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THE TAXONOMIC STATUS OF *STURNIRA BIDENS*
(CHIROPTERA:PHYLLOSTOMIDAE) WITH NOTES
ON ITS KARYOTYPE AND LIFE HISTORY

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Among the mammals prepared by us while members of the 1967 and 1968 Louisiana State University Museum Zoology Peruvian expeditions are six specimens of the species described by Thomas (1915) as *Corvira bidens*, represented until now only by the holotype. Our specimens, the first reported from Peru, were captured in mist nets in the humid montane forest on the eastern slope of the Cordillera Carpish along the Carretera Central between Huánuco and Tingo María.

We regard *Corvira bidens* Thomas as a species of the genus *Sturnira* because of its very close external, cranial, and chromosomal similarities to other species of that genus. This allocation, proposed by de la Torre (1961), was earlier suggested by Hershkovitz (1958:613). Nevertheless, in order to emphasize the uniqueness of *S. bidens*, particularly with regard to its detention, we prefer to retain the name *Corvira* as a subgenus of *Sturnira* with *bidens* as the only known species.

Genus *STURNIRA* GRAY

Sturnira Gray, 1842, Ann. Mag. Nat. Hist., ser. 1, 10:257. Type, by original designation, *S. spectrum* Gray=*Phyllostoma lilium* E. Geoffroy St.-Hilaire.

Characters.—Tail absent; interfemoral membrane greatly reduced and thickly fringed with hair; calcar obsolete; shoulder glands usually present; upper molars with a broad U-shaped longitudinal groove separating lingual and labial cusps; dental formula, i. 2/2-1, c. 1/1, pm. 2/2, m. 3/3×2=30 or 32.

Subgenus *CORVIRA* THOMAS

Corvira Thomas, 1915, Ann. Mag. Nat. Hist., ser. 8, 16:310. Type, by original designation, *C. bidens* Thomas.

Characters.—Fur of venter with a broad, dark brown basal band and a narrow, poorly defined, lighter epibasal band; upper inner incisors slender with anterior faces inclined toward each other; upper outer incisors very small; lower incisors two; premolars and molars all reduced in size and separated from one another and from canines; longitudinal groove in first upper molars depressed posteriorly; first upper molars subtriangular with rounded angles; dental formula, i. 2/1, c. 1/1, pm. 2/2, m. 3/3 \times 2=30.

STURNIRA (CORVIRA) BIDENS (THOMAS)

Corvira bidens Thomas, 1915, Ann. Mag. Nat. Hist., ser. 8, 16:311.

Type.—Immature male (skin and skull); British Museum (Natural History) no. 15. 7. 11. 7; collected April 1914 by Walter Goodfellow.

Type locality.—Baeza, Upper Coca River, Oriente of N Ecuador, elevation 6,500 ft.

Range.—Known only from the type locality in Ecuador and from the Cordillera Carpish in Peru.

Characters.—Size medium for *Sturnira*; forearm averaging 41.5 mm (Table 1); color of dorsum dark grayish brown, the individual hairs with four color bands (a very narrow white basal band, dark brown epibasal band approximately one-third length of hair, silvery gray subterminal band a little more than one-third length of hair, blackish brown terminal band approximately one-fourth length of hair); color of venter dark brown with individual hairs appearing unicolored except for a narrow, poorly defined, light epibasal band; forearms, interfemoral membrane, feet, hind legs, and adjoining wing membranes densely haired; no indication of shoulder glands; skull relatively long with a narrow, sloping rostrum; zygomatic arches weak (incomplete in three of our six specimens); tooth rows relatively straight and only slightly divergent posteriorly; upper inner incisors slender, in contact at tips, with anterior surfaces inclined toward each other, and with a small but prominent postero-external basal cusp (present but not prominent in other species); upper outer incisors small, not in contact with inner incisors nor with canines; upper molars, premolars, and canines not in contact with each other; upper premolars transversely oval in occlusal outline; first upper molars subtriangular with rounded angles; third upper molars small,

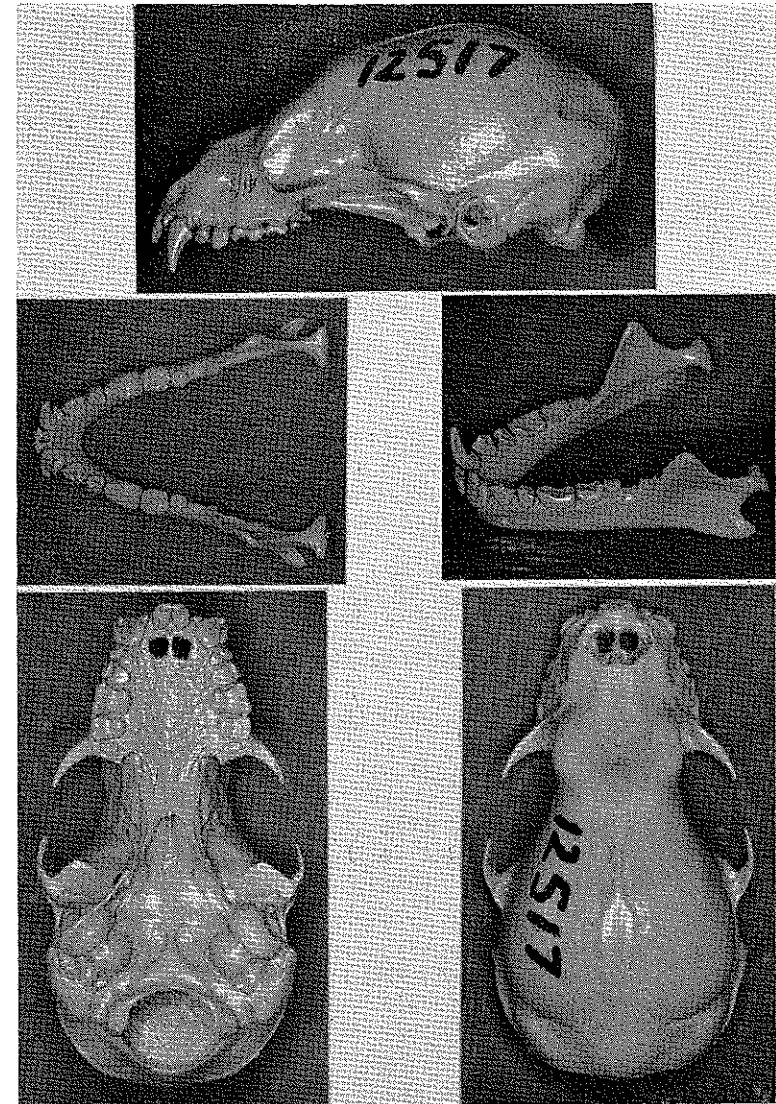


FIGURE 1. *Sturnira bidens*, LSUMZ 12517. Photographic technique modified from de la Torre and Dysart, 1966. \times 3.

the crown area about one-quarter that of second molar (Figure 1); longitudinal groove in first upper molars depressed posteriorly; lower incisors two, weakly tricuspid (bicuspid according to Thomas, 1915:311); first lower molars short, second lower molars subquadrate in occlusal outline; lower jaw slender; angular and coronoid processes short, the anterior border of the latter more sloping and not rising as abruptly from the horizontal ramus as in other species examined.

Specimens examined.—Two adult males (LSUMZ 12518 and 14197) and four adult females (LSUMZ 12517, 14198, 14199, and 14200) from the eastern slope of the Cordillera Carpish, Carretera Central, Departamento de Huánuco, Perú, elevation ca. 2,400 meters. Specimens LSUMZ 12517 and 12518 were collected 24 June 1967; LSUMZ 14197 and 14198 were collected 20 August 1968; LSUMZ 14199 and 14200 were collected 22 August 1968.

Measurements.—See Table 1.

TABLE 1. SELECTED MEASUREMENTS IN MILLIMETERS OF
S. BIDENS and *S. ERYTHROMOS*.

Character	<i>S. bidens</i>			<i>S. erythromos</i>		
	N	Mean(Range)	Type	N	Mean(Range)	
Forearm	6	41.5(39.8-43.3)	43.0	24	41.5(39.7-45.2)	
Greatest length of skull	6	21.3(20.9-21.6)	22.2	23	21.4(20.6-22.5)	
Condylbasal length	6	19.0(18.7-19.2)	20.0	23	19.3(18.5-20.5)	
Interorbital breadth	6	5.2(5.0-5.3)	5.5	24	6.0(5.6-6.5)	
Zygomatic breadth	6	11.8(11.6-12.0)	12.5	24	13.0(12.2-13.8)	
Mastoid breadth	6	11.0(10.9-11.2)	11.7	24	11.4(10.8-12.0)	
Breadth of brain case	6	9.9(9.7-10.0)	10.0	24	10.0(9.5-10.5)	
Palatal length	6	8.9(8.5-9.3)	6.7	24	8.9(8.3-10.0)	
Maxillary tooth row	6	5.9(5.8-6.1)	...	24	6.0(5.7-6.4)	
Mandibular tooth row	6	6.7(6.6-6.8)	...	24	6.7(6.3-7.0)	
Breadth across M ² -M ²	6	6.9(6.8-6.9)	7.0	24	7.6(7.3-8.2)	

The mean, range, and sample size (N) are given for each character. The measurements greatest length of skull, condylbasal length, and palatal length include the incisors. Thomas' measurement for palatal length of the type of *S. bidens* probably does not include the incisors. All measurements are based on specimens from Peru except those of the type of *S. bidens*, which are taken from the original description.

Karyotype.—Bone marrow cells were prepared in the field from a male and a female *S. bidens* (LSUMZ 14197 and 14199, respectively) for chromosomal analysis using the techniques described by Patton (1967), except that the bone marrow was collected from humeri. The diploid number, fun-

damental number, and chromosome morphology were determined by standard methods (Patton, 1967).

S. bidens has a diploid number ($2n$) of 30 and a fundamental number (FN) of 56. All autosomes are biarmed, consisting of 10 pairs of large to small metacentrics and submetacentrics and four pairs of large to medium subtelocentric chromosomes. The X-chromosome is a large subtelocentric and the Y-chromosome is a small acrocentric (see Figure 2).

The karyotype of *S. bidens* is indistinguishable from that of three males and three females of *S. erythromos* (for use of this name see de la Torre, 1961). However, the karyotype of these species differs from that described by Baker (1967) for *S. lilium* and *S. "ludovici"* from Mexico in the morphology of the Y-chromosome. According to Baker (1967:414), "The X is a fairly large subtelocentric and the Y, a small submetacentric." In *S. bidens* and *S. erythromos* the X is also a large subtelocentric; however, the Y is a small acrocentric.

Comparisons.—The specimens from Peru fit Thomas' description of *Corvira bidens* in all essential details except that the measurements of the type are all slightly larger and the lower incisors of the Peruvian specimens are weakly trilobed instead of bilobed. The "rather greyer" color across the shoulders mentioned by Thomas is present in our specimens. Probably, however, it is the result of stretching the skin in the interscapular region thereby exposing the grayer basal hair color.

Externally *S. bidens* closely resembles other species of *Sturnira*, a fact that apparently bothered Thomas, for he stated (1915:312), "So great is this external resemblance of *Corvira bidens* to *Sturnira lilium*, that the only distinguishing character I can at present point out is the decidedly darker colour, especially below, all the other features being occasionally found in the latter animal. Should any mistake have occurred in the allocation of the skin to the skull, the later should, of course, be taken as the type of the new form."

We compared our specimens of *S. bidens* with 24 specimens of *Sturnira erythromos* (Tschudi), 23 collected at the same locality as our *bidens* and one collected at Machu Picchu, Depto. Cuzco, Perú. The two species are superficially similar in appearance, and are probably similar ecologically. Externally *S. bidens* can be distinguished from *S. erythromos* on the basis of the following characters: dorsal coloration darker; venter darker with individual hairs usually appearing unicolored; legs, feet, and adjoining wing membranes more densely haired; interfemoral membrane wider, approaching 4

mm versus less than 2 mm (measured behind knee on dry skin); shoulder glands not evident.

Cranially *S. bidens* is distinct from *S. erythromos* and all other species of *Sturnira* examined. In addition to the peculiar dental characters previously mentioned, *S. bidens* is characterized by having a narrower, relatively longer, and more sloping rostrum. The zygomatic arches on our specimens of *S. bidens* are complete in the males (though broken on the right side in one) and incomplete in three of the four females. The lower jaw is slender and the angular process, although approximately the same size as in *S. erythromos*, is shorter than in other species of the genus. The coronoid process is lower and does not rise as abruptly from the horizontal ramus as it does in *S. erythromos*. For measurements of *S. erythromos* see Table 1.

Remarks.—We concur with de la Torre and Baker by including *Sturnira* in the subfamily Stenoderminae and in regarding the subfamily Sturnirinae as a synonym of Stenoderminae. On the respective bases of dental structure and chromosome similarities de la Torre (1961) and Baker (1967) conclude that the placing of the genus *Sturnira* in the monotypic subfamily Sturnirinae is not warranted.

The autosomes of the two species of *Sturnira* we have examined and the species reported by Baker (1967) are morphologically identical to the autosomes of species of the genera *Vampyrops* and *Artibeus*. The only differences that we have noted are in the morphology of the sex chromosomes. The X-chromosomes of *S. bidens* and *S. erythromos* are morphologically identical to the X-chromosomes of all other stenodermine species whose karyotypes have been reported. However, the Y-chromosome of *S. bidens* and *S. erythromos* is a small acrocentric. To date, in the subfamily Stenoderminae, only some species of *Artibeus* are known to have acrocentric Y-chromosomes, but in those species the acrocentric Y-chromosomes are associated with a multiple sex chromosome system. Our findings represent the first known example among stenodermine bats of intrageneric karyotype variation that does not appear to involve the multiple sex chromosome system discussed by Hsu, Baker, and Utakoji (1968).

According to Walker *et al.* (1968:299), "The original description states that *Corvira* is very similar to *Sturnira* in general cranial characters also, but that only two lower premolars are present." Their reference to premolars is a lapsus; they meant incisors.

Three of the four female *S. bidens* were pregnant with single embryos. Crown-rump measurements of the embryos are 20 mm (20 August 1968) and 15 mm (22 August 1968). The testes of the male obtained on 20

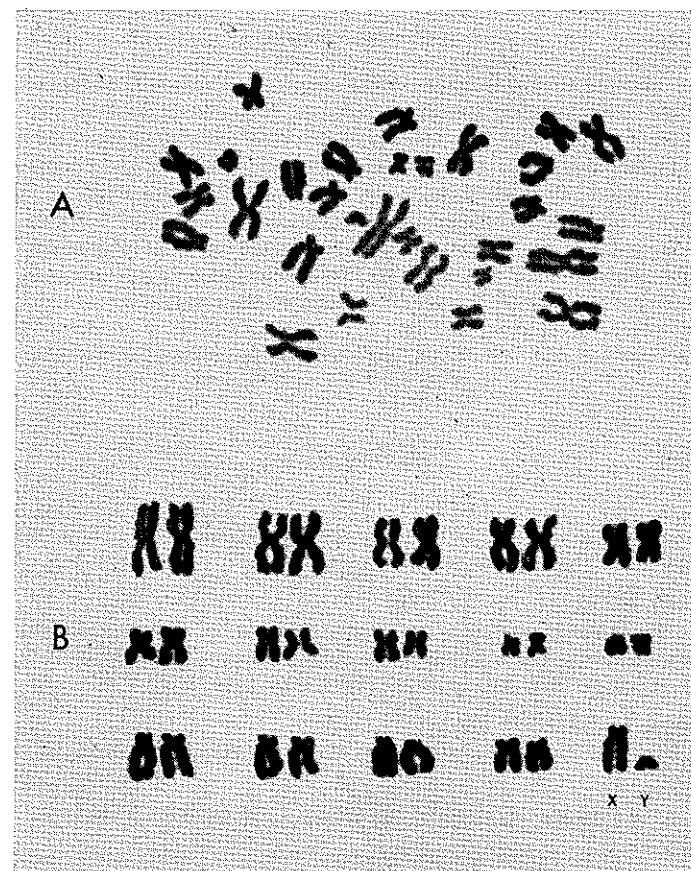


FIGURE 2. A c-metaphase (A) and a photoidiogram of a representative karyotype (B) of a male *Sturnira bidens*, LSUMZ 14197.

August 1968 measured 3.5 mm x 4.5 mm. Ten of the fifteen female *S. erythromos* collected from 15 to 22 August 1968 were pregnant. The embryos ranged in size (crown-rump) from ca. 2 mm to 18 mm. The remaining females had no embryos visible and none were lactating. A female captured in the same locality on 25 June 1967 was not pregnant. Six male *S. erythromos* collected between 15 and 22 August 1968 had enlarged testes. Mean testis size was 4.4 mm x 5.8 mm. Therefore, *S. bidens* and *S. erythromos* are reproductively active at the same time of year.

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LITERATURE CITED

- BAKER, R. J.
1968. Karyotypes of bats of the Family Phyllostomidae and their taxonomic implications. *Southwestern Nat.*, 12:407-428.
- DE LA TORRE, L.
1961. The evolution, variation, and systematics of the Neotropical bats of the genus *Sturmira*. Ph.D. Thesis. Univ. Illinois, 146 p. Univ. Microfilms (Order No. 62-584). Ann Arbor, Mich. (Diss. Abstr., 1962, 22:3781-3782).
- DE LA TORRE, L. AND M. P. DYSART
1966. A method for photographing teeth of small mammals. *J. Mamm.*, 47:515-518.
- HERSHKOVITZ, P.
1958. A geographic classification of Neotropical mammals. *Fieldiana: Zool.*, 36:579-620.
- HSU, T. C., R. J. BAKER, AND T. UTAKOJI
1968. The multiple sex chromosome system of American leaf-nosed bats (Chiroptera, Phyllostomidae). *Cytogenetics*, 7:27-38.
- PATTON, J. L.
1967. Chromosome studies of certain pocket mice, Genus *Perognathus* (Rodentia: Heteromyidae). *J. Mamm.*, 48:27-37.
- THOMAS, O.
1915. A new genus of phyllostome bats and a new *Rhipidomys* from Ecuador. *Ann. Mag. Nat. His.*, ser. 8, 16:310-312.
- WALKER, E. P., F. WARNICK, S. E. HAMLET, K. I. LANGE, M. A. DAVIS, H. E. UIBLE, P. F. WRIGHT, AND J. L. PARADISO
1968. *Mammals of the World*. Revised Edition, Vol. 1. Baltimore, Johns Hopkins Press.