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a Review of the Taxonomy of the Grey-headed Kite (*Leptodon
cayanensis* Latham, 1790)**

Author(s): Francisco Voeroes Dénes, Luís Fábio Silveira, Sergio Seipke, Russell
Thorstrom, William S. Clark, and Jean-Marc Thiollay

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THE WHITE-COLLARED KITE (*LEPTODON FORBESI* SWANN, 1922)
AND A REVIEW OF THE TAXONOMY OF THE GREY-HEADED KITE
(*LEPTODON CAYANENSIS* LATHAM, 1790)

FRANCISCO VOERES DÉNES,^{1,6} LUÍS FÁBIO SILVEIRA,¹ SERGIO SEIPKE,^{2,3}
RUSSELL THORSTROM,³ WILLIAM S. CLARK,⁴ AND JEAN-MARC THIOLLAY⁵

ABSTRACT.—The White-collared Kite (*Leptodon forbesi* Swann, 1922), previously known by the holotype and three specimens from northeastern Brazil from the late 1980s, is considered by many as a juvenile variant of the Grey-headed Kite (*L. cayanensis* Latham, 1790). We present new morphological evidence from museum specimens of both species, including a previously misidentified specimen of *L. forbesi*, and field study to support the validity of the White-collared Kite as a species, now seen as endemic and severely threatened in northeastern Brazil. This species occurs only in remnants of the Atlantic Forest in the states of Alagoas and Pernambuco. It is distinguished from its congener by its white hind-collar, underwing coverts, and leading edge of the wings. The under surface of the secondaries show reduced black barring. The number of white and black tail bands is variable, and not a good diagnostic character. We also review all taxa described for *L. cayanensis* and show the described subspecies are not valid. Received 13 May 2010. Accepted 5 November 2010.

There is disagreement about the division of species and subspecies within the genus *Leptodon* Sundevall, 1836. Some consider this genus to be monotypic and represented only by the Grey-headed Kite (*Leptodon cayanensis*) (Grossman and Hamlet 1964, Brown and Amadon 1968, Blake 1977, Sick 1997); others consider the White-collared Kite (*L. forbesi*) a valid species restricted to the Atlantic Forest of northeastern Brazil (Swann 1922, 1945; Teixeira et al. 1987a, b; Thiollay 1994; Ferguson-Lees and Christie 2001). This latter taxon was described by Swann (1922) as a species based on a single specimen (at the Natural History Museum in Tring, United Kingdom) collected by W. A. Forbes in 1882 in the northeastern Brazilian State of Pernambuco. The White-collared Kite is known from the holotype and three other specimens (at the Museu Nacional do Rio de Janeiro; Teixeira et al. 1987a) with no previous reliable observations (Roda and Carlos 2003, Silveira et al. 2003, Pereira et al. 2006).

The taxonomic status of the White-collared Kite (*Leptodon forbesi*), often considered a synonym of *L. cayanensis*, has been uncertain

since the time of its description. Brown and Amadon (1968) consider the holotype specimen of *L. forbesi*, described by Swann (1922, 1945), as a juvenile plumage variant of the more common and widespread Grey-headed Kite (*L. cayanensis*). Sick (1997) mentions the high variability of the plumage in *L. cayanensis*, acknowledged by Foster (1971), as an argument for a similar classification. Hellmayr and Conover (1949) reported the type specimen is a bird in very fresh plumage just finishing its molt, and that presence of an old primary on both wings and some dusky brown feathers on the rump suggest its immaturity. They conclude (1949:26) “while the specimen looks rather different from the ordinary run of *L. cayanensis*, further material is needed to establish the taxonomic status of *L. forbesi* beyond doubt”. Ferguson-Lees and Christie (2001) concur with Hellmayr and Conover (1949) regarding the morphological description of *Leptodon forbesi*. They indicate, however, that to consider the type specimen as a juvenile would be a mistake because it has apparently molted recently and has adult plumage with the exception of two or three secondaries and some worn coverts. The traditional diagnosis of *Leptodon forbesi* include the white underwing coverts; the gray crown; a white collar; white tips on the scapulars, mantle, and wing quills; and a broad white tail band, measuring 60–70 mm (Swann 1945, Hellmayr and Conover 1949, Pinto and Camargo 1961).

The three specimens collected in the 1980s in the State of Alagoas share some similarities with the *L. forbesi* type specimen. Preliminary analysis

¹Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, Brazil.

²Calle 57 n° 1230 “A”, La Plata 1900, Buenos Aires, Argentina.

³The Peregrine Fund, 5668 West Flying Hawk Lane, Boise, ID 83709, USA.

⁴2301 South Whitehouse Circle, Harlingen, TX 78550, USA.

⁵2 rue de la Rivière 10220 Rouilly-Sacey, France.

⁶Corresponding author; e-mail: fvdnes@gmail.com

by Teixeira et al. (1987a, b) suggested this taxon differs from *L. cayanensis*, influencing most of the subsequent literature to treat *L. forbesi* as a valid species (Forrester 1993, Thiollay 1994, Stotz et al. 1996, Ferguson-Lees and Christie 2001). More recently, Roda and Carlos (2003) found only the Grey-headed Kite in six locations in the states of Alagoas and Pernambuco, but the authors did not present the diagnosis for this taxon. Vocalizations typical of the Grey-headed Kite were also recorded in Alagoas (Silveira et al. 2003), while White-collared Kites were found in southern Pernambuco (Pereira et al. 2006).

The three subspecies of *L. cayanensis* were based on color differences. Swann (1922) suggests that *L. c. cayanensis* Latham, 1790 in northern South America (and the Amazon Basin) differs from *L. c. monachus* Vieillot, 1817 for central and southeastern South America in the following characters: darker black dorsum; dark gray head and nape; upper tail coverts without visible bands, but with some small white spots; black underwing coverts (black and white in *L. c. monachus*), but with white wing borders (Swann 1922). He further described a third subspecies *L. c. mexicanus* for Mexico south to Panama, diagnosed by the grayish nape and head; grayish black dorsum; black underwing coverts; upper tail coverts with a whitish-gray band, and grayish black spotted legs.

Hellmayr and Conover (1949) invalidated the subspecies *L. c. monachus* and *L. c. mexicanus* because they found no color differences. *L. c. mexicanus* has since been disregarded in most of the subsequent literature. They indicated that *L. cayanensis* from Argentina, Brazil, and Bolivia tend to be larger than those in the rest of the range, but offer no analysis to support these conclusions. They also affirm that if the southern form is considered a subspecies, it should be *L. c. monachus* Vieillot, 1817. This treatment is followed by Thiollay (1994) who lists *L. c. cayanensis* in the north and *L. c. monachus* in the south.

The status of the White-collared Kite is classified as 'Data Deficient' in the 2003 list of Brazilian animals threatened with extinction as the paucity of museum specimens of *L. forbesi* has severely hindered the study of its variability. This taxon, if valid, would be critically endangered upon its naming, and it would be among the five most threatened raptors of the world (Thiollay 1994, BirdLife International 2000, Ferguson-Lees and Christie 2001).

We examined differences in morphology between White-collared and Grey-headed kites, and strongly suggest the White-collared Kite is a valid species. We also present arguments in favor of considering the Grey-headed Kite monotypic.

METHODS

We examined 128 specimens within the genus *Leptodon* (Appendix) from the ornithological collections of the Museu de Zoologia da Universidade de São Paulo (MZUSP), Museu Nacional do Rio de Janeiro (MN), Natural History Museum at Tring, United Kingdom (NHM), Museum für Naturkunde of the Humboldt-University in Berlin (ZMB), Colección Ornitológica Phelps (COP), Instituto de Ciencias Naturales (ICN), and Museo de la Estación Biológica de Rancho Grande (MEBRG). We were unable to obtain permission to examine the *Leptodon* specimens reported in Teixeira et al. (1987a, b) and they are not included. Additionally, LFS and SS inspected the ornithological collections of the American Museum of Natural History, Natural History Museum Vienna, and National Museum of Natural History (Leiden) in search of specimens pertinent to the taxonomic analysis (*L. forbesi*-like specimens or from northeastern Brazil), which were not found; thus, the collections are not listed in this paper. The *a priori* naming of specimens within the genus *Leptodon* was based on the suggested ranges of the taxa.

We surveyed raptors in forest fragments in the states of Alagoas (AL) and Pernambuco (PE) in October 2007 and February and November 2008. We gathered additional information on morphology, behavior, and abundance of *Leptodon* (Seipke et al. 2011). Photographs taken in the field were used to supplement the few museum specimens. Vocalizations were opportunistically recorded using a video camera, and used for simple comparison with known recordings of Grey-headed Kites. The areas surveyed were Murici, AL; Usina Serra Grande, São José da Laje, AL; Mata do Coimbra, Ibateguara, AL; Fazenda Varrela, São Miguel dos Campos, AL; Usina Trapiche, Sirinhaém, PE; and Engenho Cachoeira Linda, Barreiros, PE. Detailed descriptions of survey methodology and localities surveyed are in Seipke et al. (2011).

We analyzed plumage color by comparing museum and field specimens with those of the diagnostic characters for each taxon in question. There are few museum specimens of *Leptodon*

forbesi, and we complemented the analysis with data taken in the field because this taxon is critically endangered (Birdlife International 2000).

We examined the distribution of *L. cayanensis* for discontinuities in characters along its geographic distribution and with *L. forbesi*. The subspecies described by Swann (1922) and taxa considered by Hellmayr and Conover (1949) may be considered valid if at least one character does not overlap between populations (evidence of lineage divergence).

Morphometry.—We measured: beak length (from the tip to the rostral edge of the cere), width (measured at the rostral edge of the cere), wing (chord), tail length, and length (measured at 3 places at the middle of each vane and at the rachis) of the distal white and black tail bands, both dorsally and ventrally. We used analysis of variance (ANOVA) to compare morphological measurements among subspecies based on specimen locality. We used only adult male specimens to avoid possible complications due to sexual dimorphism and development, and analyzed only specimens with information describing collecting location. Coordinates, when absent, were obtained from maps. We used regression analysis to test for latitudinal trends in body size.

RESULTS AND DISCUSSION

Examination of Museum Specimens.—A specimen (MZUSP 38922) of the White-necked Hawk (*Leucopternis lacemulatus*) collected in 1957 in a forest fragment at Usina Sinimbu, southeastern Alagoas (Pinto and Camargo 1961) was recognized as a representative of genus *Leptodon*. Generic identification was based on tail and tarsi size and proportion, and morphology of the beak. The bird agrees well with the holotype of *L. forbesi* in all characters traditionally recognized, including the whitish hind collar, white tips on mantle feathers, scapulars, secondaries, and inner primaries, a single broad ashy-white band on the tail, and white underwing coverts. It has a white leading edge of the wings and two waves of primary molt indicating it is an adult (Edelstam 1984, Clark 2004). This specimen is now identified as *L. forbesi*. Recent raptor surveys failed to detect *L. lacemulatus* in the states of Alagoas and Pernambuco (Silveira et al. 2003, Seipke et al. 2011).

Variability in *Leptodon cayanensis*.—Analysis of the 71 adult *Leptodon cayanensis* specimens

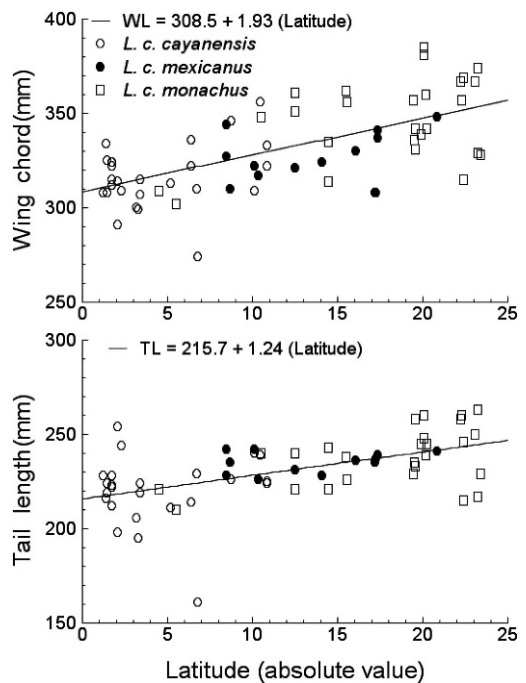


FIG. 1. The relation between body size and latitude in *Leptodon cayanensis* subspecies.

ranging from Mexico through Central America to southern Brazil and Bolivia revealed no color differences to support the subspecies described by Swann (1922). Characters supposedly diagnostic for each subspecies were found on specimens of different subspecies.

Morphometry.—Wing length of *Leptodon cayanensis* was more strongly associated with latitude ($r^2 = 0.38$, $F_{1,65} = 41.4$, $P < 0.05$) than was tail length ($r^2 = 0.28$, $F_{1,65} = 27.2$, $P < 0.05$; Fig. 1). The residuals for wing length and tail length were similar among all subspecies ($F_{2,61} = 2.72$, $P > 0.05$ and $F_{2,61} = 0.17$, $P > 0.05$, respectively) when controlling for this latitudinal cline. There was no relation with latitude in beak measurements (culmen and width) (both $P > 0.10$). Measurements of these characters were similar among all putative subspecies (all $P > 0.10$) and provide no support for separation of subspecies.

Distal tail bands, both black and white, were variable among the putative subspecies, while the white tail bands of *L. forbesi* were greater (56–57 mm) in width. The sample size for *L. forbesi* was small, and we described only the comparisons between the putative subspecies.

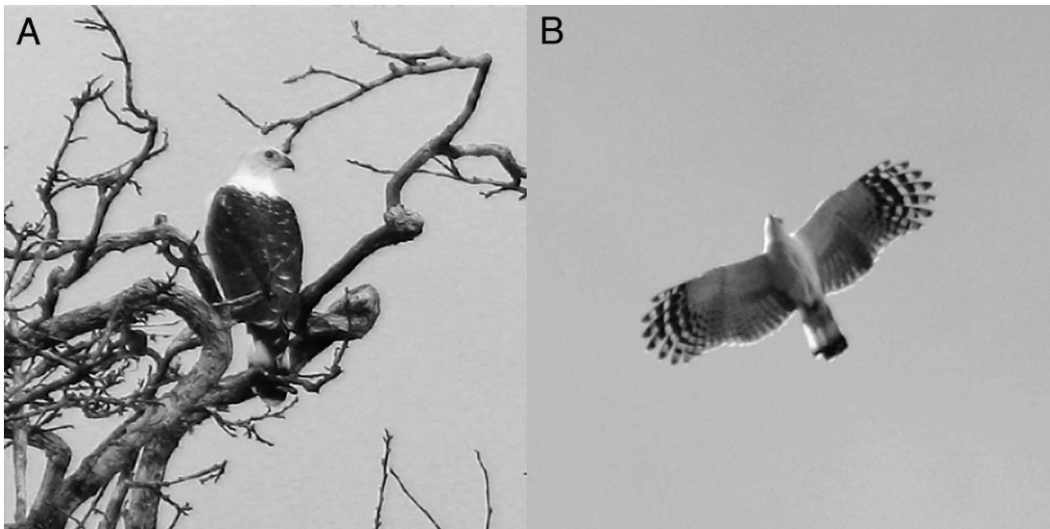


FIG. 2. Adult White-collared Kites recorded in Alagoas, Brazil in October 2007. (A). Perched exposed on tree after aerial display. Note white tips to feathers on mantle, back, secondaries, and primaries (Photograph by Sergio Seipke). (B). Soaring. Note white underwing coverts, boldly patterned primaries contrasting with rest of underwing and bulging secondaries on trailing edge of wings. This bird had a dark base of the tail and only one subterminal black tail band (Photograph by Sergio Seipke).

Ventral black tail bands were similar among all the putative subspecies ($F_{3,93} = 1.32$, $P > 0.10$) and the remaining tail bands varied somewhat between the subspecies. *L. c. mexicanus* has narrower ventral white tail bands (25.0 mm, 15.23–44.98 mm) than the other two subspecies (*L. c. monachus* = 34.6 mm, 14.12–63.62 mm; *L. c. cayanensis* = 31.5 mm, 10.43–48.33 mm). This relationship explained little of the variance among subspecies ($r^2 = 0.14$, $F_{3,85} = 5.83$, $P < 0.05$). The dorsal black band was greater for *L. c. mexicanus* (49.3 mm, 26.35–66.83 mm) than for *L. c. cayanensis* (38.6 mm, 13.37–56.3 mm, $r^2 = 0.08$, $F_{3,93} = 3.79$, $P < 0.05$). The dorsal white band was larger in *L. c. monachus* (24.2 mm, 12.4–63.6 mm) than *L. c. mexicanus* (15.4 mm, 6.82–39.18 mm, $r^2 = 0.11$, $F_{3,91} = 5.02$, $P < 0.05$). Thus, while the overlap in tail band width varied among subspecies and the difference in band width only explained between 8 and 14% of the variance in band width, we conclude that band width does not distinguish among subspecies.

Validity of Leptodon forbesi.—Examination of museum specimens and photographic records of 27 of the 41 individuals detected in the field surveys were convincing that the species *Leptodon forbesi* (Swann, 1922) is a valid taxon.

Leptodon forbesi (Swann, 1922)

White-collared Kite

Gavião-de-pescoço-branco (Brazilian name)

Milano Cuello Blanco (Spanish name,
Seipke et al. 2007)

Odontriorchis forbesi Swann 1922. Type-locality: Pernambuco, Brazil; *Leptodon forbesi* Hellmayr and Conover 1949:26. Type-locality: Pernambuco, Brazil.

Holotype.—NHM 1887.5.1.723. Adult specimen, unidentified sex, housed at the Natural History Museum at Tring, United Kingdom. Collected in Pernambuco, Brazil.

Known Specimens.—Type NHM 1887.5.1.723; MZUSP 38922; MN 34416, MN 34417 and MN 34418 (Teixeira et al. 1987a).

Diagnosis.—*Leptodon forbesi* can be distinguished from its congener, *L. cayanensis*, by the white color of the hind collar, instead of an inconspicuous and undelimited medium to pale neutral gray; mostly white in the underwing coverts rather than all black; and under surface of the secondaries predominantly white with greatly reduced black barring in comparison to the others (Fig. 2; color plate in Seipke et al. 2011).

Morphological Variation.—The slate gray feathers of the mantle, scapulars, upper wing

coverts, secondaries, and inner primaries in both the type and MZUSP specimens of *Leptodon forbesi* have conspicuous white tips which are absent in *L. cayanensis*. Photographs taken in the field survey clearly show this character in at least one wild specimen (Fig. 2A). White tips of feathers seem to wear quickly in the wild.

The holotype of *L. forbesi* has a broad distal white tail band (*contra* pale gray in *L. cayanensis*) both dorsal and ventrally with a narrower white band hidden under the tail coverts. The gray band that separates the two white bands on the ventral side is also paler in color. The broad white band is wider in the MZUSP specimen, and on the ventral side of the tail the distal black band is narrower and discontinuous in some feathers, and the proximal black band is absent. Ten of the *L. forbesi* recorded in the field had one distal and one proximal black band and one white band on the upper side of the tail, while four had a third, medial black band and two white bands. Six individuals had a single distal black band on the underside of the tail (Fig. 2B), while 13 had one distal and one medial black band. It is difficult to see the proximal tail bands in the field, as they are usually hidden under the tail coverts. We recorded one juvenile molting into adult plumage with three visible dark bands in the undertail. The tail bands in *L. forbesi* are white, and those in *L. cayanensis* are pale gray.

Bare Parts.—Beak black. Cere and eye-ring color varies from ashy gray to a lighter pale pearl gray. Eyes dark. Tarsi show yellowish to gray color.

Distribution.—Recent museum specimens of *Leptodon forbesi* were collected in the eastern part of the State of Alagoas in northeastern Brazil (Fig. 3) in Sinimbu, Murici, and São Miguel dos Campos (Teixeira et al. 1987a). We found *L. forbesi* in all localities surveyed (Fig. 3). Additional surveys in the forests north and south of the sampled areas, including the states of Paraíba, Sergipe, and Bahia are needed to ascertain the distribution limits of *L. forbesi* and *L. cayanensis*.

Habitat.—*Leptodon forbesi* occurs in lowland and highland (0 to 585 m) Atlantic Forest. Birds have been observed soaring over open country (sugar cane fields), when moving between forest fragments, but otherwise appear to avoid such areas. Birds were also recorded flying over mangroves (*Rhizophora* spp.).

Behavior and Ecology.—We gathered life-history information on *L. forbesi* during field

surveys in Alagoas and Pernambuco. Most birds were detected between 1 and 2 hrs after sunrise, for periods not longer than 30 min, when they soared over the forest. These kites frequently flew in pairs in October 2007 and November 2008, using the *Butterfly Display* flight (Thorstrom 1997). This behavior is best known for *L. cayanensis* and is an indicator of reproductive activity. We recorded feeding once, when a distant perched bird flew down, then returned to the same perch seconds later, and began to eat its prey. Prey identification was not possible, even using a telescope. Detection frequency in February 2008 was lower and display flights were rare suggesting the breeding season had ended. No nests or juveniles were recorded in either survey.

Voice.—Vocalizations of the White-collared Kite heard during field surveys apparently show no meaningful differences from known Grey-headed Kite calls. Mostly heard was the *wuh-wuh-wuh...*, or *caw-caw-caw...*, in series of 10–20, in flight, which may elicit response from individuals of nearby territories. We also heard the cat-like *eeeAAW*, often during the *Butterfly Display* flight (Thorstrom 1997). Conclusions on the vocal repertoire of these species should be viewed as preliminary, despite this apparent similarity, until several better quality vocalization recordings are made, allowing comparative sonogram analysis.

Subspecific Review of Grey-headed Kite.—Plumage color patterns are quite variable within and among subspecies and do not follow the geographic patterns that would allow delineation of the subspecies as proposed by Swann (1922, 1945), which was also noted by Hellmayr and Conover (1949). This variation should be considered as variation among individuals within species, as is common in the Family Accipitridae (Grossman and Hamlet 1964, Brown and Amadon 1968, Thiollay 1994, Ferguson-Lees and Christie 2001).

The morphometric variation analysis shows that wing length and tail length follow Bergmann's Rule (Fig. 1). Although restricted to wing and tail, this might explain the greater size of the southern populations of *L. cayanensis* as described by Hellmayr and Conover (1949). No significant variation was found, when controlled for latitude, to justify separating the subspecies, including the beak variables (culmen and width, which did not require correction for latitude). Tail band width variations also do not support the subspecies described by Swann (1922) for *L. cayanensis*. The

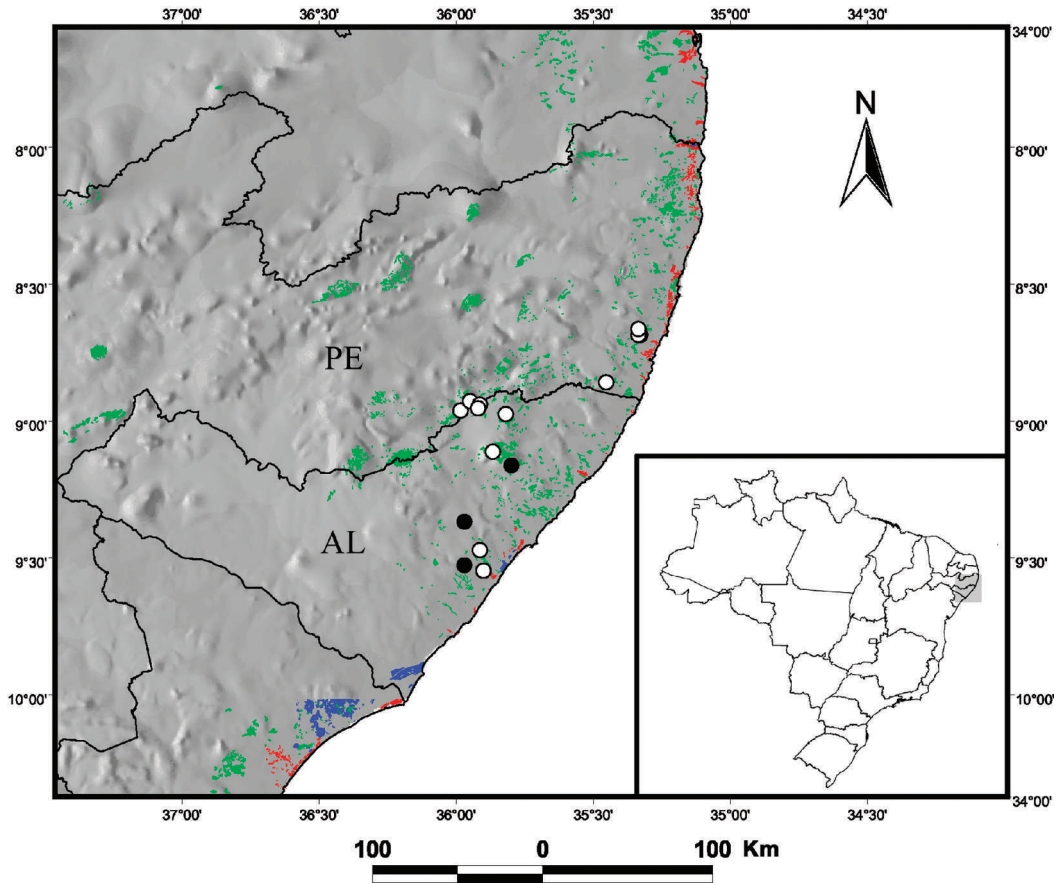


FIG. 3. Eastern Pernambuco (PE) and Alagoas (AL) states, Brazil with locality of collection of museum specimens of *Leptodon forbesi* (black circles) and individuals of the same species recorded in field surveys in October 2007 and February 2008 (white circles). Colored areas represent native vegetation remnants in the region: Atlantic Forest (green), *restinga* (red), and mangroves (blue).

analysis revealed a slight tendency for northern populations to have a darker tail (more extensive black bands) than birds from the rest of the distribution; this has gone unnoticed in traditional morphological analysis of this species (including the present study).

Taxonomy of White-collared Kite.—*Leptodon forbesi* is a valid species and should be recognized. However, its diagnostic characters must be redefined in light of the new evidence. The two specimens of *L. forbesi* (type and MZUSP) as well as the three from the MN (Teixeira et al. 1987: 153) and 22 of 27 (81.5%) individuals recorded by us in the field have all-white coloration of the underwing coverts, (Fig. 2B), differing from the black of *L. cayanensis*. One individual had the greater coverts and carpal patches black on an

otherwise white underwing; another had only the greater coverts black, the rest white; and one bird had a mostly white underwing with two brown areas in the proximal half of each wing; this was a juvenile molting to adult plumage. Dark coloration in the underwing of *L. forbesi* specimens should not be considered a constant in the adult plumage of this species. The character ‘coloration on the underwing coverts’ can still be recognized as a diagnosis for the taxa in question with *L. cayanensis* presenting all or most feathers black in this region.

The two specimens of *L. forbesi* (type and MZUSP) and 13 of 17, (76%) birds observed in the field showed noticeable white coloration on the leading edge of the wing, while four (24%) of the individuals observed in the field had incon-

spicuously black color in this region. Additionally, one *L. cayanensis* (MZUSP 22067) from Lago do Baptista, Amazonas State, shows extensive white lesser upperwing coverts, a plumage feature that probably rendered a white leading edge to the wings while the birds was alive. Due to the considerable variation in this character, it should not be considered a diagnosis for the taxa in question.

The character that gives *L. forbesi* its popular name, the white collar, instead of gray as in *L. cayanensis*, occurs in all specimens in the museum and in the field (Fig. 2A). This character can also be considered diagnostic, as all specimens of *L. cayanensis* examined had gray collars.

The tips of the scapulars, mantle, and wing quills are white in museum specimens and in at least one of the individuals observed in the field (Fig. 2A). This pattern is lacking in all of the specimens of *L. cayanensis*. Due to the lack of data resulting from the difficulty in assessing this character in wild specimens, and the scarcity of museum specimens of *L. forbesi*, more evidence is needed to clarify its use.

The broad white band on the tail has probably been considered the most important character for identification of *L. forbesi*, being the easiest to recognize in the field (Fig. 2B). However, we found this broad white band, although occurring in the type and in the MZUSP specimens, is absent in some individuals observed in the field. We also saw four reproductive pairs in the field for which one of the birds had a broad white band, while the others had two smaller white bands separated by a black band. This suggests the character is not diagnostic and possibly associated to sexual dimorphism in tail pattern.

Color pattern in the under surface of the remiges is also informative. Both primaries and secondaries in adult *L. cayanensis* have conspicuous black barring with narrower bars on the secondaries. The bars in adult *L. forbesi* are reduced on the secondaries and, in some cases, appear almost entirely white (Fig. 2B). Thirteen of 19 birds observed in the field, for which this barring was seen, had highly contrasting barring on primaries and secondaries, four had less contrasting patterns, and two had rather non-contrasting patterns on primaries and secondaries. This character should be considered diagnostic for species of the genus *Leptodon* despite the variation encountered in *L. forbesi*.

Status and Conservation.—The Atlantic Forest in northeastern Brazil is critically endangered

(Ribeiro et al. 2009) with a large percentage of its original extent already destroyed and the remaining forests highly fragmented and impacted by hunting and logging. However, we found *Leptodon forbesi* in every location that we sampled (Seipke et al. 2011). Further studies are needed to estimate population density, habitat availability, and reproductive success to better understand the conservation status of this species.

Distribution of White-collared Kite.—Most of the literature describes the range of *L. cayanensis* extending throughout tropical humid Central and South America (e.g., Thiollay 1994, Stotz et al. 1996, Ferguson-Lees and Christie 2001), an area that includes the narrow northern section of the Atlantic Forest where *L. forbesi* occurs (eastern Alagoas and Pernambuco states, northeastern Brazil). However, the only *Leptodon* specimens found in the collections from that region are White-collared Kites. Further, no Grey-headed Kites were observed during extensive field surveys in the area (Seipke et al. 2011). Redefinition of the diagnosis for both species suggests that many if not all of the previous Grey-headed Kite records in the White-collared Kite's range, most of which are not documented by either photographs or specimens, are doubtful at the least, and that probably both species are allopatric. Grey-headed Kite records from the immediate south of this area (Sergipe and northern Bahia states) lacking documentation should also be viewed with caution. Whether the White-collared Kite's range extends as far south as northern Bahia remains to be verified as new records arise, based on the precise field identification data available (Seipke et al. 2011). However, southern Bahia is apparently within Grey-headed Kite range, as exemplified by two MZUSP specimens from Ilhéus and many documented records (LFS, pers. obs.).

Uncertainty still exist in details of the life history of the White-collared Kite, including juvenile color patterns and geographic distribution among others, but recognizing this species as valid is important. Its validation will pave the way for future studies of its natural history, morphology, population dynamics, biogeography, genetic structure as well as help examine its status as a threatened species.

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APPENDIX

Specimens

Leptodon forbesi = 2.

BRAZIL: “Pernambuco”—no specific locality (NHM: 1 unsexed); Alagoas: Usina Sinimbu (MZUSP: 1♂); cited only (3): Serra Branca, Murici (MNRJ: 1♂; *vide* Teixeira et al. 1987a:153); São Miguel dos Campos (MNRJ: 1♂, 1♀; *vide* Teixeira et al. 1987a:153).

Leptodon cayanensis = 126.

No specific locality (NHM: 3 unsexed; MNRJ: 2♀, 7 unsexed; ZMB: 2 unsexed).

BELIZE: Orange Walks (NHM: 1 unsexed); Cayo, Western District (NHM: 1♂).

BOLIVIA: Esperanza (NHM: 1♀). BRAZIL: no specific locality (ZMB: 1 unsexed; MNRJ: 1 unsexed; NHM: 1 unsexed); Roraima: Rio Jamari (MNRJ: 1 unsexed); Amazonas: Lago Camaçari (MZUSP: 1♂); Rio Juruá, Rio Eiru, Santa Cruz (MZUSP: 1♂, 1♀); Lago do Baptista (MZUSP: 1♂); PARÁ: “Pará” - no specific locality (NHM: 1 unsexed); Capim (MZUSP: 1♂); Rio Tapajós, Fordlândia (MZUSP: 2♂); Rio Tapajós, Urucurituba (MZUSP: 1♂); Santarém (MNRJ: 2♂); Taperinha (MZUSP: 1♀); Utinga (MZUSP: 1♂; MNRJ: 1♂); Jardim Zoológico, Belém (MNRJ: 1♂). MATO GROSSO: no specific locality (MNRJ: 1 unsexed); Cuiabá, Villa Santo Antônio, Fazenda Maraçuissa (MZUSP: 1♀); Chapada (NHM: 1♂); Serra da Chapada (NHM: 1♀); Coxipa Mirim, Cuiabá (MNRJ: 1♀). GOIÁS: Cana Brava, Nova Roma (MZUSP: 1♂); Rio Palma (MNRJ: 1 unsexed). BAHIA: no specific locality (ZMB: 1 unsexed); Ilhéus (MZUSP: 1♂, 1♀). MATO GROSSO DO SUL: Salobra (MZUSP: 1♀). MINAS GERAIS: Peti, Santa Bárbara (MZUSP: 1♂); Jaguará, Matosinhos, Rio das Velhas (MNRJ: 1 unsexed). ESPÍRITO SANTO: Pau Gigante (MZUSP: 1♀); Chaves, Santa Leopoldina (MZUSP: 1♀); Santa Cruz (MZUSP: 1♀), Santa Thereza (MNRJ: 1♂); SÃO PAULO: Boracéia (MZUSP: 1♂); Crystais Franca (MZUSP: 1♂); Icapara (MZUSP: 1 unsexed); Ituverava (MZUSP: 1♂); Ubatuba (MZUSP: 1♂, 1♀); São Paulo (MZUSP: 3 unsexed). RIO DE JANEIRO: Rio de Janeiro (MNRJ: 1♂, 2♀); Terezópolis (MNRJ: 1♂, 1♀).

PARANÁ: Jacarezinho (MZUSP: 1♂). SANTA CATARINA: no specific locality (MZUSP: 1♂). RIO GRANDE DO SUL: Pelotas (NHM: 1 unsexed). COLOMBIA: Santa Martha (NHM: 1♀); Caracolicito, Magdalena (ICN: 1♀); Campo Costa, Magdalena (ICN: 1♀); Chico, Río Jurado (ICN: 1♂); Guapi, Cauca (ICN: 1♀, 1 unsexed). COSTA RICA: no specific locality (NHM: 2 unsexed); Nicoya (NHM: 1 unsexed). ECUADOR: Sarayacu (NHM: 5 unsexed). GUATEMALA: Costa Cuca (ZMB: 1♂). GUIANA: no specific locality (ZMB: 1♂); Bonasaka River (NHM: 1 unsexed); Demerara (NHM: 1 unsexed); Mts. of the Moon (NHM: 1 unsexed); Roraima (NHM: 1♀); Upper Lakutu Mts. (NHM: 1 unsexed). HONDURAS: no specific locality (NHM: 1 unsexed). MEXICO: Tampico (NHM: 1♂). NICARAGUA: San Emilio, Lake Nicaragua (NHM: 1♂). PANAMA: no specific locality (NHM: 1♂); Chiriqui (NHM: 1♂, 1♀, 1 unsexed). PERU: Chamicuros (NHM: 1♂); Nauta (NHM: 1♂). TRINIDAD: no specific locality (NHM: 1 unsexed); VENEZUELA: Caracas (NHM: 1 unsexed); El Palmar, Bolívar (MEBRG: 1♂); El Valle, Mérida (COP: 1♂); Esteros do Camaguan, Guarico (MEBRG: 1 unsexed); Cuare, Falcón (MEBRG: 1♀); Isla Tapacana, Amazonas (COP: 1♂); Las Adjuntas, Bolívar (MEBRG: 1♀); Las Carmelitas, Amazonas (COP: 1♂); Las Quiguas, Carabobo (COP: 1♂); Porto Cabello (NHM: 1♂; ZMB: 1♀); Río Aricuiasá, Zulia (MEBRG: 1♂); Río Claro, Bolívar (COP: 1♀); San Esteban (NHM: 1♂); San Joaquín de Navay, Táchira (MEBRG: 1♀); Tivana, Falcón (MEBRG: 1♂).