward, H. E. 1891. Description of three new species of Mexican bats. Amer. Nat., 25:743–753.

Watkins, L. C., J. K. Jones, Jr., and H. H. Genoways. 1972. Bats of Jalisco, México. Spec. Publ. Mus., Texas Tech Univ., 1:1–44.

Webb, J. P., Jr., and R. B. Loomis. 1977. Ectoparasites. Pp. 57–119, *in* Biology of bats of the New World family Phyllostomatidae. Part II (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 13:1–364.

Wilson, D. E. 1979. Reproductive patterns. Pp. 317–378, *in* Biology of bats of the New World family Phyllostomatidae. Part III (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.), Spec. Publ. Mus., Texas Tech Univ., 16:1–441.

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