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Vine snakes (*Oxybelis*) and Sharpnose snakes (*Xenoxybelis*) (Squamata, Serpentes) from lowlands of Bolivia, with first records of *Oxybelis inkaterra* for the country

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Abstract

We present information on the occurrence of colubrid vine snakes (*Oxybelis*) and dipsadid sharpnose snakes (*Xenoxybelis*) from the lowlands of Bolivia. These genera have been poorly reported from Bolivia and information presented herein includes nine new record provincials from the departments of Beni, Cochabamba, La Paz, Pando, and Santa Cruz, Bolivia. Moreover, we present the first records of *Oxybelis inkaterra* Jadin, Jowers, Orlofske, Duellman, Blair & Murphy, 2021 from Bolivia and we extend the known range of this species by approximately 207 km (Río Sipia, La Paz) and 628 km (Campamento Guacharos, Cochabamba) southeast of the type locality (Puerto Maldonado, Peru) in South America. In addition, we present morphometric information, meristic characters, coloration pattern, ecological aspects and natural history for the three species of vine snakes (*O. aeneus*, *O. fulgidus*, *O. inkaterra*) and two species of sharpnose snakes (*X. argenteus*, *X. boulengeri*) from the Bolivian lowlands.

Key Words

Arboreal, *Oxybelis aeneus*, *Oxybelis fulgidus*, Serpentes, *Xenoxybelis argenteus*, *Xenoxybelis boulengeri*

Introduction

The genera *Oxybelis* Wagler, 1830 (Colubridae) and *Xenoxybelis* Machado, 1993 (Dipsadidae) comprise several widely distributed Neotropical colubrid species commonly known as vine snakes and sharpnose snakes, respectively (Arredondo et al. 2021; Uetz et al. 2023). Several species are sympatric in many regions of South America. However, *Oxybelis* has a much broader distribution that includes a northernmost distribution into the southern United States, whereas the northernmost distribution of *Xenoxybelis* occurs in southern Venezuela (Wallach et al. 2014; Nogueira et al. 2019; Uetz et al. 2023).

The nomenclatural history of the genus *Oxybelis* is long and convoluted (see Jadin et al. 2021). In addition, taxonomy within the genus has been unclear and disputed (Keiser 1974; Machado 1993; Jadin et al. 2019, 2020).

Keiser (1974) maintained retaining *Oxybelis aeneus* (the type species for the genus) as a single species throughout its extensive range. However, Jadin et al. (2019, 2020) presented compelling data that supported multiple species and considerable diversity; moreover, they proposed an *O. aeneus* complex to include six species with the description of two new species for Central America and northern South America. Additionally, new species within the complex have also been described from Ecuador (Torres-Carvajal et al. 2021) and Peru (Jadin et al. 2021); among them *Oxybelis inkaterra* Jadin, Jowers, Orlofske, Duellman, Blair & Murphy, 2021.

The taxonomy of the genus *Xenoxybelis* has also been unclear and debated (see Melo-Sampaio et al. 2020). The genus was initially described by Machado (1993) and currently includes two species: *Xenoxybelis argenteus* (Daudin, 1803) and *X. boulengeri* (Procter, 1923) (Prudente et al. 2008; Melo-Sampaio et al. 2020; Uetz et al. 2023). Both species (*X. argenteus* and *X. boulengeri*) have been previously included in the genera *Oxybelis* (Peters and Orejas-Miranda 1970; Fugler et al. 1995) and *Philodryas* (Wallach et al. 2014; Nogueira et al. 2019). *Oxybelis* and *Xenoxybelis*, as reflected in their taxonomy, are not related but members of different colubrid families (Colubridae and Dipsadidae). However, they are a good example of convergence due to their arboreal lifestyle (e.g., morphology, coloration, diet, and habitat).

Vine snakes and sharpnose snakes are diurnal and predominately arboreal, although they are occasionally terrestrial (Duellman 1978; 2005; Dixon and Soini 1986; Martins and Oliveira 1998; Santos-Costa et al. 2015; Harrington et al. 2018). In general, species from these genera are quite cryptic, due to their coloration, elongated head, and attenuated slender bodies and long tail (authors' pers. obs.). Prey items include a diversity of small vertebrates, including lizards, birds, amphibians and mammals (Cunha and Nascimento 1978; Henderson 1982; Nascimento et al. 1988; Martins and Oliveira 1998; Duellman 2005; Scartozzoni et al. 2009; Santos-Costa et al. 2015).

Bolivian vine snakes *Oxybelis aeneus* (Wagler, 1824) and *Oxybelis fulgidus* (Daudin, 1803), and sharpnose snakes *Xenoxybelis argenteus* (Daudin, 1803) and *Xenoxybelis boulengeri* (Procter, 1923) are distributed in the Amazonian forests, Yungas, and riparian forests of the floodplains of Bolivia (Fugler et al. 1995; Moravec and Aparicio 2005; Nogueira et al. 2019; Eversole et al. 2021). However, information on the distribution and natural history of these species in Bolivia is extremely limited (Procter 1923; Donoso-Barros 1967; Fugler 1983; Keiser 1989; Fugler et al. 1995; Cadle and Reichle 2000; Cadle et al. 2003; Moravec and Aparicio 2005; Eversole et al. 2021).

Herein we report information on the distribution and natural history for Bolivian vine snakes and sharpnose snakes, including the first confirmed records of *Oxybelis inkaterra* from Bolivia.

Materials and methods

We examined specimens of vine snakes (*Oxybelis aeneus*, *Oxybelis fulgidus*, and *Oxybelis inkaterra*) and sharpnose snakes (*Xenoxybelis argenteus* and *Xenoxybelis boulengeri*) deposited in the four herpetological collections located in Bolivia: 1. Centro de Investigación de Recursos Acuáticos (CIRAH) of the Universidad Autónoma del Beni José Ballivián, Beni, 2. Colección Boliviana de Fauna (CBF) of the Museo Nacional de Historia Natural, La Paz, 3. Museo de Historia Natural Noel Kempff Mercado (MNKR), Santa Cruz, and 4. Museo de Historia Natural Alcide d'Orbigny (MHNC-R), Cochabamba (Tables 1–4).

Scale counts, scutellation, and terminology follow Dowling (1951) and Peters (1964). Measurements were taken using a flexible ruler to the nearest millimeter (snout-vent length, SVL; tail length, TL; in the case of CIRAH after euthanasia). Dorsal scale row counts were taken at three standardized locations; head length behind occiput, midbody, and head length anterior to cloaca and separated by a script (-). Paired subcaudals were counted on one side only, average number of subcaudal and ventral scales in parentheses. In addition to the number of supralabials, the scales that make contact with the orbit are identified in parentheses (right/left). In addition to the number of infralabials, the scales that make contact with the first pair of chin shields are identified in parentheses (right/left).

Specimen identification was determined by comparing and analyzing meristic data, morphometrics, coloration, figures, drawings, and photographs from description and taxonomic information by Daudin (1803), Boulenger (1896), Procter (1923), Peters and Orejas-Miranda (1970), Keiser (1974), Cunha and Nascimento (1978), Duellman (1978, 2005), Nascimento et al. (1988), Keiser (1989), Prudente et al. (2008), Jadin et al. (2020, 2021). We follow the taxonomic nomenclature proposed by Jadin et al. (2020, 2021) and Uetz et al. (2023).

For CIRAH specimens, we determined sex via cloacal probing and photographed each individual following the methodology outlined by Eversole et al. (2019). In addition, each specimen was weighed (g) with an electronic scale (Ohaus model HH 320).

We obtained geographic coordinates in decimal degrees using the Global Positioning System (Garmin eTrex, WGS84). We mapped the distribution of vine snakes and sharpnose snakes using Arc GIS software (ArcMap 10.2) including previous records cited in Tables 1, 3.

Results

We examined nine specimens of *Oxybelis aeneus*, six *Oxybelis fulgidus*, three *Oxybelis inkaterra*, one *Xenoxybelis argenteus* and seven *Xenoxybelis boulengeri* deposited in the Bolivian herpetological collections (Tables 1–4). The *O. inkaterra* record represents the first for Bolivia. We increased new locations of occurrence of these snakes for

Table 1. Previous and additional records of vine snakes (*O. aeneus*, *O. fulgidus*) and first records of *O. inkaterra* for Bolivia.

Department	Province	Locality	Latitude, Longitude	Voucher number	Reference
Oxybelis aeneus					
Beni	Vaca Diez	Tumi Chucua	-11.1333, -066.1667	–	Fugler 1983
Beni	Yacuma	Exaltación community	-13.3095, -065.2486	CIRAH-201	This study
Beni	Yacuma	Totaizal community	-14.8767, -066.3322	CIRAH-290	Eversole et al. 2021
Beni	Yacuma	Totaizal community	-14.8766, -066.3222	CIRAH-408	Eversole et al. 2021
Beni	Yacuma	El Trapiche, EBB	-14.7822, -066.3364	CBF-0948	This study
Santa Cruz	Andrés Ibáñez	Espejillos	-17.8000, -063.1667	–	Fugler et al. 1995
Santa Cruz	Ñuflo de Chávez	Perseverancia	-14.6369, -062.6318	MNKR-302	This study
Santa Cruz	Ichilo	Reserva El Chore	-17.8670, -064.1218	MNKR-1414	This study
Santa Cruz	Andrés Ibáñez	Comunidad en Maque (28 km. SW de Santa Cruz)	-17.9399, -063.3508	MNKR-1579	This study
Santa Cruz	Sara	Santa Rosa del Sara	-17.1060, -063.5956	MNKR-3396	This study
Santa Cruz	Andrés Ibáñez	Potrerillo de Guenda	-17.6706, -063.4584	MNKR-5682	This study
Oxybelis fulgidus					
Beni	Iténez	Bella Vista	-13.2667, -063.7000	–	Quintana and Padial 2003
Beni	José Ballivián	Cumbre del Pilon	-14.5167, -067.5833	–	Fugler et al. 1995
Beni	Vaca Diez	Buen Retiro community	-11.3130, -066.0489	CIRAH-929	This study
La Paz	Iturralde	Ixiamas, Barraca, Santa Rosa, Río Manurimi	-12.1667, -067.5000	MNKR-2120	This study
La Paz	Larecaja	Guanay	-15.5006, -067.8867	CBF-0223	This study
La Paz	Sud Yungas	La Asunta	-16.0333, -067.1667	CBF-0437	This study
La Paz	Franz Tamayo	Chalalán, PNyANMI Madidi	-14.4167, -067.9167	CBF-2345	This study
Pando	Manuripi	San Antonio	-11.6114, -068.2025	CBF-0866	This study
Pando	Nicolás Suarez	Surroundings Cobija (approximate coordinates)	-11.0693, -068.7839	–	Cadle and Reichle 2000
Oxybelis inkaterra					
Cochabamba	Carrasco	Campamento Guacharos El Palmar, PNC	-17.0615, -065.4929	MNKR-3740	This study
La Paz	Franz Tamayo	Río Sipia, PNyANMI Madidi	-14.3619, -068.5417	CBF-4275	This study
Unknown	Unknown	Unknown	–	CBF-3780	This study

Table 2. Meristic characters and scale counts of examined specimens of *Oxybelis* in the Bolivian herpetological collections. For abbreviations, see Materials and Methods. *=incomplete tail.

Voucher number	Sex	SVL (mm)	TL (mm)	Weight (g)	Dorsals	Ventrals	Subcaudals	Cloacal	Loreal	Supralabials (in contact with the orbit)	Infralabials (in contact with the first pair of chin shields)
Oxybelis aeneus											
CIRAH-201	Female	383	227	8.0	17-17-13	184	158	Divided	Absent	9(5,6)/9(5,6)	10(1-5)/10(1-5)
CIRAH-290	–	843	520	94.0	17-17-13	185	156	Divided	Absent	9(4,5)/9(4-6)	10(1-4)/9(1-4)
CIRAH-408	Female	301	165	5.0	17-17-13	185	154	Divided	Absent	9(5,6)/9(4-6)	10(1-4)/9(1-4)
CBF-0948	Female	800	519	–	17-17-13	192	168	Divided	Absent	9(4-6)/9(4-6)	10(1-4)/10(1-4)
MNKR-302	–	770	510	–	17-17-13	188	156	Divided	Absent	8(4,5)/9(5,6)	9(1-4)/10(1-4)
MNKR-1414	–	630	370	–	17-17-13	192	154	Divided	Absent	9(4-6)/9(4-6)	10(1-4)/10(1-4)
MNKR-1579	–	760	510	–	17-17-13	182	152	Divided	Absent	8(4,5)/9(4,5)	10(1-4)/9(1-4)
MNKR-3396	–	575	345	–	17-17-13	190	166	Divided	Absent	9(4,5)/9(4,5)	10(1-4)/9(1-4)
MNKR-5682	–	730	460	–	17-17-13	188	–	Divided	Absent	8(4,5)/8(4,5)	10(1-4)/10(1-4)
Oxybelis fulgidus											
CIRAH-929	Female	1322	553	325.0	17-17-13	217	128*	Divided	Absent	10(5-7)/10(5-7)	10(1-4)/10(1-4)
MNKR-2120	Male	1200	560	–	17-17-13	207	145	Divided	Absent	10(5-7)/10(5-7)	10(1-4)/10(1-4)
CBF-0223	–	1133	564	–	17-17-13	220	151	Divided	Absent	10(5-7)/10(5-7)	10(1-4)/10(1-4)
CBF-0437	Male	1093	587	–	17-17-13	205	155	Divided	Absent	10(5-7)/10(5-7)	10(1-4)/10(1-4)
CBF-2345	–	969	531	–	17-17-13	214	155	Divided	Absent	10(5-7)/10(5-7)	10(1-4)/10(1-4)
CBF-0866	Male	1161	544	–	17-17-13	202	156	Divided	Absent	9(5-6)/9(5-6)	10(1-4)/10(1-4)
Oxybelis inkaterra											
MNKR-3740	Female	580	385	–	17-17-13	181	170	Divided	Absent	8(4,5)/8(4,5)	10(1-4)/9(1-4)
CBF-4275	Male	730	531	–	17-17-13	200	160	Divided	Absent	9(4-6)/9(4-6)	9(1-3)/10(1-4)
CBF-3780	–	810	544	–	17-17-13	197	161	Divided	Absent	8(4-6)/8(4-6)	10(1-4)/9(1-4)

Bolivia and contributed information on some aspects of their natural history.

We compiled localities, geographic coordinates, voucher number (this study) and references of the previous, additional and first records of *Oxybelis* and *Xenoxybelis* for Bolivia (Tables 1, 3), and examined the morphometric and meristic characters of specimens (Tables 2, 4).

Table 3. Previous and additional records of sharpnose snakes (*X. argenteus*, *X. boulengeri*) for Bolivia.

Department	Province	Locality	Latitude, Longitude	Voucher number	Reference
Xenoxybelis argenteus					
Beni	Cercado	Trinidad, Mamoré River	-14.7833, -064.7833	–	Procter 1923
Beni	Moxos	Villa Fatima community, TIPNIS	-16.4667, -065.9175	MHNC-R 442	This study
Cochabamba	Carrasco	Río Chimore	-16.7167, -064.8167	–	Donoso-Barros 1967
Pando	Federico Roman	Caiman	-10.2167, -065.3667	–	Cadle et al. 2003
Pando	Federico Roman	Piedritas	-9.9500, -065.3333	–	Cadle et al. 2003
Pando	Nicolás Suarez	Bioceanica	-11.1333, -069.3667	–	Moravec and Aparicio 2005
Xenoxybelis boulengeri					
Beni	Cercado	Trinidad, Mamoré River	-14.7833, -064.7833	–	Procter 1923
Pando (probably)	–	–	-12.4919, -068.6422	–	Keiser 1989
Pando	Manuripi	San Francisco community	-11.6193, -069.0959	CIRAH-589	This study
Pando	Manuripi	San Francisco community	-11.6143, -069.1073	CIRAH-608	This study
Pando	Manuripi	Alta Gracia community	-11.5985, -068.2578	CIRAH-624	This study
Pando	Manuripi	Alta Gracia community	-11.5805, -068.2827	CIRAH-670	This study
Pando	Nicolás Suarez	Vera Cruz community	-11.4102, -069.0171	CIRAH-730	This study
Pando	Nicolás Suarez	Vera Cruz community	-11.4066, -069.0198	CIRAH-744	This study
Pando	Manuripi	Ucia community	-11.7454, -068.9755	CIRAH-1086	This study

Table 4. Meristic characters and scale counts of examined specimens of *Xenoxybelis* in the Bolivian herpetological collections. For abbreviations, see Materials and Methods. *=incomplete tail.

Voucher number	Sex	SVL (mm)	TL (mm)	Weight (g)	Dorsals	Ventrals	Subcaudals	Cloacal	Loreal	Supralabials (in contact with the orbit)	Infralabials (in contact with the first pair of chin shields)
Xenoxybelis argenteus											
MHNC-R 442	Female	691	411	–	17-17-15	209	182	Undivided	Absent	6(4)/6(4)	7(1-4)/7(1-4)
Xenoxybelis boulengeri											
CIRAH-589	Male	704	435	22.0	17-17-15	200	173	Divided	1/1	6(4)/6(4)	7(1-4)/7(1-4)
CIRAH-608	Male	692	430	25.0	17-17-15	200	163	Divided	1/1	6(4)/6(4)	7(1-4)/7(1-4)
CIRAH-624	Male	615	384	–	17-17-15	205	183	Divided	1/1	6(4)/6(4)	7(1-4)/7(1-4)
CIRAH-670	Male	728	506	24.9	17-17-15	196	186	Divided	1/1	6(4)/6(4)	7(1-4)/7(1-4)
CIRAH-730	Male	640	340	19.5	17-17-15	197	132*	Divided	1/1	6(4)/6(4)	7(1-4)/8(1-4)
CIRAH-744	Male	668	461	23.5	17-17-15	202	186	Divided	1/1	6(4)/6(4)	8(1-4)/7(1-4)
CIRAH-1086	–	432	261	7.8	17-17-15	209	187	Divided	1/1	6(4)/7(4)	8(1-4)/8(1-4)

Oxybelis aeneus (Wagler, 1824)

Fig. 1A, B

Specimens examined. One subadult female (CIRAH-201) collected at 2307 h on 14 June 2015 from the community of Exaltación. One adult (CIRAH-290) collected at 0225 h on 26 June 2015 and one juvenile female (CIRAH-408) collected at 2312 h on 22 June 2016 from Totaizal community. One adult female (CBF-0948) collected at 1100 h on 07 August 1992 from El Trapiche, Estación Biológica del Beni (EBB). One adult (MNKR-302) collected on 14 April 1990 from Perseverancia. One adult (MNKR-1414) collected on 17 October 1997 from Reserva El Chore. One adult (MNKR-1579) collected on 11 July 1997 from Comunidad en Maque. One adult (MNKR-3396) collected on 07 August 2002 from Santa Rosa del Sara. One adult (MNKR-5682) collected on 05 February 2022 from Potrerillo de Guenda (Table 1, Fig. 3).

Morphometric and meristic characters. Snout-vent length 575–843 mm (adults > 500 mm, n = 7). Tail length 345–520 mm (n = 7). Smooth dorsal scales 17-17-13 rows (100%), without apical pits. Ventral scales 182–192 ($\bar{x}$ = 187). Subcaudal scales 152–168 ($\bar{x}$ = 158). Divided cloacal plate (100%). Loreal absent (100%). Preocular 1 (100%). Postoculars 2 (100%). Temporals 1+2 (100%). Supralabials 8–9 (9/9 in 66% of specimens, 8/9 in 22% and 8/8 in 11%); fourth and fifth contact the orbit (33%), fourth, fifth and sixth contact the orbit (56%), and fifth and sixth contact the orbit (11%). Infralabials 9–10 (9/10 in 56% of specimens and 10/10 in 44%); the first four in contact with the first pair of chin shields (89%) and the first five contact the first pair of chin shields (11%) (Table 2); and usually the fourth, fifth and sixth contact the second pair of chin shields.

Coloration pattern. Upper region of head golden brown to tan; supralabials and ventral surface of head uniform cream color, the color transition is separated by a dark brown preocular line that extends from the nasal scale, under the eye, and toward the anterior region of the body. Black bars or spots present in the anterior region of the body; dorsal and ventral surface of the rest of the body relatively uniform light brown with scattered small black spots (Fig. 1A, B).

Ecological notes. The specimens (CIRAH-201, 290, 408) were found resting on herbaceous plants and tree branches at a height between 0–4 m from the ground during nocturnal searches between 2307–0225 h. The localities where they were found are best described as riparian forests (secondary and tertiary forests) of the Mamoré River sub-basin.

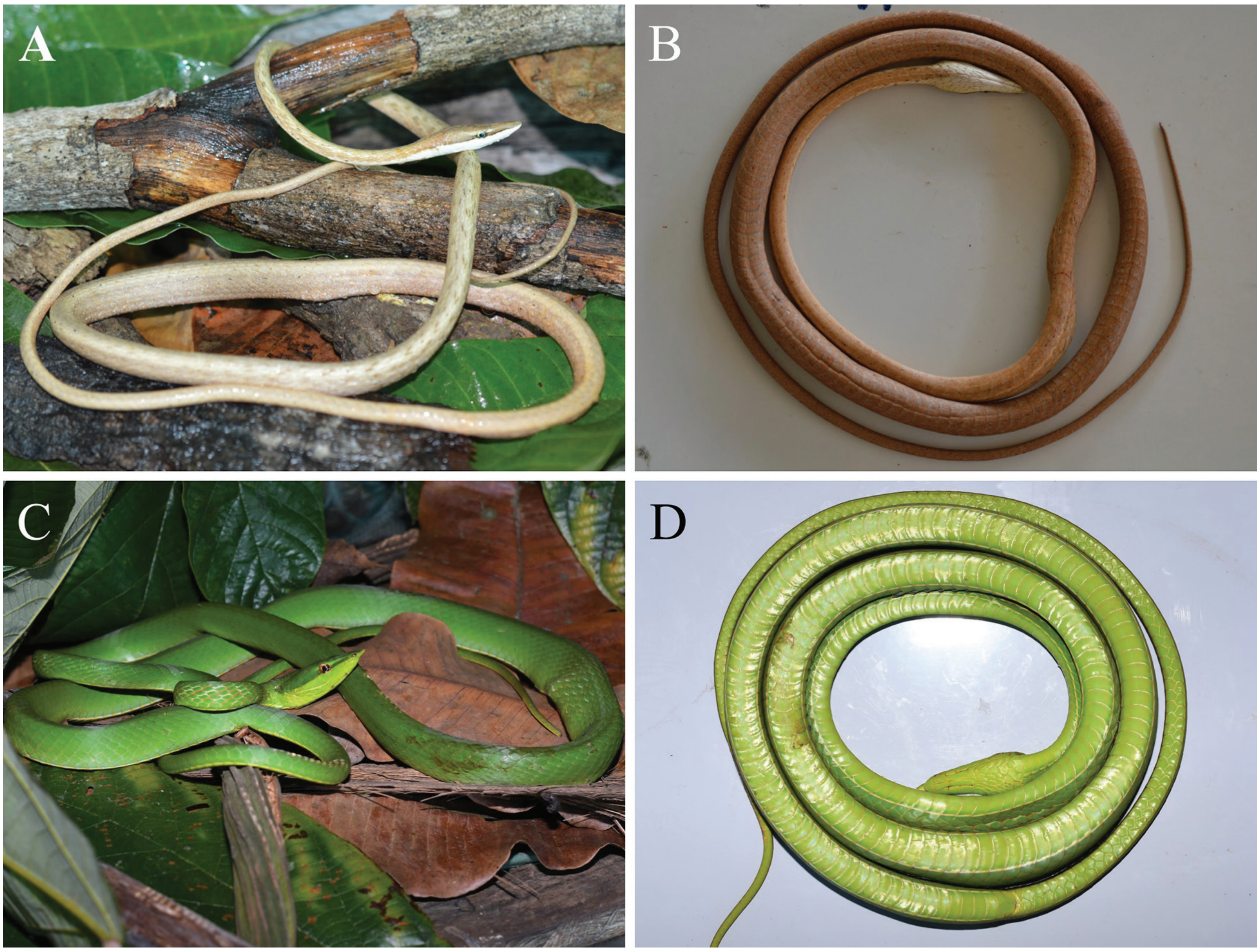

Figure 1. Vine snakes from Bolivia. **A, B.** Dorsal (CIRAH-408) and ventral (CIRAH-290) view *Oxybelis aeneus*, Totaizal community, Yacuma, Beni; **C, D.** Dorsal and ventral view *Oxybelis fulgidus* (CIRAH-929), Buen Retiro community, Vaca Diez, Beni. Photos by Cord Eversole (**A–D**).

Oxybelis fulgidus (Daudin, 1803)

Fig. 1C, D

Specimens examined. One adult female (CIRAH-929) collected at 1145 h on 24 June 2022 from Buen Retiro community. One adult male (MNKR-2120) collected on 01 March 1999 from Ixiamas, Barraca, Santa Rosa, Río Manurimi. One adult (CBF-0223) collected on 10 July 1986 from Guanay. One adult male (CBF-0437) collected on 02 June 1990 from La Asunta. One adult (CBF-2345) collected on 31 January 2007 from Chalalán, Parque Nacional y Area Natural de Manejo Integrado Madidi (PNyANMI Madidi). One adult male (CBF-0866) collected on 07 October 1995 from San Antonio (Table 1, Fig. 3).

Morphometric and meristic characters. Snout-vent length 969–1322 mm (adults, n = 6). Tail length 531–587 mm (n = 6). Smooth dorsal scales 17-17-13 rows (100%), vertebral and paravertebrals keeled, without apical pits. Ventral scales 202–220 ($\bar{x}$ = 211). Subcaudal scales 145–156 ($\bar{x}$ = 152). Divided cloacal plate (100%). Loreal absent (100%). Preocular 1 (100%). Postoculars 2 (100%). Temporals 1+2 (100%). Supralabials 9–10 (10/10 in 83% of specimens and 9/9 in 17%); fifth, sixth and seventh contact the orbit (83%) and fifth and sixth contact the orbit (17%). Infralabials 10 (100%); the first four contact the first pair of chin shields (100%) (Table 2); and fourth, fifth and sixth in contact with the second pair of chin shields.

Coloration pattern. Upper region of the head green; supralabials and ventral surface of head yellowish green, the color transition is not separated by any line; it is evident from the rostral to the last supralabial. Dorsal surface of body uniform green; yellowish-green ventral surface with two yellow ventrolateral lines extending from the throat to the tail (Fig. 1C, D).

Ecological notes. The specimen CIRAH-929 was found capturing a bird in the crown of a pacay tree (*Inga* sp.) at an approximate height of 5.5 m from the ground. Found in a rural village, typical of Amazonian Bolivia, surrounded by secondary Amazonian forest where the harvesting of Brazilian nuts (*Bertholletia excelsa*) and the açaí palm (*Euterpe oleracea*) are common.

Oxybelis inkaterra Jadin, Jowers, Orlofske, Duellman, Blair & Murphy, 2021

Fig. 2A–D

First record. Bolivia.

Specimens examined. One adult female (MNKR-3740) collected on March 2005 from Campamento

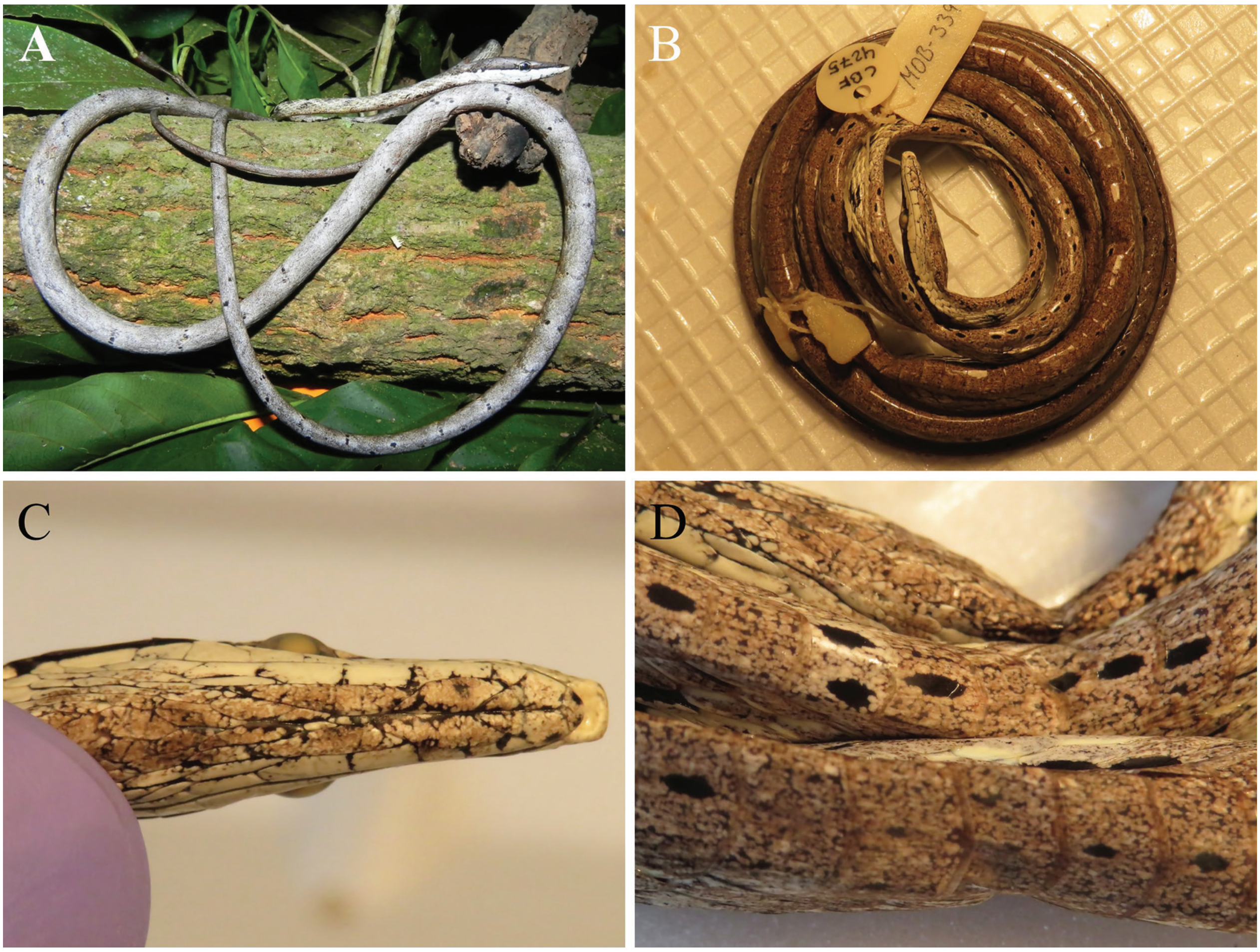

Figure 2. First record of *Oxybelis inkaterra* (CBF-4275), Río Sipia, Franz Tamayo, La Paz, Bolivia. **A, B.** Dorsal and ventral view (surface mottled with dense black spots); **C.** Bottom of the head black spots; **D.** Eyespot on ventrals scales. Photos by Mauricio Ocampo (**A**) and Gustavo Rey (**B–D**).

Guacharos, El Palmar, Parque Nacional Carrasco (PNC). One adult male (CBF-4275) collected on 24 June 2015 from Río Sipia, PNyANMI Madidi. One adult (CBF-3780) date and location unknown (Table 1, Fig. 3).

Morphometric and meristic characters. Snout-vent length 580–810 mm (adults, n = 3). Tail length 385–544 mm (n = 3). Smooth dorsal scales 17-17-13 rows (100%), without apical pits. Ventral scales 181–200 ($\bar{x}$ = 193). Subcaudal scales 160–170 ($\bar{x}$ = 164). Divided cloacal plate (100%). Loreal absent (100%). Preocular 1 (100%). Postoculars 2 (100%). Temporals 1+2 (100%). Supralabials 8–9 (8/8 in 67% of specimens and 9/9 in 33%); fourth and fifth contact the orbit (33%) and fourth, fifth and sixth contact the orbit (67%). Infralabials 9–10; generally the first four contacting the first pair of chin shields (Table 2) and fourth, fifth and sixth contact the second pair chin shields. Supraocular and prefrontal of similar length; posterior border of internasals extends beyond posterior edge of first supralabial; and presence of small scales between the second pair of chin shields (Fig. 2C).

Coloration pattern. Upper region of head is brown with dark brown to black mottling, black spots on posterior edge of nasal, and on preocular; black mottling on temporals forming an irregular postocular stripe that extends to second or third ventral; supralabials with mottling on borders, infralabials heavily mottled; mental, first pair of infralabials, and chin shields black with white spots (more intense in specimens CBF-3780 and MNKR-3740). Dorsal scales mottled with black and brown pigment in all rows; on anterior third of the body, some scales have heavy black pigment on their borders and irregular transverse bands; anterior ventrals heavily mottled becoming fine stippling posteriorly; some ventrals mottled with scattered black spots anteriorly; posteriorly, these spots encircled with white pigment to form eyespot markings; some of these markings also occur on the ventral and lateral portions of the tail (Fig. 2A–D).

Ecological notes. Specimen CBF-4275 was accidentally severed into two pieces by local guides while they were clearing work trails near the camp. The area has xeric and thorny vegetation, with representatives from the Bromeliaceae, Cactaceae, and Araceae families. This particular individual, feeling threatened, remained motionless, mimicking one of the branches of the shrub it was on. Unfortunately, this behavior caused it to go unnoticed by the guide, resulting in the unfortunate accident.

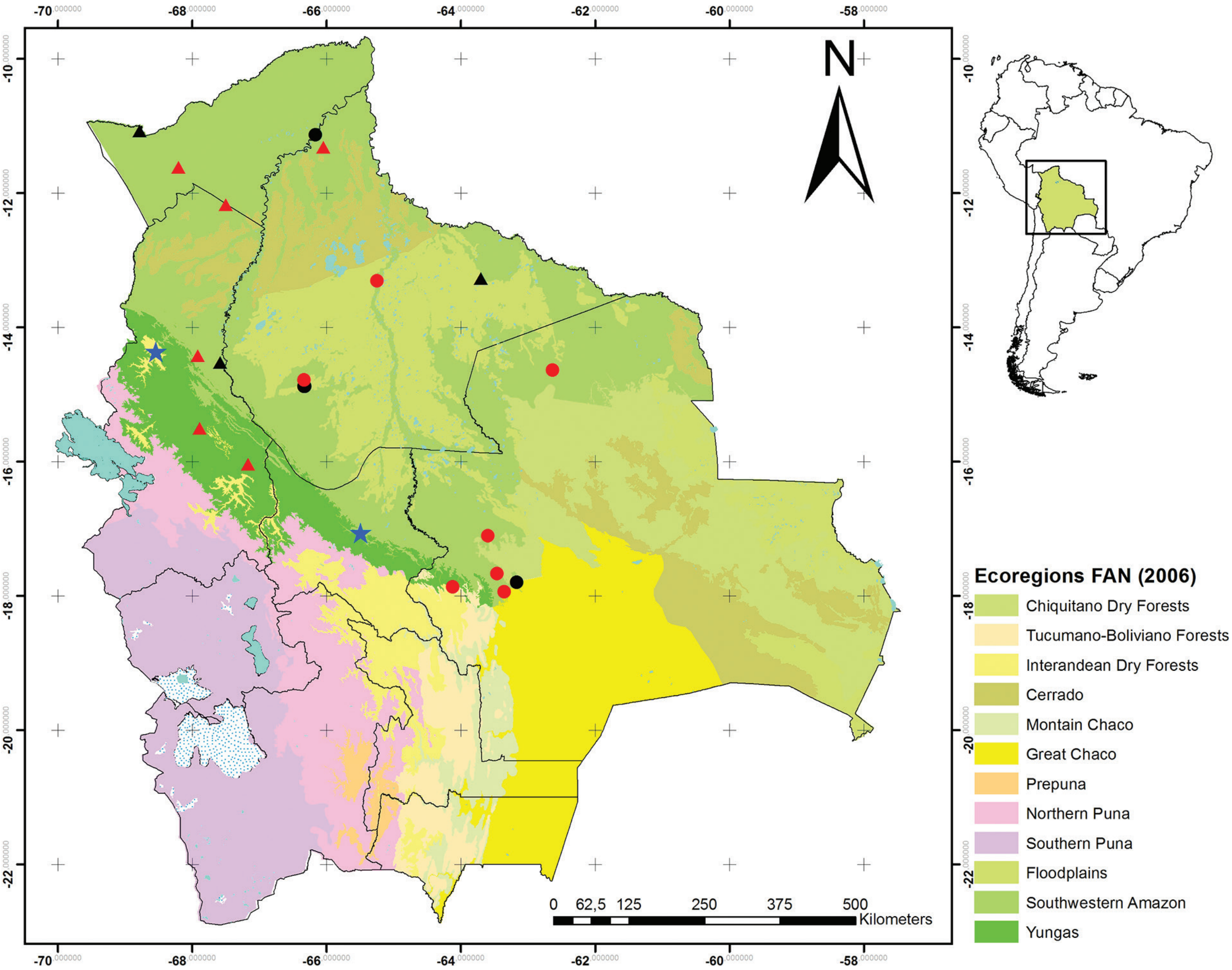

Figure 3. Distribution of the vine snakes in Bolivia. *Oxybelis aeneus* (points), *Oxybelis fulgidus* (triangles), and *Oxybelis inkaterra* (blue stars, first records). Red symbols correspond to additional records.

Xenoxybelis argenteus (Daudin, 1803)

Fig. 4A, B

Specimen examined. One adult female (MNHC-R 442) collected at 2315 h on 17 August 2001 from Villa Fatima community, Territorio Indígena y Parque Nacional Isiboro Sécure (TIPNIS) (Table 3, Fig. 5).

Morphometric and meristic characters. Snout-vent length 691 mm. Tail length 411 mm. Smooth dorsal scales 17-17-15 rows, without apical pits. Ventral scales 209. Subcaudal scales 182. Undivided cloacal plate. Loreal absent. Preocular 1. Postoculars 2. Temporals 1+1+2/1+2+2. Supralabials 6; fourth contacting the orbit. Infralabials 7; the first four contacting the first pair of chin shields (Table 4) and fourth and fifth contact the second pair of chin shields.

Coloration pattern. Upper center region of head brown; dorsolateral region of the head and supralabials light brown green, separated by broad grayish-green band, from nasal, crosses the eye, and extends to the body; ventral surface of the head yellowish green with scattered black points. Dorsal surface of the body light-greenish brown with two thin greenish-brown lateral bands; ventral surface bright yellowish green anteriorly and light green posteriorly with two lateral green bands (Fig. 4A, B).

Ecological notes. The specimen was found during the night resting on a branch of Piperaceae at a height 1.9 m off the ground in a secondary forest close to a stream.

Xenoxybelis boulengeri (Procter, 1923)

Fig. 4C, D

Specimens examined. Two adult males (CIRAH-589, 608) collected at 2318 and 2112 h on 28 and 30 June 2017 from San Francisco community. Two adult males (CIRAH-624, 670) collected at 2122 and 0036 h on 01 and 04 July 2017 from Alta Gracia community. Two adult males (CIRAH-730, 744) collected at 2332 and 2229 h on 04 and 05 June 2019 from Vera Cruz community. One juvenile (CIRAH-1086) collected at 1943 h on 07 July 2023 from Ucia community (Table 3, Fig. 5).

Morphometric and meristic characters. Snout-vent length 615–728 mm (adults > 500 mm, n = 6). Tail length 340–506 mm (n = 6). Smooth dorsal scales 17-17-15 rows (100%), without apical pits. Ventral scales 196–209

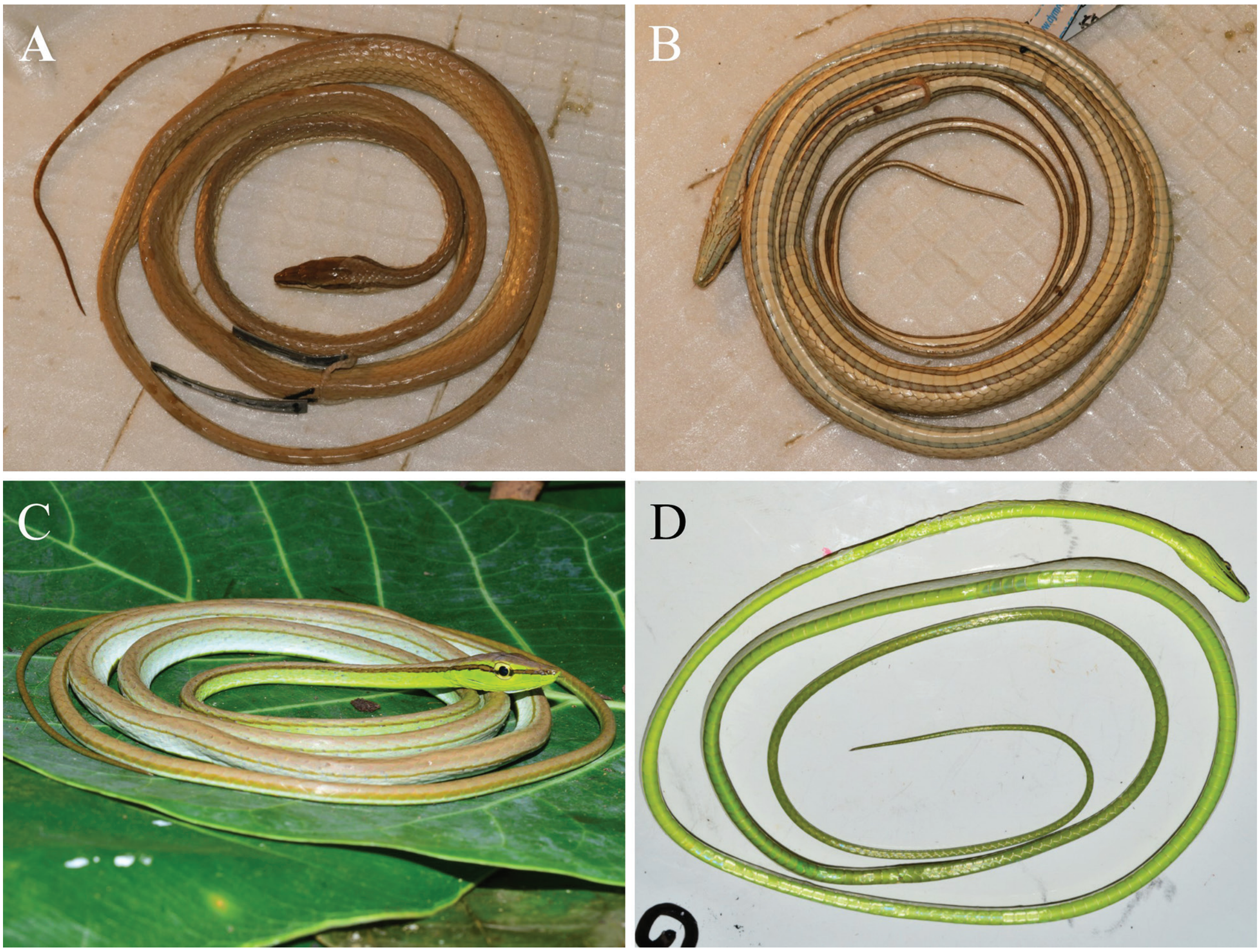

Figure 4. Sharpnose snake from Bolivia. **A, B.** Dorsal and ventral view *Xenoxybelis argenteus* (MHNC-R 442), Villa Fatima community, Moxos, Beni; **C, D.** Dorsal (CIRAH-670) and ventral (CIRAH-624) view *Xenoxybelis boulengeri*, Alta Gracia community, Munuripi, Pando. Photos by Gabriel Callapa (**A, B**) and Cord Eversole (**C, D**).

($\bar{x}$ = 201). Subcaudal scales 163–187 ($\bar{x}$ = 180). Divided cloacal plate (100%). Loreal 1 (100%). Preoculars 1–2 (1/1 in 71% of specimens, and 2/2 in 29%). Postoculars 2–3 (2/2 in 57% of specimens, and 3/3 in 43%). Generally temporals 1+1(2)+2 and 1+2+3 or less. Supralabials 6–7 (6/6 in 86% of specimens and 6/7 in 14%); fourth contacting the orbit. Infralabials 7–8 (7/7 in 57% of specimens, 7/8 in 29% and 8/8 in 14%); the first four contacting the first pair of chin shields (100%) (Table 4) and fourth and fifth contact the second pair of chin shields (100%).

Coloration pattern. Upper center region of head brown; dorsolateral region of the head and supralabials yellowish green, separated by a dark brown band with black edges, from nasal, crosses the eye, and extends to the front of the body; ventral surface of the head yellowish green. Dorsal surface of the body with two thin dark greenish-brown lateral bands, the broad vertebral band light greenish-brown, the broad lateral bands light green (much brighter on the anterior part of the body); ventral surface uniform yellowish-green (Fig. 4C, D).

Ecological notes. The specimens were found resting (coiled) on tree branches between 0.5–2 m above the ground, during nocturnal searches between 1943–0036 h. The localities where they were found correspond to primary and secondary Amazonian forests of the Manuripi and Tahuamanu river sub-basin.

Discussion

Previous records of vine snakes (*O. aeneus* and *O. fulgidus*) collected in Bolivia include the departments of Beni, La Paz, Pando, and Santa Cruz (Fugler 1983; Fugler et al. 1995; Cadle and Reichle 2000; Quintana and Padial 2003; Nogueira et al. 2019; Eversole et al. 2021). This study increases the museum voucher material collected in lowlands of Bolivia by 13 additional records of *O. aeneus* (n = 7) and *O. fulgidus* (n = 6) for the departments of Beni, Cochabamba, La Paz, Pando, and Santa Cruz (Table 1, Fig. 3). It is likely that some records presented in this study correspond to the southern distribution limit of both species.

Furthermore, we report the first records of *O. inkaterra* for Bolivia, with specimens from the department of Cochabamba and La Paz (one specimen does not have a specific locality) and it constitutes the eighth and ninth locality of the species across its range (Table 1, Fig. 3). *Oxybelis inkaterra* was recently described by Jadin et al. (2021) within the *O. aeneus* complex, with specimens from Peru. Jadin et al. (2021) indicated that this species probably also occurs in Bolivia, Colombia and Brazil. Additionally, Torres-Carvajal et al. (2021) reported *O. inkaterra* from Ecuador. The specimens reported herein confirm the presence of *O. inkaterra* in Bolivia and extend the known distribution by approximately 207 km (Río Sipia) and 628 km (Campamento Guacharos, both localities located in protected areas) southeast of the type locality (Puerto Maldonado, Peru).

Previous records of sharpnose snakes (*X. argenteus* and *X. boulengeri*) collected in Bolivia include the departments of Beni, Cochabamba, and Pando (Procter 1923; Donoso-Barros 1967; Keiser 1989; Fugler et al. 1995; Cadle et al. 2003; Moravec and Aparicio 2005). Our report adds eight new records for *X. argenteus* (n = 1) and *X. boulengeri* (n = 7), all from the Amazonian forests of the department of Beni and Pando respectively (Table 3, Fig. 5), considering that the type locality of *X. boulengeri* is located to the south in the riparian forests of the Mamoré River, Trinidad, Beni (Procter 1923). *Xenoxybelis boulengeri* is considered rare and poorly represented in scientific collections (Prudente et al. 2008).

The meristic and morphological variation of *O. aeneus* has been well supported by Jadin et al. (2020) in its distribution range of the Amazon basin. The characters of the examined specimens of Bolivian *O. aeneus* (Table 2, Fig. 1A, B) are congruent with the description of the species by Jadin et al. (2020), and the color pattern (in life) matches the description of the species by Keiser (1989) and Jadin et al. (2020).

The meristic characters and color pattern (in life) of the examined specimens of *O. fulgidus* (Table 2, Fig. 1C, D) are congruent with the description of the species by Daudin (1803) and Boulenger (1896), and other related publications (Peters and Orejas-Miranda 1970; Nascimento et al. 1988; Cole et al. 2013; Fraga et al. 2013; Curlis et al. 2020). In addition, we contribute meristic data of the examined specimens, information scarcely available in the available literature. It is likely that the reduced number of subcaudals (128 scales) in the specimen CIRAH-929 is the result of the specimen having lost part of its tail at some point during its life.

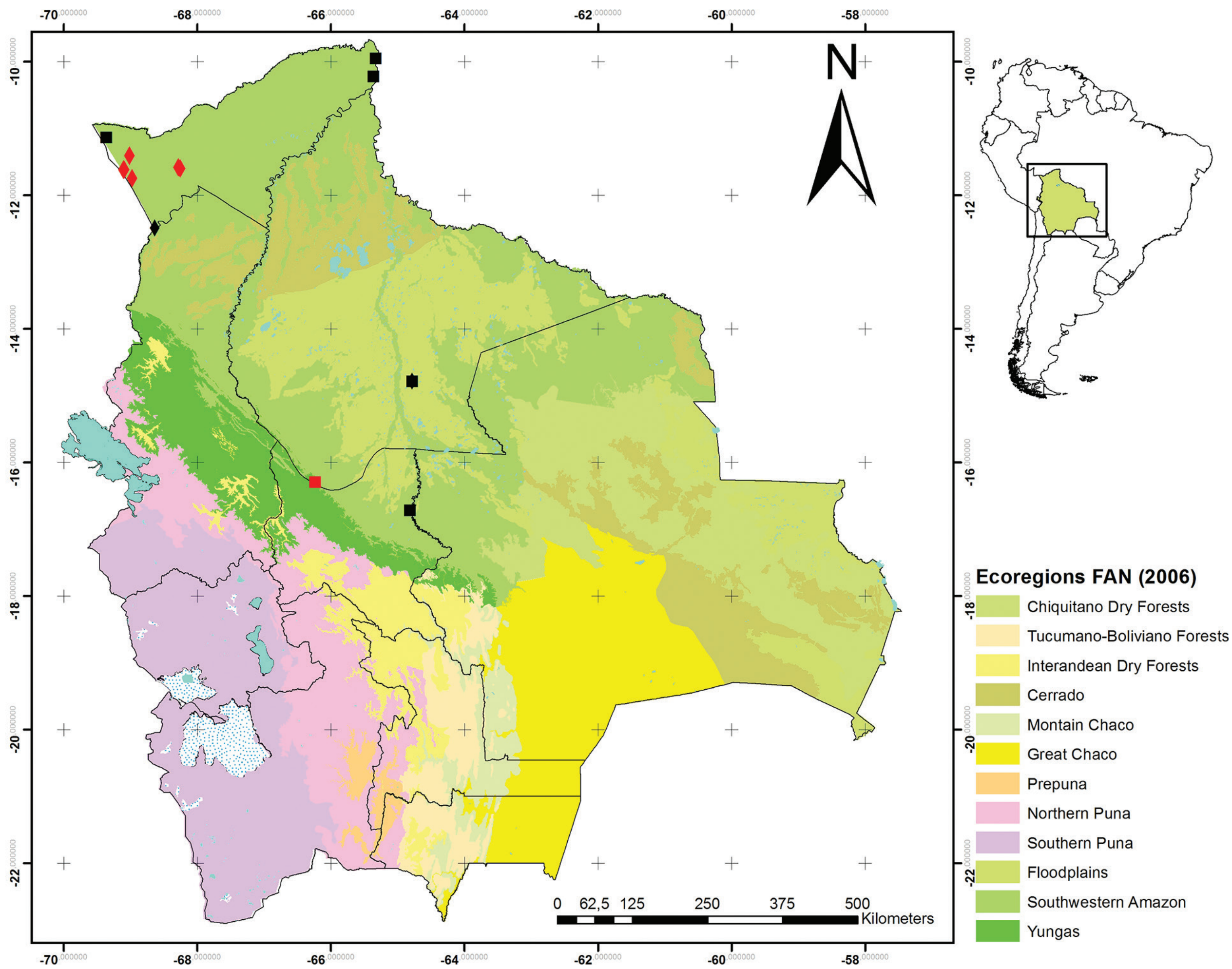

Figure 5. Distribution of the sharpnose snakes in Bolivia. *Xenoxybelis argenteus* (squares), and *Xenoxybelis boulengeri* (diamond). Red symbols correspond to additional records.

Specific meristic characters and coloration of *O. inkaterra* specimens reported in our study (Table 2, Fig. 2A–D) are congruent with the original description of the species by Jadin et al. (2021). However, specimen CBF-4275 has few eyespots in the posterior ventral and subcaudal region of the body; this is less evident in specimen MNKR-3740. Furthermore, this last specimen presents two supralabials that contact the orbit (fourth and fifth), unlike the other two specimens examined (fourth, fifth and sixth contact the orbit).

Our examined specimen of *X. argenteus* (Table 4, Fig. 4A, B) is consistent with the description and identification of the species by Daudin (1803) and Duellman (1978) respectively. In addition, we contribute with meristic data of the examined specimen. The absent loreal scale and undivided cloacal scale are specific characters of the species.

The meristic characters and color pattern (in life) of the examined specimens of *X. boulengeri* (Table 4, Fig. 4C, D) are congruent with the description of the species (Procter 1923; Keiser 1989; Duellman 2005; Prudente et al. 2008). However, our data on ventral scales (196–205) and divided subcaudal scales (132–186) of male specimens are slightly lower than those reported by Prudente et al. (2008). It is likely that the reduced number of subcaudals (132) counted in this study is the result of a specimen also having lost part of its tail at some point in its life. Furthermore, unlike Prudente et al. (2008) who described one preocular, we counted two preoculars in 29% (n=2) of the specimens examined.

The mimicry of *Oxybelis* and *Xenoxybelis* with their environment is characteristic of this group of snakes, which is why it is very difficult to observe and capture them during the day. As a result, 91% of the specimens examined (CIRAH) were collected during the night, generally resting on branches or leaves of bushes at a height between 0–4 m from the ground. Only one specimen was found at ground level.

These new and first additional reports of *Oxybelis* and *Xenoxybelis* represent contributions that can be used to improve the understanding of their distribution (Figs 3, 5) and aspects of their natural history in Bolivia and throughout their range in South America. In addition, they constitute valuable voucher specimens for Bolivian herpetological collections.

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