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Xiphorhynchus striatigularis (Dendrocolaptidae): *Nomen monstrositatum*

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On 18 November 1894, Frank B. Armstrong collected an unusual woodcreeper near Altamira, Tamaulipas, Mexico. This specimen was sent with others for identification to the United States National Museum during the winter of 1894-1895 (Richmond 1896), and was eventually described as a new species, *Dendroornis* [= *Xiphorhynchus*] *striatigularis*, based on its distinct plumage (Richmond 1899; USNM 135157; 18 November 1894, Alta Mira, Tamaulipas; female).

Despite the fact that this region can now be considered rather well collected, this taxon continues to be represented only by the unique type, suggesting that it is: (A) a very rare and now probably extinct (but valid) species; (B) the hybrid product of two valid species; or (C) an aberrant individual of a valid species (cf. Graves 1990). *Xiphorhynchus striatigularis* has received little attention since its description. Some authors simply list the taxon with little or no discussion (e.g. Ridgway 1911, Cory and Hellmayr 1925, Peters 1951, Blake 1953, Miller et al. 1957), while others either exclude it altogether (Edwards 1972, 1989, Peterson and Chalif 1973), or consider it an aberrant *X. flavigaster* (AOU 1983, Sibley and Monroe 1990). No evidence has been presented to favor any of the above hypotheses or treatments. My examination attempts to resolve the nature of the unique type.

Methods.—It is assumed that woodcreeper species occupying the region around Altamira (lower elevations of northeastern Mexico) will be morphologically distinct and that, if valid, *X. striatigularis* would exhibit a size and shape different from that of same-sex individuals of other species in this area. This assumption would not be robust for all taxonomic groups or geographic areas. It seems robust here, however, because the center of species diversity in *Xiphorhyn-*

chus occurs in South America (Sibley and Monroe 1990), and no cryptic species of Dendrocolaptidae are known in northern Middle America. Armstrong's handwriting is apparent on the original label of *X. striatigularis*, suggesting that the data there are correct (see Oberholser 1974:8).

The hypothesis of hybrid origin does not make morphological predictions. Although it would seem likely, intermediacy in body form might not occur, even if the individual is an F₁ hybrid (G. Graves pers. comm.). If *X. striatigularis* is an aberrant individual of a valid species and the aberrancy is restricted to pigment deposition in the plumage (the latter is the basis for this taxon; Richmond 1899), its external morphometrics should match one of the species occurring in the region.

Diagnosis of this unique type is aided by the fact that southern Tamaulipas is near the northerly limits of the Dendrocolaptidae, and only two species (of two genera) currently occur in the region where the unique type was taken: *X. flavigaster* and *Lepidocolaptes affinis*. A third species, *L. souleyetii*, reaches central Veracruz, and is included in this study. Three other dendrocolaptids occur in northern Mexico, but were not included in this analysis. *Xiphocolaptes promeropyrhynchus* and *Sittasomus griseicapillus* were excluded because their sizes, ranges, and plumage characteristics preclude their involvement in the latter two hypotheses presented above. I excluded *Xiphorhynchus erythropygius* because of its range, its montane elevational preference in Mexico, and a lack of evidence in the plumage of *X. striatigularis* of a contribution from *erythropygius*.

The unique type of *X. striatigularis* is in basic plumage, and its distinct plumage characteristics are not

TABLE 1. Univariate morphometric characteristics of female *Xiphorhynchus striatigularis*, *X. flavigaster*, *Lepidocolaptes affinis*, and *L. souleyetii* ($\bar{x} \pm$ SD, with range in parentheses; measurements in mm).

	<i>X. striatigularis</i>	<i>X. flavigaster</i> (n = 46)	<i>L. affinis</i> (n = 26)	<i>L. souleyetii</i> (n = 30)
Wing chord	104.5	107.6 \pm 3.49 (98.9–114.9)	106.0 \pm 2.59 (101.7–111.0)	92.5 \pm 2.66 (86.9–97.5)
Tail length	80.5	85.9 \pm 5.95 (73.0–98.0)	91.0 \pm 3.86 (82.1–97.4)	78.5 \pm 3.66 (69.7–85.0)
Tarsometatarsus length	22.6	21.6 \pm 0.55 (20.6–22.8)	19.5 \pm 0.58 (18.3–20.8)	18.3 \pm 0.64 (16.9–19.6)
Bill length	30.1	30.8 \pm 1.42 (27.2–34.0)	22.7 \pm 1.00 (20.2–24.5)	22.2 \pm 0.89 (19.8–23.8)
Bill height	8.0	7.7 \pm 0.54 (6.7–9.1)	5.3 \pm 0.33 (4.8–6.1)	5.4 \pm 0.28 (4.9–6.0)
Bill width	6.4	6.2 \pm 0.81 (4.1–7.1)	4.4 \pm 0.60 (3.6–5.7)	4.9 \pm 0.74 (3.8–6.2)
Length of primary 8	80.0	83.8 \pm 2.95 (77.0–92.0)	84.1 \pm 2.30 (79.0–88.0)	72.3 \pm 2.61 (67.0–77.5)
Length of primary 9	75.0	79.5 \pm 2.98 (72.0–87.5)	80.5 \pm 2.44 (76.0–85.0)	69.6 \pm 2.38 (63.5–73.5)
Length of primary 10	59.5	62.5 \pm 3.18 (50.5–69.0)	62.8 \pm 2.87 (55.0–67.5)	54.2 \pm 1.74 (50.0–58.5)

caused by the retention of juvenal plumage characteristics; the juvenal plumage of woodcreepers tends to closely match the plumage of the adult (pers. obs.).

For morphometric study, I examined a broad sample of female specimens of *X. flavigaster*, *L. affinis*, and *L. souleyetii* from the Atlantic slope of northern Middle America. Postulations of sedentariness in Neotropical species can be invalid (see Winker et al. 1992: 714, Winker 1995). Also, in studies like this, it is useful to have a good sample of the morphological variation occurring within the taxa examined, and large specimen samples from restricted geographic areas in the Neotropics are rare.

Measurements to the nearest 0.1 mm were taken of the lengths of wing chord, tail, tarsometatarsus, and bill, as well as of bill height and bill width, using vernier calipers (following Baldwin et al. 1931). Also, the lengths of primaries 8, 9, and 10 were measured to the nearest 0.5 mm (following Jenni and Winkler 1989). Specimens with missing values were not included. Patterns among the measured characters were examined using principal component analysis. The first two principal components were extracted from the correlation matrix of log-transformed mensural data (Tables 1 and 2). Unstandardized principal component scores were generated for each individual.

Results and discussion.—Except for *X. striatigularis*, the taxa examined occupy discrete regions of morphological space (Fig. 1). *Xiphorhynchus striatigularis* is morphometrically inseparable from the common *X. flavigaster* (Table 1, Fig. 1). Given the propensity for the species of Dendrocolaptidae in the lowlands of northeastern Mexico to be morphologically distinct, and under the assumptions upon which the study was based, *X. striatigularis* is not a valid species. Its taxonomic status, therefore, is either *nomen hybridum* or *nomen monstrositatum* (Lincoln et al. 1982).

It is more difficult to distinguish between the two remaining hypotheses of origin: hybridization or aberrancy. The position of *X. striatigularis* in morpho-

logical space (Fig. 1) does not approach either of the *Lepidocolaptes* species. It does, however, closely match other female *X. flavigaster*. Morphometrically, the hypothesis of aberrancy is supported. The morphometric data are neutral with respect to the hypothesis of hybrid origin (see Methods). However, hybrid origin seems highly unlikely from several perspectives. First, hybrids among the woodcreepers and their nearest suboscine relatives are decidedly rare; only one has been described (Graves 1992). Also, in this case, hybridization would most likely be intergeneric, a less common source of hybrids than congeneric crossings (Gray 1958).

The geographically most probable second parent taxon for a hybrid woodcreeper at Altamira would be *L. affinis*, which occupies higher elevations than the other two species considered here (>550 m; Miller et al. 1957). Armstrong did not obtain *L. affinis* at Altamira (Richmond 1896, Phillips 1911; extant specimen record), which is not surprising, given that it does not usually occur in the lowlands. Only one species

TABLE 2. Eigenvectors and eigenvalues for first two principal components based on correlation matrix of log-transformed measurements of female woodcreepers of four taxa.

Character	PC1	PC2
Wing chord	0.422	-0.093
Tail length	0.282	-0.325
Tarsometatarsus length	0.384	0.225
Bill length	0.352	0.318
Bill height	0.324	0.371
Bill width	0.170	0.528
Length of primary 8	0.365	-0.319
Length of primary 9	0.230	-0.437
Length of primary 10	0.389	-0.156
Eigenvalue	5.097	2.744
Percent of total variance explained	56.6	30.5

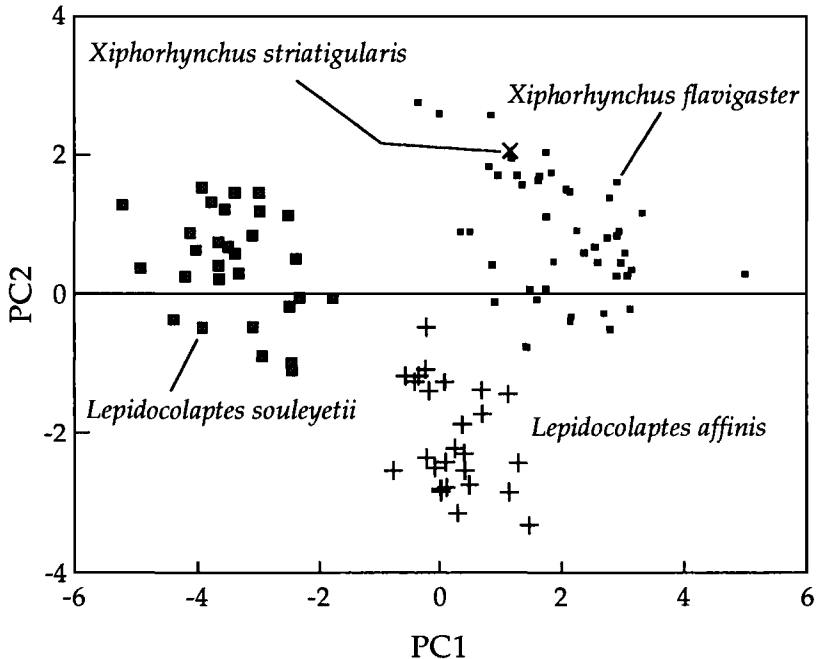


Fig. 1. Bivariate plot of individual scores on first two principal components of 101 adult female woodcreepers.

of woodcreeper, *X. flavigaster*, is known to occur at Altamira. Topographic maps show that the nearest locality with an elevation suitable for *L. affinis* occurs about 60 km from Altamira (in the Sierra de Tamaulipas, where the species is known to occur; Miller et al. 1957). It is approximately 430 km from Altamira to the range of *L. souleyetii* (using ranges from Miller et al. 1957). Banding studies in southern Veracruz suggest that *X. flavigaster* is sedentary there (unpubl. data). Morphometric studies of *L. affinis* and long-term observations in southern Veracruz (unpubl. data) suggest that this species is also sedentary in eastern Mexico.

Given the inadequacy of morphometrics to resolve the two remaining hypotheses of origin, plumage examination is useful. Unlike any other member of the family in northern Middle America, the throat of *X. striatigularis* shows heavy streaking (Fig. 2). These streaks are caused by feathers having a black margin around a buff center, and the nature of these feathers is also unusual, in that the black/buff interface is ragged, rather than smooth. This ragged interface, which characterizes streaked ventral feathers to the abdomen, is not found in other members of this genus, nor in the two *Lepidocolaptes* species examined. It appears that genetic control of black pigment deposition on the venter went awry, causing aberrancy in how black pigment was deposited in ventral feathers, as well as an exaggeration in the occurrence of these feathers anteriorly. The density of pigment also

appears greater than in other woodcreepers (*X. flavigaster*) taken at the same time and locality. Except for these characteristics, restricted largely to the anterior venter, all aspects of the plumage of *X. striatigularis* can be found represented in female *X. flavigaster* from eastern Mexico (Fig. 2).

Although the hypothesis of hybrid origin cannot be rejected, it is very improbable for several reasons: (1) rarity of hybrids in woodcreepers and their relatives (Graves 1992); (2) only one species of woodcreeper occurs at the type locality; and (3) the type, clearly different from other woodcreepers, nevertheless shows only localized plumage differences that lack intermediacy between two possible parent taxa. The data are more consistent with origin through aberrancy. Unlike hybridization, genetic mutations occur regularly and, although odd melanistic plumages seem uncommon, aberrancies in feather pigment deposition are relatively frequent (e.g. partial albinism or leucism). Based upon this evidence, I conclude that *X. striatigularis* is an aberrant *X. flavigaster*. Markedly aberrant individuals are monstrosities, and a name based upon such an individual has the taxonomic standing of *nomen monstrositatum* (Lincoln et al. 1982).

The day after Armstrong collected the unique *X. striatigularis*, he collected another bird in the same area that Wetmore (1942) later designated as the type of *X. flavigaster saltuarius* (USNM 135161; Alta Mira, Tamaulipas, 19 November 1894; male). *Xiphorhynchus*

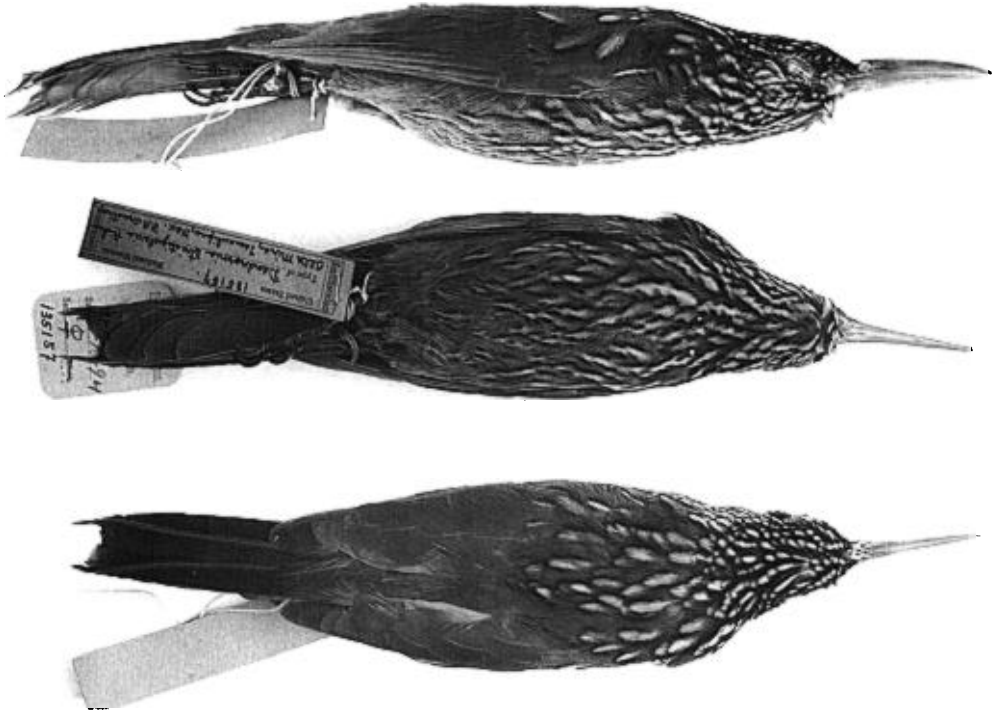


Fig. 2. Type of *Xiphorhynchus striatigularis*.

striatigularis should henceforth be considered a synonym of *X. flavigaster saltuarius*.

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Quantitative Comparison of Two Methods of Assessing Diet of Nestling Skylarks (*Alauda arvensis*)

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Studies of the diet of nestlings traditionally have been based on direct or indirect methods, corresponding to diet assessment before ingestion (e.g. observations or collection of prey fed to chicks) or after ingestion (e.g. analysis of crop contents, feces or regurgitants). The actual approach adopted often depends on circumstances, and the welfare of the birds involved is an increasingly sensitive issue to be taken into consideration. We present a comparison of a direct and an indirect method, one potentially much more dangerous to the chicks than the other.

The first method involves the use of neck collars on chicks, which prevent chicks from swallowing the food that they have been fed by their parents, thereby allowing the collection of the food before digestion. It has been applied by several authors (Orians 1966, Jenny 1990, Poulsen 1993) and, clearly, is invasive. The primary limitation of using neck collars is the very short period during which the collars are safe

to use. For example, Skylarks (*Alauda arvensis*) younger than four days may be hurt by the physical handling involved when placing the collar around the neck and, after seven days, the chicks risk fledging with collars still attached (Orians 1966, Jenny 1990).

The second method is the much safer and noninvasive one of fecal analysis (i.e. collection and analysis of chick feces), which has been applied to gamebirds (Gray Partridge, *Perdix perdix* [Green 1984]; Red-legged Partridge, *Alectoris rufa* [Green 1984]; Ring-necked Pheasant, *Phasianus colchicus* [Hill 1985]), and small passerines (House Martin, *Delichon urbica* [Bryant and Westerterp 1981]; Pied Wagtail, *Motacilla alba yarrelli*; Yellow Wagtail, *Motacilla flava flavissima* [Davies 1976, 1977], and Skylark, *Alauda arvensis* [Rjabow 1968, Green 1978, 1980, Jenny 1990, Poulsen 1993]). The most serious problem related to fecal analysis is that of differential digestion, whereby the proportion of certain prey items in the diet is either under- or overestimated according to the particular item's relative digestibility (Hartley 1948, Owen 1975, Ralph et al. 1985). We compare the diet composition of nestling Skylarks assessed from analyses of feces and from food samples obtained by neck collars, collected from the same chicks at similar times.

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