



A new species of *Chironius* Fitzinger, 1826 from the state of Bahia, Northeastern Brazil (Serpentes: Colubridae)

DANIEL SILVA FERNANDES^{1,3,4} & BRENO HAMDAN^{1,2}

¹ Laboratório de Répteis, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Ilha do Governador, 21941-902 Rio de Janeiro - RJ, Brazil

² Coleção Científica Instituto Vital Brazil, Instituto Vital Brazil, Rua Maestro José Botelho, nº64, Vital Brazil, Niterói - RJ, Brazil

³ Departamento de Vertebrados, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, 20940-040 Rio de Janeiro - RJ, Brazil

⁴ Corresponding author. E-mail: danferufjr@gmail.com

Abstract

We describe a new species of *Chironius* Fitzinger, 1826 from the highlands of Chapada Diamantina, state of Bahia, Brazil. The new species is distinguished from all currently recognized congeners by a unique combination of states of characters on coloration, scale counts, scale ornamentation, and hemipenis. The new species closely resembles *Chironius flavolineatus* (Jan, 1863) in color pattern, but differs from the later taxon by the presence of two to four posterior temporal scales; cloacal shield entire; six to ten rows of keeled dorsal scales at midbody; ventral scales with posterior dark edges forming conspicuous transverse bars along almost the entire venter; conspicuous dark longitudinal stripes (in “zigzag”) in the midventral portion of subcaudals; region of medial constriction of hemipenis slightly covered with spinules separating calyces of apex from spines below region of constriction; and sulcus spermaticus situated on convex face of hemipenis in lateral view. The new species is apparently restricted to Chapada Diamantina, corroborating the biological importance of this region from a conservational perspective.

Key words: Plateau of Central Brazil, Chapada Diamantina, Morphology, *Chironius* taxonomy

Resumo

Descrevemos uma nova espécie de *Chironius* Fitzinger, 1826 das partes altas da Chapada Diamantina, estado da Bahia, Brasil. A nova espécie é distinta das demais congêneres atualmente reconhecidas por apresentar uma combinação única de estados de caracteres relativos à coloração, contagem e ornamentação das escamas e hemipênis. A nova espécie se assemelha a *Chironius flavolineatus* (Jan, 1863) em relação ao padrão de coloração, porém difere desta última por apresentar duas a quatro temporais posteriores; escudo cloacal inteiro; sexta a décima fileiras de escamas dorsais quilhadas no meio do corpo; ventrais com bordas posteriores escuras formando barras transversais conspícuas ao longo de quase toda a extensão do ventre; faixas longitudinais escuras conspícuas (em “zigue zague”) na porção mesoventral das subcaudais; região da constrição medial do hemipênis levemente recoberta por espínulas que separam os cálices da porção apical dos espinhos abaixo da região da constrição; e sulco espermático situado na face convexa do hemipênis em vista lateral. A nova espécie é aparentemente restrita à Chapada Diamantina, corroborando a importância biológica desta região em uma perspectiva conservacionista.

Palavras-chave: Platô do Brasil Central, Chapada Diamantina, Morfologia, Taxonomia de *Chironius*

Introduction

The genus *Chironius* Fitzinger, 1826 comprises a monophyletic assemblage of the family Colubridae, morphologically defined as the only neotropical snakes having 10 or 12 dorsal scale rows at midbody (Dixon *et al.* 1993; Hollis 2006; Kok 2010; Klaczko *et al.* 2010). As presently recognized the genus includes 20 species (Hollis 2006; Kok 2010; Klaczko *et al.* 2010; Hamdan *et al.* 2014; Wallach *et al.* 2014) of diurnal snakes widely distributed from Honduras (Central America) south to Uruguay and northeastern Argentina (Bailey 1955; Dixon *et al.* 1993; Klaczko *et al.* 2014).

Recently, Hamdan *et al.* (2014) redefined the taxonomic identity and authorship of *Chironius flavolineatus* (Jan, 1863) and designated a lectotype for this taxon. This species is widespread in open formations of South America (particularly in the Cerrado and Caatinga domains), with records from the Marajó island, northern Brazil (Dixon *et al.* 1993: 105). Among other diagnostic features, *C. flavolineatus* is promptly distinguishable from other congeners by the presence of a conspicuous yellow vertebral stripe bordered anteriorly by black (Boettger 1885; Boulenger 1894; Bailey 1955; Dixon *et al.* 1993). Despite the wide distribution and usually large samples of *C. flavolineatus* in several collections, studies approaching its geographic variation and testing its specific boundaries are still lacking.

During herpetological surveys in the region of Chapada Diamantina, state of Bahia, northeastern Brazil, one of us (B. Hamdan) collected two *Chironius* specimens with color pattern promptly associated to *C. flavolineatus*, but exhibiting slight differences from the later, especially regarding the coloration of flanks, ventral, and subcaudal scales. Such variation led us to look into additional specimens of *Chironius* from the same region deposited in herpetological collections in order to assess its possible congruence with other morphological characters allowing the recognition of an independent taxonomic entity. Our comparisons of these populations with samples of *C. flavolineatus* of several other localities confirmed that specimens from Chapada Diamantina represent a new species that we described herein.

Material and methods

Specimens and additional material examined are listed in Appendix. Museum acronyms follow Sabaj Pérez (2014), except Coleção Científica de Serpentes Instituto Vital Brazil (IVB), Niterói, Rio de Janeiro, Brazil; Museu de Zoologia da Universidade Estadual de Santa Cruz (MZUESC), Ilhéus, Bahia, Brazil; Coleção Herpetológica da Universidade Federal do Ceará (CHUFC), Fortaleza, Ceará, Brazil; Coleção Herpetológica da Universidade Federal do Rio Grande do Norte (CLAR), Natal, Rio Grande do Norte, Brazil; Coleção Herpetológica da Universidade Federal de Sergipe (UFS), Aracaju, Sergipe, Brazil.

We follow Peters (1964) for terminology of cephalic shields, Dowling (1951) for ventral counts, while biometric measurements are according to Dixon *et al.* (1993) and Hamdan *et al.* (2014). We follow techniques of Manzani & Abe (1988) as modified by Pesantes (1994) for hemipenis preparation and used an alcoholic solution of Alizarin Red as suggested by Nunes *et al.* (2012) in an adaptation of the procedures described by Uzzell (1973) in order to emphasize spines and other calcified structures of the hemipenes. We follow Zaher (1999) for hemipenis terminology. We measured snout-vent (SVL), and tail lengths (TL) with a flexible ruler to the nearest 1.0 mm by stretching carefully the specimens along the ruler. For the following remaining measures we used a dial caliper to the nearest 0.05 mm: head length, head width, horizontal and vertical diameter of eyes, length of prefrontal and parietal sutures, length of frontal-supraocular suture, and length and width (measured only on right side of head) of prenasals, postnasals, internasals, prefrontals, frontals, parietals, supraoculars, preoculars, postoculars, loreals, temporals, and chin shields. We obtained data on color pattern through direct observation of preserved and live specimens. Sex was determined through a ventral incision at the base of the tail. We compared data from the specimens examined with literature data from Bailey (1955), Dixon *et al.* (1993), Hollis (2006), Kok (2010), and Klaczko *et al.* (2010).

We here adopted the general lineage concept of species (De Queiroz 2007) considering species as unique evolving metapopulation lineages. The limits of a given species are hereby established when 95% or more of its examined members hold a unique combination of one or more fixed states of characters (Wiens & Servedio 2000). These states of characters, occasionally in a polymorphic frequency of 5% or less, are used for diagnosing species. Therefore, if a population shows a unique combination of state(s) of character(s) distributed in 95% or more of its representatives we consider this population a valid species.

Chironius diamantina, sp. nov.

Figs. 1–6

Chironius flavolineatus (Jan, 1863)—Freitas & Silva (2007: 182, fig. MAF, Lençóis, BA)

Chironius flavolineatus (Jan, 1863)—Hamdan & Lira-da-Silva (2012: 43, fig. 2k)

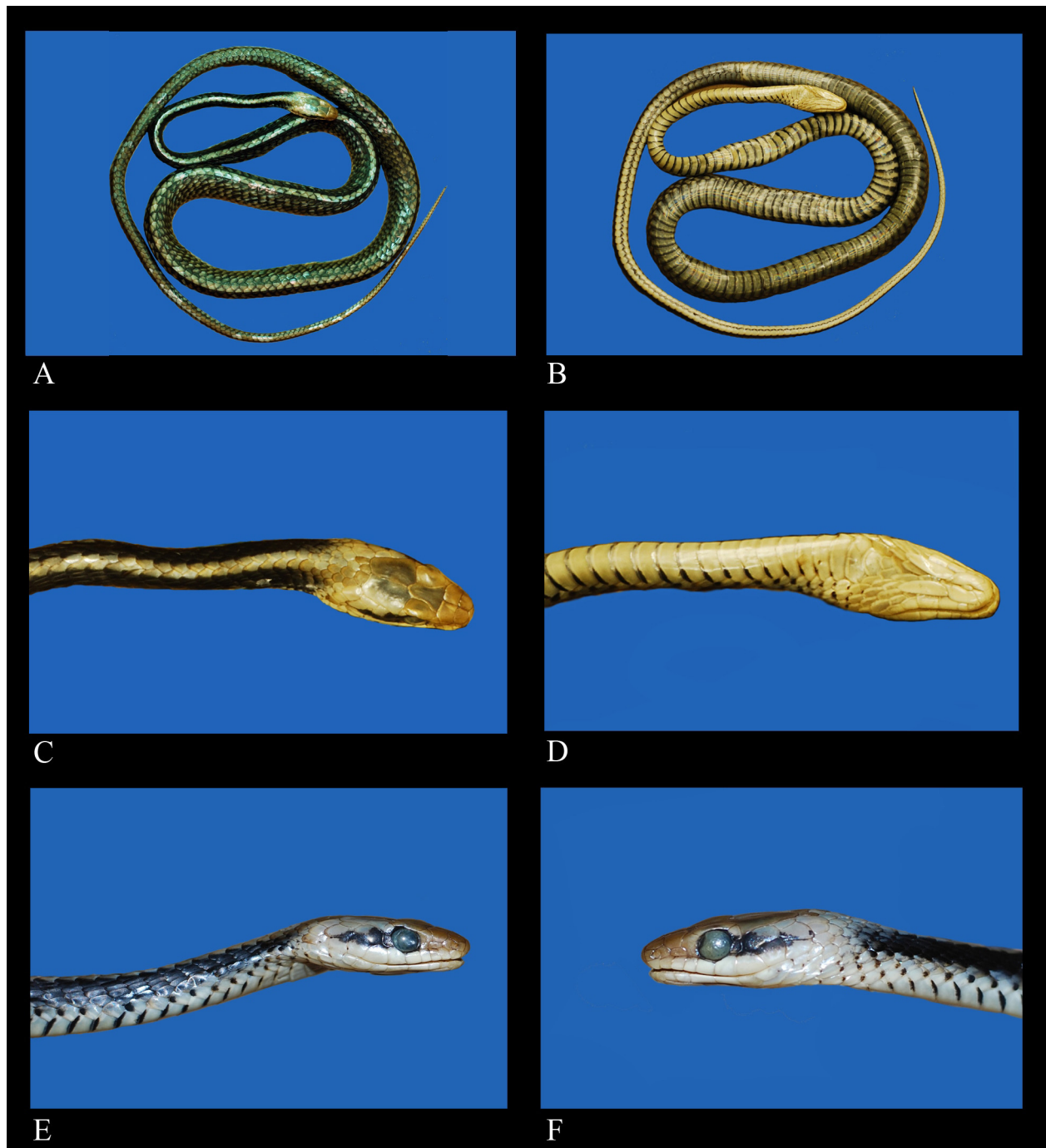


FIGURE 1. Dorsal (A–C) and ventral (B–D) views of the body, and right (E) and left (F) lateral views of the head of the holotype of *Chironius diamantina* (M—ZUFBA 1657, SVL 645 mm, TL 373 mm) from Morro do Chapéu, state of Bahia, Brazil.

Holotype. Adult female, MZUFBA 1657, collected in November 2005, no collector data, from the municipality of Morro do Chapéu (11° 33' 9"S, 41° 9' 27"W, about 1000 m above sea level; asl hereafter), oriental zone of Chapada Diamantina, state of Bahia, Brazil.

Paratypes. All specimens from the state of Bahia, Brazil. Adult female, MZUFBA 2394, tail damaged, collected on March 13, 2013 by B. Hamdan, in the municipality of Palmeiras, village of Vale do Capão (12° 30' 50"S, 41° 34' 39"W, 1310 m asl), in an area of Campos Rupestres along the bank of the river of Cachoeira da

Fumaça waterfall; adult male, AAGARDA 7191, collected on January 2013 by W. Pessoa, in the municipality of Palmeiras, village of Vale do Capão, in a tropical grassland environment near Cachoeira Águas Claras waterfall; adult male, UEFS 1519, no collector data, from the municipality of Palmeiras (12° 36' 34"S, 41° 30' 24"W, 1000 m asl); adult male, MZUSP 7804, tail damaged, and adult female, MZUSP 7805, both collected in 1980 by M. T. Rodrigues, in the municipality of Morro do Chapéu. All other specimens collected in the municipality of Rio de Contas (13° 26' 30"S, 41° 50' 28"W, about 1000 m asl), collection data from A.J.S. Argôlo. Adult male, MZUESC 2633, collected between 22 November 2001 and 26 June 2002, at Bittencourt farm; adult female, MZUESC 2102, tail damaged, collected between 26 May 2001 and 21 November 2001, at Brejo farm; adult male MZUESC 2642, tail damaged, adult female MZUESC 2643, adult female MZUESC 2644, tail damaged, and adult female MZUESC 2645, all four specimens collected between 22 November 2001 and 26 June 2002 at Brejo farm.

Diagnosis. *Chironius diamantina* can be distinguished from all congeners by the following combination of states of characters in preserved specimens: first third of body black or dark gray; vertebral stripe yellowish or creamish white, distinct from dorsals of nape and extending throughout almost the whole body length; head dorsum tan to brown, distinct from background color of first third of body; posterior temporal scales two to four; cloacal shield entire; six to ten rows of keeled dorsal scales at midbody; ventral scales with dark edges forming conspicuous transverse bars virtually throughout whole belly length; ventral surface of tail with conspicuous longitudinal dark stripes (in “zigzag”) in midventral portion of subcaudals; region of medial constriction of hemipenis slightly covered with spinules separating calyces of apex from spines below region of constriction; in lateral view, sulcus spermaticus positioned on convex face of hemipenis.

Comparisons. *Chironius diamantina* is distinguished from all currently recognized congeners, except *C. flavolineatus*, by having the combination of first third of body black or dark gray, vertebral stripe yellowish or creamish white extending from nape throughout almost the whole body length, and head dorsum tan to brown distinct from background color of first third of body. Additionally, *C. diamantina* differs from *C. flavolineatus* (character states in parentheses) by having posterior temporals two to four (vs. single posterior temporal); cloacal shield entire (vs. divided); six to ten (vs. maximum of four rows of keeled dorsal scales at midbody); ventral scales with dark edges forming conspicuous transverse bars virtually throughout whole belly length; conspicuous dark longitudinal stripes (in “zigzag”) in the midventral portion of subcaudals (vs. ventrals and subcaudals uniformly creamish white); region of medial constriction of hemipenis slightly covered with spinules separating calyces of apex from spines below region of constriction (vs. region of medial constriction indistinct); in lateral view, sulcus spermaticus positioned on convex face of hemipenis (vs. sulcus spermaticus positioned on concave face of hemipenis in lateral view). Refers to Table 1 for additional qualitative characters to distinguish *C. diamantina* and *C. flavolineatus*.

Description of the holotype (Fig. 1). Adult female; head distinct from neck; body slightly thinner in anterior portion; total length 1018 mm; SVL 645 mm; TL 373 mm; head length 231 mm; head width 126 mm; snout length 86 mm; snout width 78 mm; body width at midbody 110 mm; body height at midbody 128 mm. Length/width of rostral (4.5/2.1 mm); prenasals (1.7/1.8 mm); postnasals (1.6/1.7 mm); internasals (2.7/2.4 mm); loreals (2.2/1.3 mm); prefrontals (3.0/3.0 mm); prefrontal suture 2.5 mm; preoculars (1.7/3.0 mm); supraoculars (5.5/2.8 mm); frontal (6.5/4.9 mm); frontal-supraocular suture 4.1 mm; parietals (8.3/4.2 mm); parietal suture 6 mm; anterior temporals (4.4/2.5 mm); posterior upper temporal (3.2/1.5 mm); posterior lower temporal (4.5/2.2 mm); first pair of chin shields (6/2.1 mm); second pair of chin shields (8.3/2.1 mm); horizontal eyes diameter (4.1/4.5 mm); vertical eyes diameter (3.5/3.4 mm). Loreal longer than high, separated from orbit by preocular; loreal contacting postnasal anteriorly, preocular posteriorly, prefrontal dorsally, and second and third supralabials ventrally; preocular single, separated from frontal by suture between supraocular and prefrontal; pupil rounded; postoculars two; anterior temporal 1/1; posterior temporals 2/2; five occipital scales contacting parietals; supralabials 9/9, fourth, fifth, and sixth contacting orbit; infralabials 10/10, first to fifth contacting first pair of chin shields; fifth and sixth contacting second pair of chin shields; gulars three. Maxillary teeth 33. Dorsal scales rows formula 12/12/10; low density of apical pits on scales of neck; two rows of keeled dorsal scales at anterior portion of body; ten rows of keeled dorsal scales at midbody; six rows of keeled dorsal scales at posterior portion of body; keels very strong, mostly at midbody. Ventrals 161; subcaudals 137; cloacal shield entire (4.1/8.4 mm).

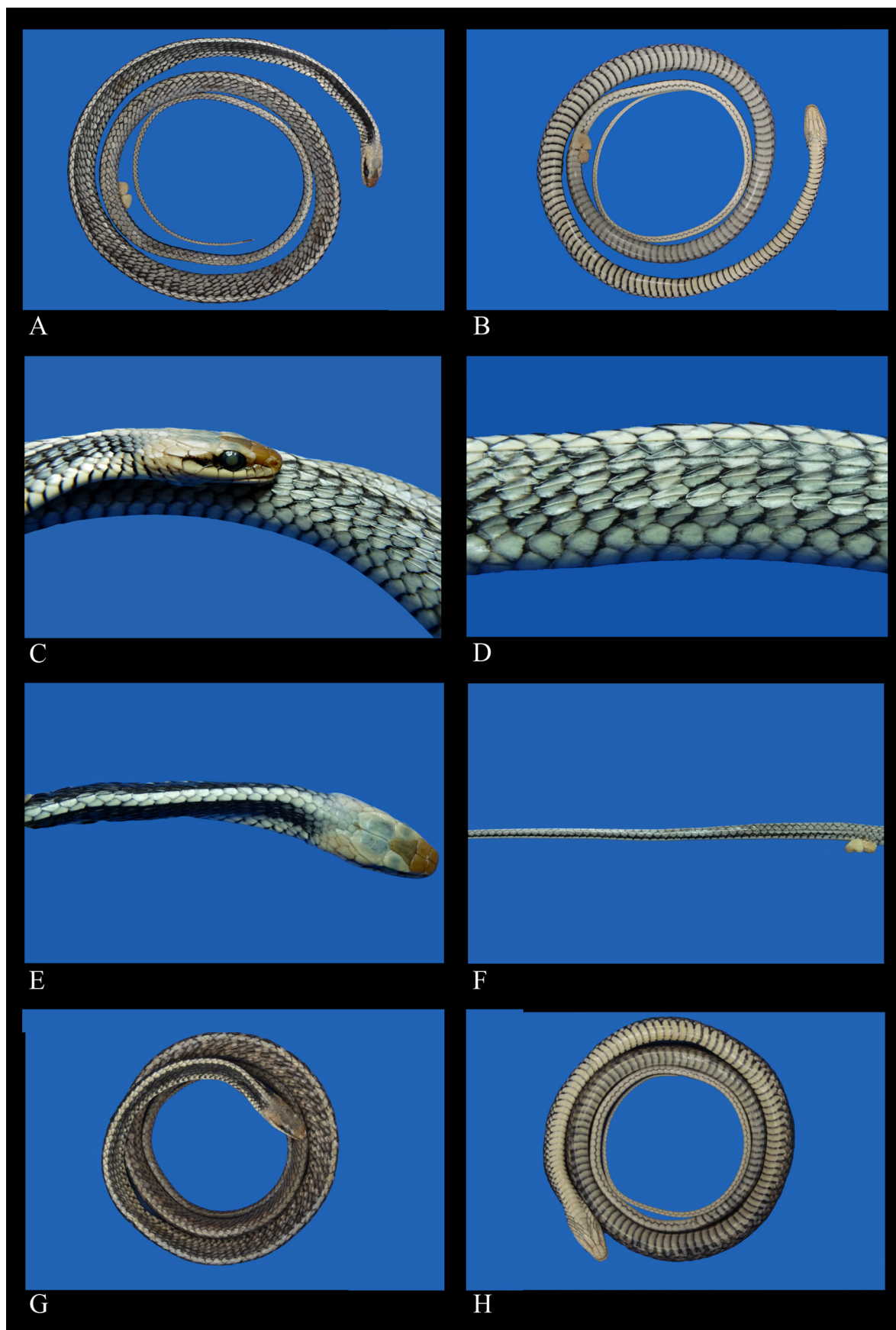


FIGURE 2. Color pattern variation in preservative (alcohol 70%) of adult male (A–F, paratype MZUSP 7804, SVL 640 mm, TL 371 mm), and adult female (G–H, paratype MZUSP 7805, SVL 504 mm, TL 306 mm) of *Chironius diamantina*.

Color of the holotype in preservative (alcohol 70%) (Fig. 1). Head dorsum uniformly brown; orbit slightly encircled by black; supralabials, infralabials, and ventral surface of head creamish white; dark postocular stripe reaching postoculars, temporals, and last supralabials (Fig. 1E–F). First third of body dark gray gradually fading anteroposteriorly; first portion of vertebral stripe creamish white, gradually darkening anteroposteriorly, well distinct until posterior third of body; anterior portion of vertebral stripe 1.5 scale wide (Fig. 1C). Row of paraventral scales in first third of body stained by black or dark brown (Fig. 1E–F). Venter ground color creamish yellow to grayish, conspicuously marked by transversal dark bars corresponding to posterior margins of ventrals; transversal dark bars incomplete on anterior portion of belly (Fig. 1D). Cloacal shield creamish white with gray spots; anterior portion of ventral surface of tail grayish, gradually getting lighter towards terminal caudal spine; conspicuous dark longitudinal stripes (in “zigzag”) along midventral portion of subcaudals (Fig. 1B).



FIGURE 3. General views of adults (A–G) and juvenile (H) of *Chironius diamantina* in life (A and F adult female paratype MZUFBA 2394, SVL 895 mm, tail damaged). Photos by M. Freitas (B, H), R. Santos (C, D, G), and T. Lordelo (E).



FIGURE 4. Asulcate (left), sulcate (center), and lateral (right) views of the hemipenis of *Chironius diamantina* (paratype MZUSP 7804). Photos by M.G. Pires.

Color pattern variation (Figs. 1–2). In alcohol 70%, color pattern of head dorsum possibly reaching lateral regions of head. Dorsal ground color of body dark gray, usually homogeneous; dorsum color pattern may attain lateral edges of ventrals, more conspicuous on tail region. Vertebral stripe 1–2 dorsal scales wide. Row of paraventral scales in first third of body creamish white. Conspicuous lateral stripe on tail region (Fig. 2F). Venter ground color generally gray, usually lighter on first third; ventral surface of tail creamish white (Fig. 2B, H).

Color in life (Fig. 3). Head dorsum and snout brownish distinct from anterior portion of body; supralabials creamish white or yellowish; postocular stripe black or grayish; postocular stripe reaching postoculars, temporals, and occasionally last supralabials; infralabials and ventral surface of head creamish white. Dorsolateral ground color of body black, brown or grayish; first third of body darker than rest of dorsum; paraventral region brownish, lighter than rest of dorsum; dorsal scales generally black edged. Vertebral stripe golden extending from dorsal scales of nape to last third of dorsum of body where it gradually merges into body coloration. Venter ground color creamish white or light gray, conspicuously marked by transversal black or dark gray bars, especially after first third of belly; transversal bars correspond to posterior margins of ventrals (Fig. 3F). Ventral surface of tail light gray with conspicuous black longitudinal stripes (in “zigzag”) along midventral portion of subcaudals. A single juvenile, not collected, showed dorsolateral ground color of body light brown with conspicuous light gray cross bands along the dorsum, which are not observed in adult specimens, and vertebral stripe extending from dorsal scales of nape to approximately midbody (Fig. 3H).

Morphometric and meristic variation. Largest male (MZUESC 2633) 720 mm SVL, 391 mm TL, largest female (MZUFBA 2394) 895 mm SVL, tail damaged. Total length in males 885–1111 mm (n=3), females 701–1018 mm (n=4); snout length in males 6.4–8.7 mm (n=4), females 6.1–11.8 mm (n=6); snout width 6.3–7 mm in males (n=4), females 4.3–10 mm (n=6); head length in males 22.2–26.3 mm (n=4), females 19.3–33.2 mm (n=7); head width in males 9.3–11.2 mm (n=4), 7.6–13.6 mm (n=7) in females; body width in midbody in males 8.8–12.7 mm (n=4), females 6.4–13.8 mm (n=7); body height in midbody in males 7.2–12.2 mm (n=4), 6.1–12.8 mm (n=7) in females. Variation of meristic and other morphometric data for *C. diamantina* are summarized in

Table 1. Rows of keeled dorsal scales along body show variation (see Table 1) but keels are generally more conspicuous in males than in females.

TABLE 1. Variation of meristic data for all examined specimens of *C. diamantina* and conditions of meristic and qualitative diagnostic characters (in bold) for both *C. diamantina* and *C. flavolineatus*. SO=supralabials contacting orbit; TEp=posterior temporals; KDA, KDM, and KDP=rows of keeled dorsal scales at anterior, midbody, and posterior portion of body, respectively; TB=ventrals with posterior dark edges forming transverse bars; LS=dark longitudinal stripes in midventral portion of subcaudals; CH= region of medial constriction of hemipenis; SS=position of sulcus spermaticus in lateral view of hemipenis; mean $\pm$ standard deviation; r=range; n=sample size.

	<i>C. diamantina</i>		<i>C. flavolineatus</i>
	Males (n=4)	Females (n=7)	
SVL	545–720 mm	450–895 mm	
TL	340–391 mm (n=3)	251–373 mm (n=4)	
Ventrals (VE)	159.3 $\pm$ 4.0; r=154–163	159.7 $\pm$ 3.0; r=156–165	
Subcaudals (SC)	135.5 $\pm$ 3.5; r=133–138 (n=3)	135.3 $\pm$ 2.4; r=132–137 (n=4)	
VE+SC	295 $\pm$ 8.5; r=289–301 (n=3)	294.8 $\pm$ 3.8; r=291–298 (n=4)	
SO	4°–6° (n=8) or 4°–5° (n=3)		
Infralabials	10 (n=10) or 9 (n=1)		
TEp	2 (n=8) or 4 (n=3)		1
Maxillary teeth	35.0 $\pm$ 1.6; r=33–37 (n=5)		
Cloacal shield	entire (n=11)		divided
KDA	0 (n=7); 2 (n=3) or 8 (=1)		
KDM	10 (n=10) or 6 (=1)		maximum 4
KDP	8 (n=5); 10 (n=3); 6 (n=2) or 4 (n=1)		
TB	present (n=11)		absent
LS	present (n=11)		absent
CH	distinct (n=3)		indistinct
SS	convex face (n=3)		concave face

Hemipenis (n=3, Fig. 4). Organ unilobed, cylindrical, and unicalyculate. Hemipenis with large spinulate and well developed calyces on most apical portion. Medial portion of hemipenis with pronounced constriction region scattered with spinules, separating apical calyces from spines on hemipenial body. Medium to large curved spines covering lateral and assulcate sides and spinules covering sulcate side of organ. Sulcus spermaticus simple, centrolineal, and bordered by spinules along its extension. Sulcus spermaticus positioned more laterally at basal portion of hemipenis, gathering more centralized position from the end of proximal third of hemipenis. In lateral view, sulcus spermaticus situated on convex face of the organ. Basal portion of hemipenis with few spinules irregularly distributed.

Etymology. The specific name, a noun in apposition, refers to the Chapada Diamantina, central region of the state of Bahia from where the new species was described.

Geographic distribution and natural history. The new species is known from municipalities of Morro do Chapéu, Rio de Contas, and Palmeiras in the Chapada Diamantina, state of Bahia, Brazil (Fig. 5). All available specimens were collected in areas up to 1000 m asl.

An individual was observed foraging around 3:00 PM on the banks of a rocky river in an area of Campos Rupestres near Cachoeira da Fumaça waterfall (1148 m asl), village of Vale do Capão, Municipality of Palmeiras, Bahia (Fig. 6). A few minutes later plunged into the river and remained there for about two minutes. When disturbed the specimen tried to escape, but when facing the observer opened its mouth, adopted the “S” posture, and attempted to bite. The specimen also showed the behavior of turning sideways along its axis when head was restrained.

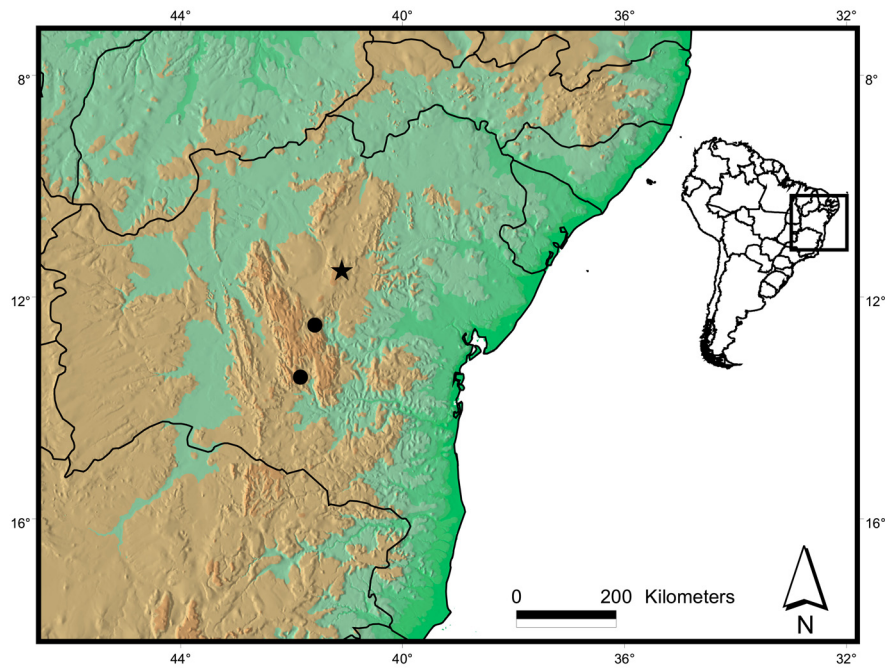


FIGURE 5. Geographic distribution of *Chironius diamantina*. Star represents the type-locality.

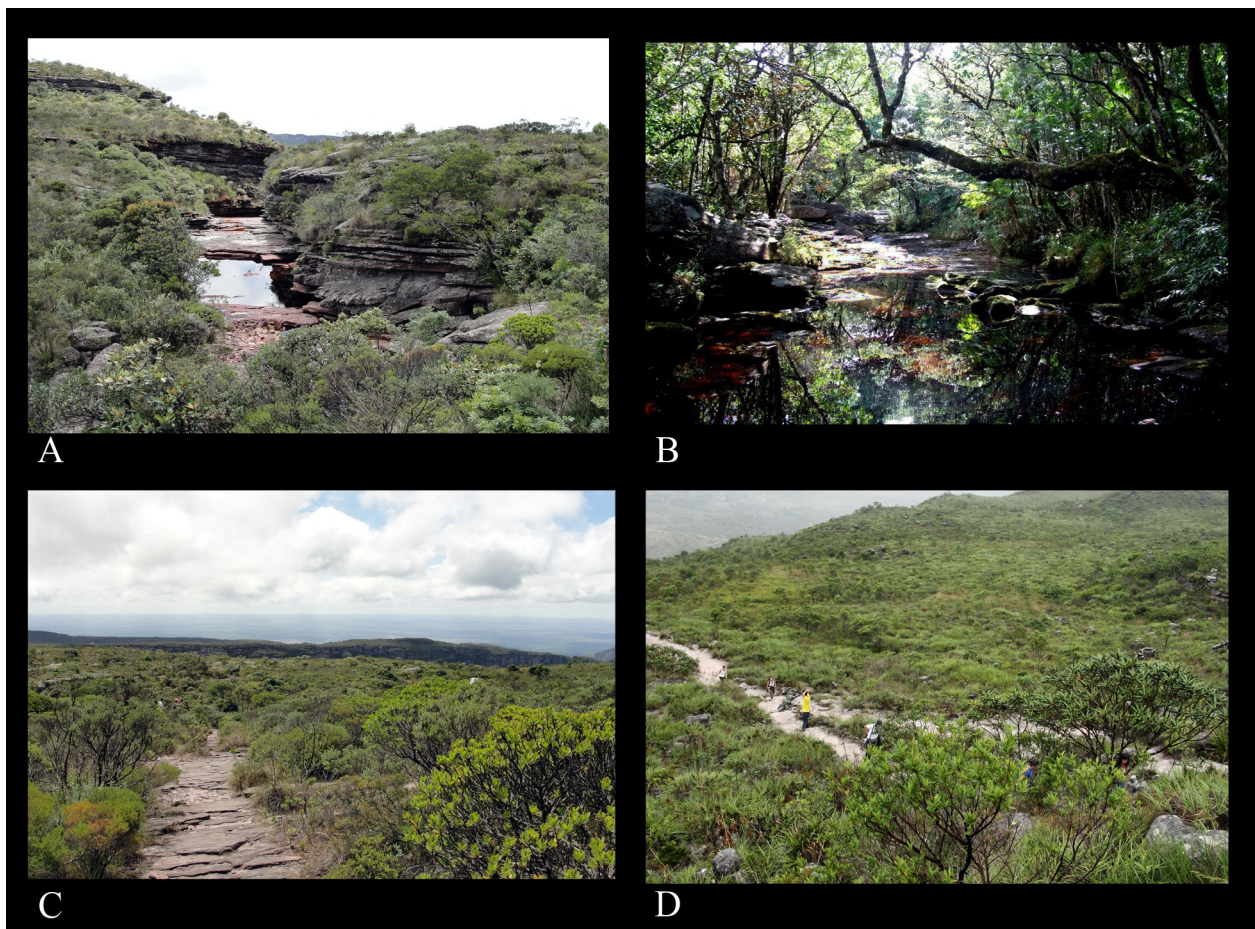


FIGURE 6. Formations of riparian forests (A–B) and Campos Rupestres (C–D) in the Chapada Diamantina, northern portion of Serra do Espinhaço, where paratype of *C. diamantina* (MZUFBA 2394) was collected, municipality of Palmeiras, state of Bahia, Brazil. Photos R. Turba (C–D).

Discussion

Chironius diamantina is apparently restricted to the Chapada Diamantina, state of Bahia, Brazil. This region represents the northern portion of Serra do Espinhaço and is considered a hotspot due to the high biological diversity (Silva *et al.* 2003). Furthermore, besides unique geomorphologic formation, Chapada Diamantina is inserted in the morphoclimatic domain of semiarid Caatinga, although different types of vegetation—Campos Rupestres, Cerrado, deciduous, semideciduous, and ombrophilous forests—are present (Giulietti *et al.* 1997). This geomorphologic formation harbors some typical taxa of high elevations and has a high degree of endemism in both fauna (e.g. Heyer 1999; Napoli & Juncá 2006; Rodrigues *et al.* 2006; Rodrigues *et al.* 2009; Napoli *et al.* 2011; Pombal Jr. *et al.* 2012; Teixeira Jr. *et al.* 2012) and flora (e.g. Ribeiro *et al.* 2008; Rapini *et al.* 2012). The occurrence of this new species in Chapada Diamantina reinforces the biological importance of this region from a conservational perspective.

Specimens of *C. diamantina* were identified as *C. flavolineatus* in biological collections revealing that the specific limits of the later taxon have been overestimated, hindering the knowledge of the new species. The recognition and delimitation of species representing unique evolving metapopulation lineages is fundamental in light of the current biodiversity crisis and taxonomic impediment (Wilson 1985; De Queiroz 2007; Carvalho *et al.* 2007; Dubois 2008). However, the recognition of such lineages with available information (e.g. ecological, historical, molecular, morphological, etc.) remains a challenge (Wiens & Servedio 2000; Sites & Marshall 2004). This issue is particularly important considering taxa described based on few specimens and/or with diagnostic characters apparently very conspicuous. Frequently these taxa may actually represent species complexes, weakening the diagnosis of species already described and hindering the recognition of cryptic species (Bickford *et al.* 2006; Franco *et al.* 2007; Henderson *et al.* 2009).

Chironius flavolineatus meets these requirements and the description of *C. diamantina* reinforces the need for detailed taxonomic revisions including different sources of characters in order to improve the recognition of distinct evolutionary lineages, especially those involving taxa distributed in poorly sampled regions, such as Chapada Diamantina. Finally, Wheeler & Platnick (2000) argue that hypotheses in several areas (e.g. ecology, physiology, and comparative morphology) should not be proposed if delimitation of species, as the fundamental unity of the study, is not clearly defined. Therefore, efforts must be directed to the production of accurate and fast descriptions of biodiversity, enabling improvement of results in different fields of scientific researches.

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Appendix

Specimens examined

***Chironius flavolineatus*. BRAZIL:** ALAGOAS: Camaragibe: MNRJ 3981, Matriz de Camaragibe UFPB 4669, Quebrangulo MZUSP 3169; AMAPÁ: Ferreira Gomes CHUNB 219; AMAZONAS: Humaitá, CHUNB 217, 218, MRNJ 19786; BAHIA: Barreiras, MZUFBA 2131 (hemipenis), MNRJ 3064, 3065, Cachoeira, MZUFBA 1647 (hemipenis), Camaçari, MZUFBA 1199, Candeias, MZUFBA 592, Catú, MZUFBA 610, Cruz das Almas, UEFS 1525, Dias Dávila, UEFS 1469, MZUESC 1759, Itanagra, MZUFBA 401, Salvador, MZUFBA 1668, 1784, 1819, 2278, Santa Rita de Cássia, MZUSP 3602, São Desidério, MZUFBA 2309 (hemipenis), MZUESC 7078, 7079, Saubara, UEFS 686, no specific locality, MZUFBA 2280 (hemipenis), Simões Filho, MZUFBA 1603; CEARÁ: Barbalha, CHUFC 2127, Ubajara, MZUSP 10504; DISTRITO FEDERAL: Brasília, CHUNB 24908; GOIÁS: Alto Paraíso de Goiás, IVB 3291, Aporé, CHUNB 48242, 48241, Buritinópolis, MZUSP 17770, Formosa, CHUNB 19698, Goiânia, CHUNB 56373, Minaçu, CHUNB 29774, 6669, 29778, 29783, 29777, 29769, 49133, 50423, MZUSP 11097, 11098, Uruaçu MNRJ 7495; MARANHÃO: Balsas, CHUNB 52146, Carolina, MZUFBA BH38; MATO GROSSO: Acorizal, MZUSP 7307, Araputanga, UFMT 5918, Barra do Tapirapé, MNRJ 588, 589, Brasnorte, UFMT 8031, Cáceres, UFMT 1529, Chapada dos Guimarães, UFMT 542, 547, CHUNB 55217, MZUSP 5348, 11843, CHUNB 15378, 15380, 15417, 15418, Confresa, MZUSP 3812, Cuiabá, UFMT 8559,

Guarantã do Norte, UFMT 5715, Guiratinga, MZUSP 20707, Jauru, UFMT 2817, Jupiá, MZUSP 4425, Nossa Senhora do Livramento, UFMT 1527 (hemipenis), Nova Xavantina, CHUNB 63633, MZUSP 3170, Porto Estrela, UFMT 8330, Primavera, UFMT 7608, São José do Rio Claro, MZUSP 11333, Utiariti, MZUSP 4751, Xavantina, MNRJ 6697, 9274, 9276; *MATO GROSSO DO SUL*: Aquidauana, MNRJ 1511, MZUSP 10158, Campo Grande, MZUSP 10157, Corumbá, UFMT 1463, Porto, MZUSP 11651; *MINAS GERAIS*: Arinos, MZUSP 3849, Buritizeiro, CHUNB 44474, Conquista, FUNED 392, Indianópolis, MCNR 607, FUNED 1695, Jaíba, MZUFV 946, Januária, MZUFV 1090, João Pinheiro, MNRJ 12900, 12901, 14853, 14854, 14855, 14901, 15251, 15252, 15299, 15312, 15355, 15396, 17155, 17156, 17157, 17158, 17159, 17183, 17211, 17251, 17271, 17770, 17771, 17821, 17822, 19985, 19997, 20222, Joaquim Felício, MZUFV 1121, Nova Lima, MCNR 1474, Pompeu, MCNR 3818, Uberaba, MCNR 4141, Uberlândia, MCNR 608, UHE Queimado Unai, MNRJ 10929; *PARÁ*: Cachimbo, CHUNB 12798, Itaituba, MZUSP 3111, Novo Progresso, CHUNB 40091; *PARAÍBA*: Alhandra, UFPB 9374, Cruz do Espírito Santo, MZUSP 20271, Gurinhém, UFPB 4667, MZUSP 9656, João Pessoa, UFPB 4665, UFPB 4666, UFPB 8839, Mamanguape, MZUSP 3171, CHUNB 29018; *PERNAMBUCO*: Recife, MZUSP 8010, Serra Talhada, UFPB 4668, MZUSP 9011; *RIO GRANDE DO NORTE*: Ceará-Mirim, UFRN AAGARDA1894, Macaíba, UFRN AAGARDA 3511, Nisia Floresta, UFRN AAGARDA6236; *SÃO PAULO*: Emas, MZUSP 1894, Igarapava, FUNED 389, 417, 428, 429, 1305, MCNR 791, 792, 793, Jales, MZUSP 3987, Pirassununga, MZUSP 3989, Tambaú, CHUNB 24568, 24572; *SERGIPE*: Areia branca, UFS 419 (hemipenis), MZUSP 5444, Barra dos Coqueiros, MZUSP 17451, Itabaiana, UFS 2612, Itaporanga da Ajuda, UFS 519, Lagarto, CHUFC 892, Pirambu, UFS 14, 19, Santo Amaro das Brotas, MZUSP 6991, São Cristovão, UFS 337 (hemipenis), 1329, 1330; *TOCANTINS*: Aliança do Tocantins, UFPB 4860, 4861, Dianópolis, CHUNB 33433, Guaraí, MZUSP 12697, Jalapão, CHUNB 24376, Lajeado, MZUSP 14171, 14172, Mateiros, CHUNB 41307, Palmas, CHUNB, 16175, 21959, Peixe, MZUSP 15513, CHUNB 3759, 52634, São Salvador do Tocantins, MZUSP 12125, 17681. **BOLÍVIA**: *SANTA CRUZ DE LA SIERRA*: Andres Ibañez: Barrio Los Olivo, MNKP BOLÍVIA 201, Ñuflo de Chávez: Perseverancia, MNKP BOLÍVIA 405; Chiquitos/Santiago de Chiquitos, MNKP BOLÍVIA 2254; Andres Ilbñez/Santa Cruz de la Sierra, MNKP BOLÍVIA 5056; **PARAGUAY**: *AMAMBAY*: Cerro Corá National Park, MNHNP PARAGUAY 5201; **NO SPECIFIC LOCALITY**: MSNM Re2729 (lectotype), MZUFBA 785, 1261, 1313, 1544.

Chironius diamantina. **BRAZIL**: *BAHIA*: UFRN AAGARDA7101, 7106, 7107.