

## Rediscovery of the Rare *Atractus bocki*, with Assessment of the Taxonomic Status of *Atractus canedii* (Serpentes: Colubridae: Dipsadinae)

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**ABSTRACT.**—*Atractus bocki* was described based on a single specimen from the Cochabamba region in Bolivia, and since its original description, there have been no further records for the species. During the examination of Argentinean and Bolivian collections, we found four additional specimens of this poorly known snake. In this paper, we describe these individuals and report new data on meristic and morphometric variation for *A. bocki*. We also evaluate the taxonomic status of *Atractus canedii* and propose its synonymy with *A. bocki*.

**RESUMEN.**—*Atractus bocki* fue descrita en base a un espécimen proveniente de la región de Cochabamba en Bolivia y desde su descripción original no hubieron registros adicionales para la especie. Durante la revisión de las colecciones de Argentina y Bolivia fueron encontrados cuatro ejemplares adicionales de esta serpiente muy poco conocida. En este trabajo describimos estos especímenes y reportamos datos nuevos de variación merística y morfométrica para *A. bocki*. La posición taxonómica de *Atractus canedii* también fue evaluada y proponemos su sinonimización con *A. bocki*.

The cryptozoic snake genus *Atractus* Wagler is distributed widely in the Neotropical region, occurring from Panama to Argentina (Giraud and Scrocchi, 2000; Myers, 2003). *Atractus* is the most diverse Alethinophidian genus having about 130 currently recognized species, most of them with restricted distribution or known only from the type series (Passos, 2008; Passos and Fernandes, 2008; Prudente and Passos, 2008). Despite recent work focusing on this genus (Passos et al., 2007a,b; Myers and Donnelly, 2008; Passos and Arredondo, 2009), a comprehensive revision is still lacking, and efforts must be made to address problems of morphological variation, geographic ranges, and species boundaries among the many recognized *Atractus* species (Passos et al., in press).

Werner (1909) described *Atractus bocki* based on a specimen from the Cochabamba region in Bolivia. Amaral (1930a) examined the holotype of *A. bocki* and suggested the possibility to consider it as subspecies of *Atractus modestus*. Subsequently, Amaral (1930b) synonymized *A. bocki* with *A. modestus*, without any comment on his decision. Peters and Orejas-Miranda (1970) resurrected *A. bocki* because there was no evidence for Amaral's act and pointed out the restricted and remote distributions of both taxa (Cochabamba, Bolivia—*A. bocki* vs. western Ecuador—*A. modestus*). Passos et al. (2007a) redescribed the holotype of *A. modestus* and reported new specimens and records for the species. Passos et al. (2007a) established that there was no reason to accept Amaral's synonymy (1930b), because *A. modestus* and *A. bocki* differ much in the number of supralabials and general color pattern.

Scrocchi and Cei (1991) described *Atractus canedii* on the basis of two specimens from Salta and Jujuy Provinces in northwestern Argentina, distinguishing

it from other *Atractus* species mainly by its distinct color pattern. Scrocchi and Cei (1991) suggested *A. canedii* exhibited certain affinities with the *Atractus elaps* species group (sensu Savage, 1960), sharing with them a banded color pattern and dark pigmented venter. Despite the appearance that *A. elaps* has a banded color pattern, it differs from *A. canedii* in many ways: having a unique cephalic plate arrangement, maxillary teeth and caudal spine shape compared to the former species (see Savage, 1960). Scrocchi and Cei (1991) also differentiated *A. canedii* from congeners distributed in adjacent areas of the Amazon and Chaco of Bolivia and Paraguay (*Atractus balzani*, *Atractus boettgeri*, *Atractus emmeli*, *Atractus taeniatus*, and *Atractus torquatus*), on the basis of its distinct color pattern. However, they did not compare *A. canedii* with the poorly known *A. bocki* described from the Cochabamba region. All remaining "Chaco" species cited by Scrocchi and Cei (1991) occur in fact, in Amazon (*A. torquatus*), Amazon/Andean enclaves (*A. emmeli*, *A. boettgeri*, and *A. taeniatus*), or Yungas (*Atractus balzani*; Passos, 2008). Finally, Giraud and Scrocchi (2002) extended the geographic range of *A. canedii* to Argentinian provinces of Chaqueña and Yungas.

While examining Argentinean and Bolivian collections, we found four specimens of a rare *Atractus* species that we report herein. Werner (1909) described *A. bocki* on the basis of a single specimen from Cochabamba in Bolivia, and since its original description in the past 100 years, there are no further records for the species. Herein, we describe new individuals of *A. bocki* and provide data on meristic and morphometric variation for the species. In addition, we appraise the taxonomic status of the poorly known *A. canedii*.

### MATERIALS AND METHODS

Specimens examined are housed in the following collections: Fundación Miguel Lillo (FML), San Miguel

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TABLE 1. Meristic and morphometric variation of the known specimens of *Atractus bocki*. Missing data for FML specimens and “?” for MACN specimen are a result of their poor preservation condition.

Data	ZMH 4194 holotype of <i>A. bocki</i>	FML 1082 holotype of <i>A. canedii</i>	MRSN R 106 paratype of <i>A. canedii</i>	CBG 405	FML 17641	FML 17640	MACN 34796
Sex	Male	Male	Female	Female	Male	Female	Female?
Ventral scales	164	167	164	169	161	167	176
Subcaudal scales	50	50	39	48	45	41	57
Supralabial scales	6	6	6	7	7	6	6
Infralabial scales	7	7	7	7	—	7	7
Postocular scales	2	2	1	2	1	2	2
Temporal formulae	1 + 2	1 + 1/1 + 2	1 + 2	1 + 2	1 + 2	1 + 2	1 + 1
Snout-vent length	299 mm	262 mm	341 mm	370 mm	—	—	352 mm
Caudal length	66 mm	55 mm	57 mm	77 mm	—	—	57 mm
SVL : CL ratio	22.1	21	16.7	20.8	—	—	16.2

de Tucumán, Argentina; Museo Argentino de Ciencias Naturales Bernardino Rivadavia (MACN), Buenos Aires, Argentina; Colección de Vertebrados del Centro de Biodiversidad y Genética (CBG), Cochabamba, Bolivia; and Museo Regionale di Scienze Naturali (MRSN-R), Torino, Italy. Terminology for cephalic shields follows Savage (1960), whereas the method to count ventral scales follows Dowling (1951). Regarding the condition of the loreal scale, we consider three states according to Passos et al (2007b). Measurements were taken with a dial caliper to the nearest 0.1 mm, except for snout-vent length (SVL) and caudal length (CL), which were measured to the nearest 1 mm with a flexible ruler. Sex was determined by the presence or absence of hemipenes through a ventral incision at the base of the tail.

#### SYSTEMATICS

Unfortunately, the holotype of *A. bocki* was lost in the Second World War (J. Hallermann, pers. comm.). Although a neotype designation for *A. bocki* could be desirable, the original description and plates allow an accurate identification of the species. Therefore, in accordance with qualifying conditions of ICZN (1999), it is not necessary to designate a neotype. The examination of the holotype of *A. canedii* contrasted with the original description and illustration of *A. bocki*, showing both species to be indistinguishable in cephalic plates, meristic, morphometric, and color pattern characters (see Werner, 1909). Both species share unusual external characters (Table 1) and color pattern (Figs. 1–2) among the congeners. In this sense, the only characters of the holotype of *A. canedii* that disagree with the original description and additional specimens of *A. bocki* are the occurrence of a single postocular and 1+1 temporals, but both characters are polymorphic for the type series of *A. canedii* (see Scrocchi and Cei, 1991). Therefore, we propose herein the synonymy of *A. canedii* with *A. bocki*.

*Atractus bocki* Werner, 1909 (Figs. 1–3)

*Atractus bocki* Werner, 1909; Mitt. Naturhist. Mus. Hamburg 26:228.

*Atractus modestus*—Amaral, 1930; Mem. Inst. Butantan 4:26.

*Atractus bocki*—Peters and Orejas-Miranda, 1970; U.S. Nat. Mus. Bull. 297:27.

*Atractus canedii* Scrocchi and Cei, 1991; Mus. Reg. Sci. Nat. Torino 9:205. New synonymy.

*Holotype*.—Specimen originally housed at Zoologisches Museum, Hamburg (ZMH 4194), collected by G. Bock in the Cochabamba Department (without specific locality collection), Bolivia. This specimen was destroyed in the Second World War (J. Hallermann, pers. comm.).

*Material Examined*.—ARGENTINA: Salta: Anta Department, between Anta and J. V. González (FML 1082, holotype of *A. canedii*); Jujuy: Parque Nacional Calilegua, Seccional Mesada de Colmenas: (MACN 34796); San Salvador de Jujuy: (MRSN-R 106); Tumbaya Department: Barcena, Arroyo del Medio (FML 17641); Laguna Volcán (FML 17640). BOLIVIA: Cochabamba: Chapare Province (CBG 405).

*Diagnosis*.—*Atractus bocki* is distinguished from all congeners by the following combination of characters: (1) 17/17/17 smooth dorsal scale rows; (2) one or two postoculars; (3) moderate loreal; (4) temporal 1 + 1 or 1 + 2; (5) six or seven supralabials, third and fourth contacting orbit; (6) seven infralabials, first four contacting chinshields; (7) seven maxillary teeth; (8) three gular scale rows; (9) four prefrontals; (10) 164–169 ventrals in females, 161–167 in males; (11) 39–48 subcaudals in females, 45–51 in males; (12) dorsal ground color cream with black bands alternating on flanks, generally connected to opposite one at vertebral area; (13) venter predominantly black with anterior margins of each scale cream; (14) moderate body size, females reaching 341 mm SVL, males 299 mm SVL; (15) long tail in females (16.7–20.8% SVL), males (21.0–22.1% SVL); (16) hemipenis moderately bilobed.

*Comparisons*.—Among all congeners, *A. bocki* shares with *Atractus gigas* six supralabials, dorsal ground color cream (in preservative) with alternating black bands at least in juveniles specimens, venter predominantly black. *Atractus bocki* differs from it in having four infralabials contacting chinshields and maximum SVL 370 mm (vs. three infralabials contacting chinshields, adults uniformly black, and SVL reaching 1,000 mm).

*Description of Referred Specimens*.—Adult female, CBG 405, SVL 370 mm, CL 77 mm (20.8% SVL); body diameter 10.5 mm (2.8% SVL); head length 10.5 mm

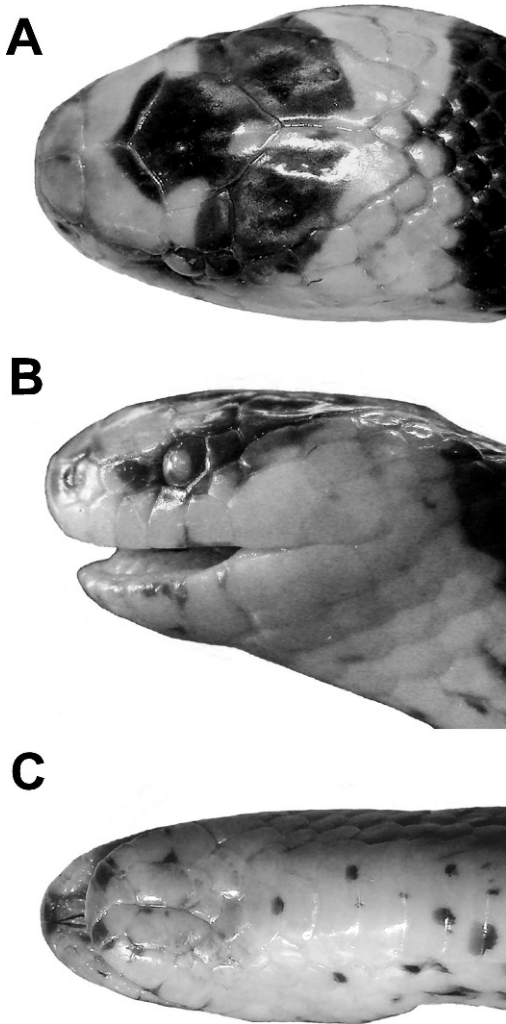


FIG. 1. (A) Dorsal, (B) lateral, and (C) ventral views of head of *Atractus bocki* (CBG 405).

(2.8% SVL); head width 7.8 mm (74% of head length); interorbital distance 5.8 mm; rostral distance 4.4 mm (75.8% interorbital distance); nasorbital distance 2.5 mm; head slightly curved in lateral view, round in dorsal view; snout truncate in lateral view, round in dorsal view; cervical constriction barely distinct; rostral subtriangular in frontal view, 1.6 mm high, 2.7 mm wide, little visible in dorsal view; internasal 1.9 mm wide, 1.6 mm long; internasal suture sinistral with respect to prefrontal suture; prefrontal 3.0 mm wide, 2.5 mm long; supraocular subrectangular, 2.1 mm long, 1.3 mm wide; frontal subpentagonal, 4.1 mm long, 3.7 mm wide, with anterior apex moderately projected; parietal 5.4 mm long, 3.4 mm wide; nasal divided; nostril between prenasal and postnasal; prenasal twice as high as long; postnasal 1.5 mm high, 1.2 mm long, slightly higher than prenasal; loreal 1.7 mm long, twice as long as high, contacting second and third supralabials; eye

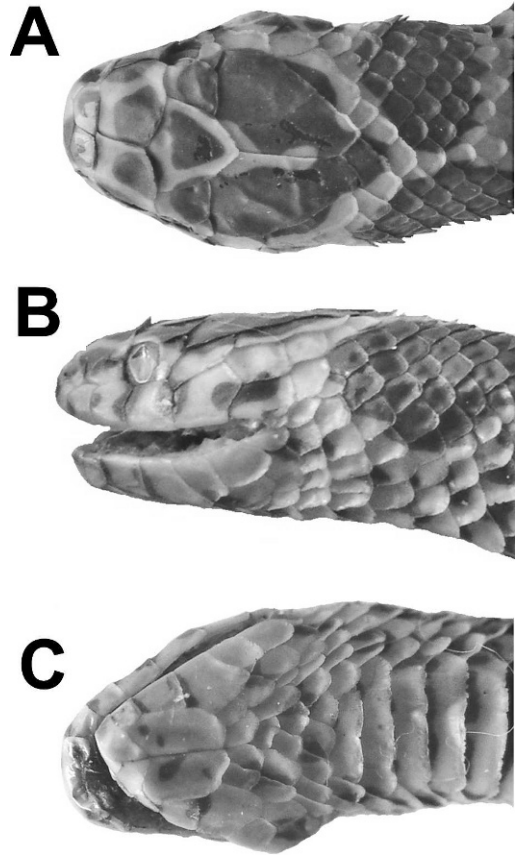


FIG. 2. (A) Dorsal, (B) lateral, and (C) ventral views of head of *Atractus bocki* (FML 1082, holotype of *Atractus canedii*).

diameter 1.6 mm; pupil subelliptical; two postoculars; upper postocular of similar height (0.8 mm) and twice longer (1.33 mm) than lower postocular; temporals 1 + 2; anterior temporal 2.5 mm long, about twice as long as high; upper posterior temporal nonelongated; six supralabials, third and fourth contacting orbit; second supralabial higher than first and smaller than third; sixth higher and longer than remaining supralabials; symphyial triangular, 2.2 mm wide, 1.1 mm long; seven infralabials, first four contacting chinshields; first pair of infralabials in contact behind symphyial, preventing symphyial/chinshields contact; chinshields 3.3 mm long, 1.7 mm wide; 17/17/17 dorsal scale rows; dorsals smooth, lacking apical pits, supranal tubercles, and keels; 169 ventrals; 48 subcaudals; caudal spine short, robust, and rhomboid.

Adult male, FML 1082, SVL 262 mm, CL 65 mm (21% SVL); body diameter 7.5 mm (2.8% SVL); head length 11.2 mm (4.3% SVL); head width 6.1 mm (54.5% of head length); interorbital distance 4.9 mm; rostral distance 3.3 mm (67.3% interorbital distance); nasorbital distance 2.0 mm; head slightly curved in lateral view, round in dorsal view; snout truncate in lateral view, round in dorsal view; cervical constriction barely distinct; rostral subtriangular in

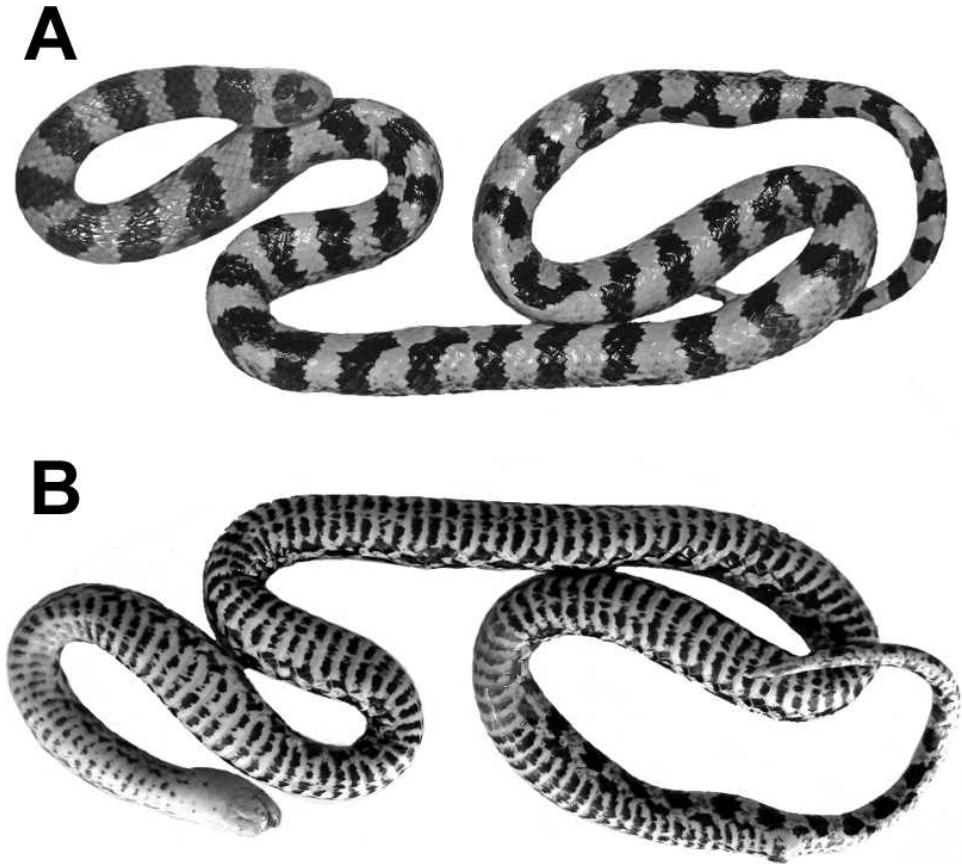


FIG. 3. (A) Dorsal and (B) ventral views of *Atractus bocki* (CBG 405).

frontal view, 1.3 mm high, 2.7 mm wide, little visible in dorsal view; internasal 1.0 mm wide, 1.6 mm long; internasal suture sinistral with respect to prefrontal suture; prefrontal 2.6 mm wide, 2.3 mm long; supraocular subrectangular, 1.7 mm long, 1.6 mm wide; frontal subpentagonal, 2.7 mm long, 2.9 mm wide, with anterior apex moderately projected; parietal 4.3 mm long, 3.0 mm wide; nasal divided; nostril between prenasal and postnasal; prenasal twice as high as long; postnasal 1.0 mm high, 0.7 mm long, slightly higher than prenasal; loreal 1.4 mm long, about twice as long as high, contacting second and third supralabials; eye diameter 1.6 mm; pupil subelliptical; two postoculars; upper postocular of similar height (1.0 mm) and length (0.9 mm) than lower postocular; temporals 1 + 1 on the left and 1 + 2 on the right side; anterior temporal 1.7 mm long, about twice as long as high; upper posterior temporal nonelongated; six supralabials, third and fourth contacting orbit; second supralabial higher than first and smaller than third; sixth higher and longer than remaining supralabials; symphisial triangular, 1.7 mm wide, 0.9 mm long; seven infralabials, first four contacting chinshields; first pair of infralabials in contact behind symphisial, preventing symphisial/chinshields contact; chinshields 2.4 mm long, 1.3 mm wide; 17/17/17 dorsal scale rows; dorsals smooth,

lacking apical pits, supranal tubercles, and keels; 167 ventrals; 50 subcaudals; caudal spine short, robust, and rhomboid. The three other new specimens (FML 17640–17641 and MACN 34796) were found dead on the road and are poorly preserved. The meristic (see Table 1) and color pattern (see below) characters available for these specimens leave no doubt of their identification as *A. bocki*.

*Maxillary Arch*.—Arched in dorsal view, with six prediastemal and one postdiastemal teeth; prediastemal teeth large, robust at the base and narrower at apices, angular in cross-section; first three prediastemal teeth poorly spaced and more curved posteriorly; fourth to sixth prediastemal teeth least curved and little to moderately spaced; maxillary diastema short; postdiastemal teeth smaller than last prediastemal ones.

*Color in Preservative*.—Dorsum of head black with cream borders; cream borders frequently expanded, constituting large light blotches above internasal and prefrontal dorsally and nasal and loreal laterally; background of head black to dorsal margin of supralabials; supralabials mostly creamish-white, occasionally with posterior suture between scales dark pigmented; symphisial, infralabials, gulars, and chinshields cream with dispersed black dots; venter predominantly black, with posterior margin cream



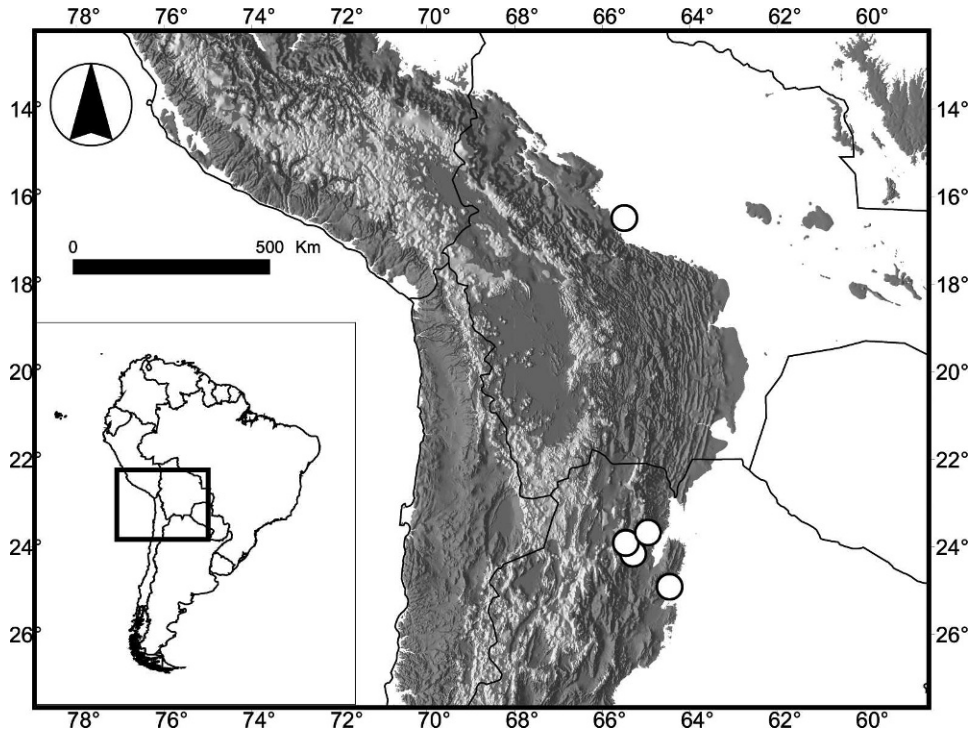


FIG. 4. Geographical distribution of *Atractus bocki*.

colored; venter occasionally cream, only with anterior margins black pigmented; tail generally black with subcaudal edges cream bordered; tail occasionally predominantly cream, with small black dots concentrated in center of subcaudals and dispersed black spots on lateral sides of subcaudals; dorsal ground color of body cream with broad black bands (two or three scales wide), alternating on flanks; bands generally connected to opposite one above vertebral region; interspaces (two or three scales wide), occasionally with irregular paraventral black blotches covering first to fourth dorsal scale rows.

*Color in Life*.—The specimens FML 17640 and 17641 were collected recently dead on the road, and the dorsal ground color of the body was red with black bands (J. Baldo, pers. comm.).

*Hemipenis (Inverted Organ N = 2)*.—Retracted organ moderate bilobed, bifurcates at level of sixth and extends to seventh subcaudal.

*Distribution*.—Amazonian Rainforest, Andean Yungas, Prepuna, and dry and wet Chaco regions (sensu Cabrera, 1994) of central-western South America, from central Bolivia in the Cochabamba Department (Chapare Province, 16°30'S, 65°30'W, approximately 350 m) to northeastern Argentina in the Jujuy (San Salvador de Jujuy, 24°10'S, 65°18'W, approximately 1,200 m and Calilegua National Park 23°41'S, 64°58'W, and Tumbaya Department, Barcena, 23°55'S, 65°28'W and Laguna Volcán, 23°56'S, 65°28'W, approximately 2,000 m) and Salta (between Anta and J. V. González, 24°55'S, 64°28'W, approximately 650 m; Fig. 4).

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