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A new species of montane gymnophthalmid lizard, genus *Cercosaura* (Squamata: Gymnophthalmidae), from the Amazon slope of northern Peru

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***Abstract.*—Based on morphological and previously published molecular and phylogenetic evidence, we report the discovery of a new species of *Cercosaura* from the northern portion of Cordillera Central, northern Peru. The new species inhabits the montane forests of northeastern Peru at elevations between 1,788–1,888 m. It differs from other species of *Cercosaura* by having the dorsum lighter than flanks, a white labial stripe that continues along the ventrolateral region until the hind limb insertion, subdigital lamellae on toes not tuberculate, 6–8 longitudinal rows of ventral scales, 32–36 transverse rows of dorsal scales, and dorsal surface of forelimbs and fingers dark brown.**

Key words. Central Andes, collar scales, Peruvian Yungas, San Martin, systematics, new species, lizard, South America

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Introduction

The New World lizard clade Gymnophthalmidae Merrem, 1820 comprises 248 extant species belonging to 47 taxa ranked as genera (Colli et al. 2015; Uetz 2015). Gymnophthalmid lizards are small, often secretive and many species have fossorial or semi-fossorial habits (Colli et al. 1998; Pianka and Vitt 2003; Mesquita et al. 2006). They are primarily limited to tropical latitudes, present in the lowland Amazonian forest and foothills, valleys and hillsides of the Andes (Presch 1980). There are also species that inhabit the Quaternary sand dunes in the São Francisco Basin in Brazil (Rodrigues 1996) to high elevations in the Andes, such as *Proctoporus bolivianus* that can be found at 4,080 m elevation in the Peruvian Andes (Duellman 1979).

The genus *Cercosaura* Wagler, 1830 was reviewed by Doan (2003) using morphological data in a phylogenetic analysis, as a result the genus was redefined to include the genera *Pantodactylus* and *Prionodactylus*, a view that was corroborated by subsequent molecular studies (Castoe et al. 2004; Doan and Castoe 2005). With the taxonomic changes by Doan (2003), the genus *Cercosaura* contained 11 species distributed throughout the Amazonian, Guianan, and savannah regions of South America, occurring in all its countries, except for Chile, and extending into Panama. Some years later, *Pantodactylus steyeri* was assigned to *Cercosaura* (Bernils et al. 2007), and *C. hypnoides* Doan and Lamar 2012 was described, increasing the number of *Cercosaura* species to 13 (Uetz 2015). Recently, Torres-Carvajal et al. (2015) presented a molecular phylogeny of *Cercosaura* and related taxa, "*Cercosaura*" *vertebralis* and "*Cercosaura*" *dicra* were found to be nested within *Pholidobolus*, and therefore referred to that genus. Furthermore, their phylogenetic hypothesis supported the recognition of *C. argula* and *C. oshaughnessyi* as different species (Avila Pires 1995), and of *C. ocellata bassleri*, as separate species (i.e., *C. bassleri* and *C. ocellata*). Therefore 13 species of *Cercosaura* are currently recognized: *C. argulus* Peters,

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1863; *C. bassleri* (Ruibal, 1952); *C. eigenmanni* (Griffin, 1917); *C. hypnoides* Doan and Lamar, 2012; *C. manicata* O'shaughnessy, 1881; *C. nigroventris* (Gorzula and Senaris, 1999); *C. ocellata* Wagler, 1830; *C. oshaughnessyi* (Boulenger, 1885); *C. parkeri* (Ruibal, 1952); *C. phelpsorum* (Lancini, 1968); *C. quadrilineata* (Boettger, 1876); *C. schreibersii* Wiegmann, 1834; and *C. steyeri* (Tedesco, 1998). It should be highlighted that the inclusion of species such as *C. hypnoides*, *C. nigroventris*, *C. parkeri*, *C. phelpsorum*, and *C. steyeri* need to be confirmed by a robust phylogeny that include the mentioned taxa.

Recent fieldwork in the montane forests of San Martín department, northeastern Peru, resulted in the discovery of a potentially new species of *Cercosaura*, which was later confirmed after examination of *Cercosaura manicata manicata* and *C. manicata boliviana* specimens and its position in Torres-Carvajal et al. (2015) phylogeny.

Materials and Methods

Specimens were fixed in 10% formalin for 24 hours, and later stored in 70% ethanol. All type specimens were deposited in the herpetological collection of the Centro de Ornitología y Biodiversidad (CORBIDI), Lima, Peru. Other species of *Cercosaura* examined in this study are deposited at CORBIDI and the Museo de Zoología Pontificia Universidad Católica del Ecuador, Quito (QCAZ), and are listed in Appendix I. Scale counts and color pattern information for *Cercosaura argulus*, *C. eigenmanni*, *C. oshaughnessyi*, and *C. ocellata* were taken from Avila-Pires (1995); *C. quadrilineata*, *C. schreibersii*, and *C. phelpsorum* from Doan (2003); and *C. parkeri* from Soares-Barreto et al. (2012) and *C. steyeri* from Tedesco (1998). Snout-vent length (SVL) and tail length (TL) measurements were taken to 1 mm with a ruler. For characters recorded on both sides, condition on the right side is presented first. Egg volume was calculated using the formula for a prolate spheroid $V = 4/3\pi$ (length/2) $(\text{width}/2)^2$. Sex was determined by dissection or by noting the presence of hemipenes. We follow the terminology and general description format of Doan and Lamar (2012).

Results

Cercosaura doanae sp. nov.

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Cercosaura sp. Torres-Carvajal et al., 2015: 282 (see discussion).

Figs. 1–3, 4 (upper), 5A, 6C.

Holotype: CORBIDI 00651, adult male from Laguna Negra (06°53'29.3''S, 77°23'18.3''W; WGS 84), 1,788 m, Mariscal Caceres Province, San Martin Department, Peru, collected by P.J. Venegas and D. Vasquez on 3 February 2008.

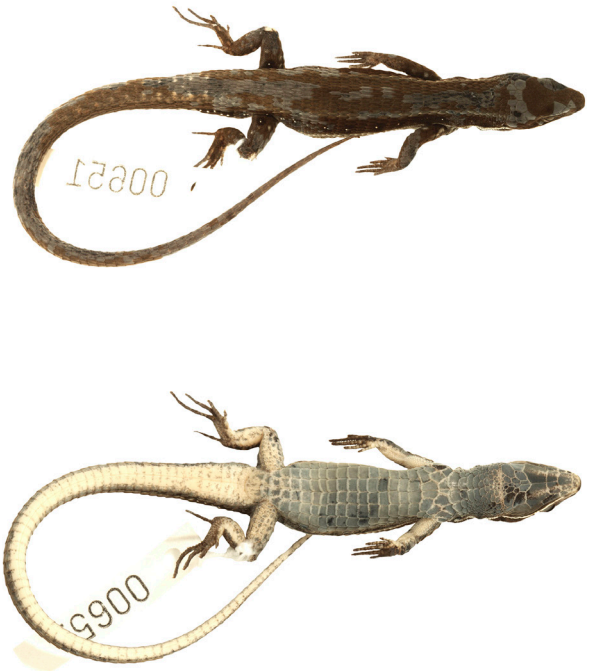

Fig. 1. Holotype (CORBIDI 00651; SVL = 52 mm) of *Cercosaura doanae* **sp. nov.** in dorsal (upper) and ventral (bottom) views. *Photographs by G. Chávez.*

Fig. 2. Head of the holotype (CORBIDI 00651) of *Cercosaura doanae* **sp. nov.** in lateral (A), dorsal (B), and ventral (C) views. *Photographs by G. Chávez.*

Fig. 3. Holotype of *Cercosaura doanae* **sp. nov.** in life: dorsolateral (upper) and ventral (bottom) views. *Photographs by P.J. Venegas.*

Paratypes (19): PERU: San Martin Department: Mariscal Caceres Province: from type locality CORBIDI 00649, 00656, 00658, 00659 adult females, CORBIDI 00650, 00652, 00660, 00662 juveniles, CORBIDI 00663, 00654, 00655, 00657, 00661 adult males, CORBIDI 00653 subadult female, collected between 2–4 February 2008, by P.J. Venegas and D. Vasquez; Añasco Pueblo (06°50'11.6''S, 77°29'09.7''W), 1,888 m, CORBIDI 00648 a juvenile collected on 2 February 2008 by P.J Venegas and D. Vasquez; Lajasbamba (06°44'48.4'' S, 77°38'25.6'' W), 1,814 m altitude, CORBIDI 15074 adult female, CORBIDI 15075 juvenile female, CORBIDI 15076 juvenile male, CORBIDI 15088 adult male collected between 25–28 October 2014 by L.Y. Echevarría and A.C. Barboza.

Diagnosis: *Cercosaura hypnoides* from the Amazon slope of Colombia (Doan and Lamar 2012), *C. manicata manicata* from the Amazon slope of Ecuador and central Peru, and *C. manicata boliviana* Werner, 1899 from southern Peru and Bolivia (Uzzel 1973) are the most similar species to *C. doanae* by having the dorsum lighter than flanks and a light labial stripe. Nevertheless, *Cercosaura doanae* can be distinguished from *C. hypnoides* by having 6–7 supralabials (5 in *C. hypnoides*), dorsal scales in transverse rows (transverse and oblique rows in *C. hypnoides*), and 0–3 lateral scale rows (4–7 in *C. hypnoides*). The new species can be distinguished from *C. manicata boliviana* Werner 1899 (character state of *C. manicata boliviana* in parenthesis) by having a cream labial stripe beginning before the eye, on first or second supralabial, continuing along the ventrolateral region up to hind limb insertion (light labial stripe beginning under eye and ending before collar fold; Fig. 4, middle), two conspicuous widened collar scales at midline (three or four enlarged collar scales at midline; Fig. 5B), and three posterior cloacal plates in males and five in females (four in males and females). Furthermore, *C. doanae* differs from *C. manicata manicata* (character state of *C. manicata manicata* in parenthesis) by having subdigital lamellae on toes not tuberculate (tuberculate for entire length of toes); and dorsal surface of forelimbs dark brown (brown with a white broad line on brachium, antebrachium, and fingers I, II, III; Fig. 5C).

Furthermore, *Cercosaura doanae* is easily distinguished from *C. argula*, *C. bassleri*, *C. eigenmanni*, *C. ocellata*, *C. oshaughnessyi, C. parkeri*, *C. quadrilineata*, and *C. schreibersii* (Fig. 6) in having brown labials with a white stripe extending from the first or second supralabial towards forelimb insertion. *Cercosaura argula* and *C. oshaughnessyi* have labials white or light cream, *C. eigenmanni* has brown labials with white broad vertical bars, *C. bassleri* and *C. ocellata* have creamy gray or gray labials with thin black vertical bars, *C. parkeri* has creamy gray or white labials with dark or faint brown vertical bars, *C. quadrilineata* and *C. schreibersii* have labials varying from creamy gray or dirty cream to white with dark flecks, spots or mottling. Additionally, *C. doanae* can be distinguished from *C. argula* by having an undivided frontonasal (divided in *C. argula*), two genials (three), single lamellae on fingers and toes (mostly divided), 32–36 transverse dorsal scale rows (38–45), 34–42 scales around midbody (27–35), and venter pale orange (white); from *C. eigenmanni* by having 34–42 scales around midbody (26–32 in *C. eigenmanni*), and 9–12 femoral pores in males (6–7); from *C. bassleri* and *C. ocellata* by having hexagonal dorsal scales (quadrangular in *C. bassleri* and *C. ocellata*), scales on flanks slightly smaller than dorsals,

Fig. 4. Lateral views of male specimens of (upper) *Cercosaura doanae* (holotype), (middle) *C. manicata boliviana* (CORBIDI 16500), and (bottom) *C. manicata manicata* (CORBIDI 08797). *Photographs by J.C. Chávez-Arribasplata.*

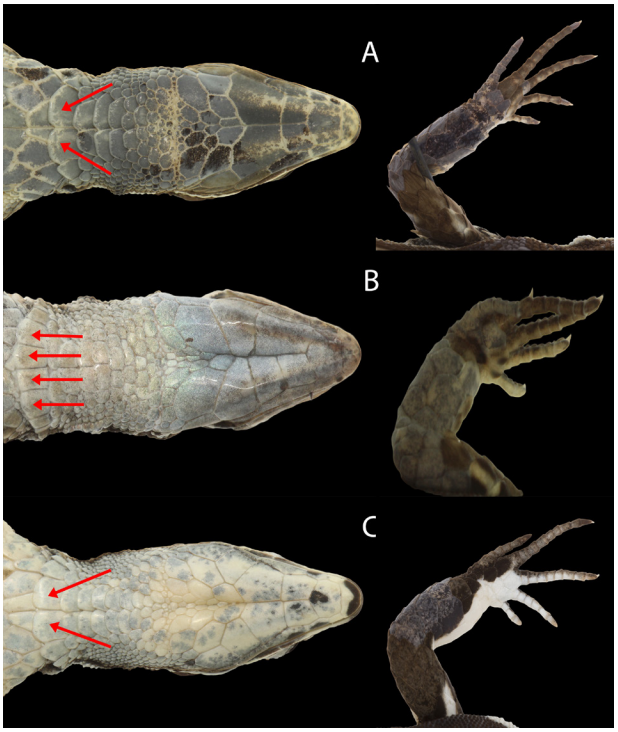

Fig. 5. Ventral views of heads and dorsal surface of the forelimbs of (A) *Cercosaura doanae* **sp. nov.** (holotype), (B) *C. manicata boliviana* (CORBIDI 14272), and (C) *C. manicata manicata* (CORBIDI 08797); showing the collar scales and the striking white line along the brachium, antebrachium, and fingers I, II, III of *C. manicata manicata*. Red arrows indicate the collar scales at midline. *Photographs by D. Quirola and J.C. Chávez-Arribasplata.*

keeled (scales on flanks distinctly smaller than dorsals, smooth or slightly keeled), lamellae on toes single (mostly divided), 10–13 lamellae under fourth finger (14–18), and 15–18 lamellae under fourth toe (16–24); from *C. oshaughnessyi* by having a single frontonasal (divided in *C. oshaughnessyi*), 32–36 transverse dorsal scale rows (37–52), scales on flanks slightly smaller than dorsals (scales on flanks distinctly smaller and sharply delimited from dorsals and ventrals), and venter orange (white); from *C. parkeri* by having 34–42 scales around midbody (24–30 in *C. parkeri*), 9–12 femoral pores in males (2–6), and lateral scales slightly smaller than dorsals (lateral scales similar in size to dorsals); from *C. quadrilineata* by having 6–8 longitudinal rows of ventral scales (four in *C. quadrilineata*), 16–19 transverse rows of ventral scales (21–23), and 9–12 femoral pores in males (eight); from *C. schreibersii* by having 16–19 transverse ventral scale rows (17–24 in *C. schreibersii*), and 9–12 femoral pores in males (3–5).

Cercosaura doanae can be distinguished from both *C. nigroventris* and *C. phelpsorum* by having subdigital lamellae on toes not tuberculate (tuberculate in *C. nigroventris* and *C. phelpsorum*) and by ventral coloration in preservative, having creamy tail (beige and dark brown in *C. nigroventris* and *C. phelpsorum*, respectively) (Doan 2003).

The new species differs from the poorly known *Cercosaura steyeri* in having 6–8 longitudinal rows of ventral scales (four in *C. steyeri*), dorsal scales not mucronate (strongly mucronate), 34–42 scales around midbody (17), and 15–18 lamellae on Toe IV (14).

Pholidobolus hillisi and the former *Cercosaura* species, *P. dicra* and *P. vertebralis* (see Torres-Carvajal et al. 2015), are also very similar to *C. doanae* in having dorsum lighter than flanks, brown labials with a white or light cream labial stripe that extends towards the forelimb insertion, and hexagonal and strongly keeled dorsal scales. However, the new species can be readily distinguished from all these *Pholidobolus* species by lacking a light vertebral stripe, which in *P. dicra* bifurcates anteriorly at midbody, and by having the loreal scale in contact with supralabials (in the aforementioned species of *Pholidobolus* the loreal scale is not in contact with supralabials). Additionally, it can be distinguished from *P. hillisi* (in parenthesis) by lacking a distinct diagonal white stripe on each side of the chin, extending from the fourth genial to the forelimb (present); from *P. dicra* (in parenthesis) by having three supraoculars (four); and from *P. vertebralis* (in parenthesis) by having palpebral disc single or divided, usually into 2–3 scales (divided, into 5–8 scales).

Characterization: (1) supraoculars three; (2) superciliaries 3–4, first expanded onto dorsal surface of head; (3) palpebral eye-disc made up of a single or divided transparent scale; (4) supralabials 6–7; (5) infralabials 5–7; (6) dorsal body scales hexagonal, strongly keeled; (7) dorsal scales only in transverse rows; (8) transverse rows of dorsals 32–36; (9) a continuous series of small lateral scales (usually two) separating dorsals from ventrals; (10) two conspicuous widened collar scales at midline; (11) transverse rows of ventrals 16–19; (12) longitudinal rows of ventrals 6–8; (13) femoral pores per hind limb 9–12 in males, 0–9 in females; (14) precloacal pores absent; (15) posterior cloacal plates three in males, five in females; (16) subdigital lamellae on toe IV 15–18; (17) limbs overlapping when adpressed against body; (18) dorsum brown; light brown dorsolateral stripe present, extending from loreal onto the tail; flanks chocolate brown, darker than dorsum; cream labial stripe, starting on second or third supralabial and running continuously as a ventrolateral creamy brown stripe along the body; black ocelli with white or creamy brown center present along the flanks; (19) ventrally throat and neck pinkish gray; chest yellowish orange; venter yellowish orange in males and pinkish brown in females, ventral surface of hind limbs and ventral surface of tail orange, becoming grayish cream towards the tip; and ventral surface of forelimbs yellow.

Description of holotype: Adult male (CORBIDI 00651), hemipenes not everted, SVL = 52 mm, tail complete, TL = 108 mm; head scales rugose and porous; rostral scale wider than tall, meeting supralabials on either

Fig. 6. Some species of *Cercosaura*: (A) *C. argula* (CORBIDI 12634) from Ere river, Loreto, Peru; (B) *C. bassleri* (CORBIDI 13208) from Bahuaja Sonene National Park, Puno, Peru; (C) *C. doanae* **sp. nov.** (CORBIDI 661) from Laguna Negra, San Martin, Peru; (D) *C. eigenmanni* from Porto Velho, Rondônia, Brazil; (E) *C. manicata manicata* (CORBIDI 9217) from Cordillera Azul National Park, San Martin, Peru; (F) *C. manicata boliviana* (CORBIDI 16500) from San Pedro, Cusco, Peru; (G) *C. ocellata* from Para, Brazil; (H) *C. oshaughnessyi* (CORBIDI 12637) from Ere river, Loreto, Peru; and (I) *C. schreibersii* from Iperó, São Paulo, Brazil. *Photographs by: A–C, E, and H by P.J. Venegas; F by A. Catenazzi; G by P. Melo-Sampaio; D and I by M. Teixeira-Junior.*

side at above the height of supralabials, in contact with frontonasal, nasals, and first supralabials; frontonasal wider than long, hexagonal, in contact with nasals and prefrontals, shorter than frontal; prefrontals present, not in contact; frontal longer than wide, hexagonal, in contact with anteriormost supraocular, prefrontals, and frontoparietals; frontoparietals pentagonal, in contact with all three supraoculars, parietals and interparietal; supraoculars three, first supraocular in contact with first three superciliaries, second supraocular in contact with third superciliary, third supraocular in contact with fourth supraciliary, one postocular, and parietal; interparietal longer than wide, heptagonal, in contact with parietals and occipitals; parietals hexagonal, in contact with one postocular, a subequally large supratemporal, and one occipital; occipitals three, smaller than parietals, median one smallest, extending further posteriorly than two lateral occipitals. Nasal longer than high, nostril situated anteriorly, in contact with first and second supralabials and loreal; loreal irregularly pentagonal, in contact with second supralabial, frenocular, and first superciliary; frenocular subtriangular, dorsal most corner in contact with first superciliary, in contact with second and third supralabials, preocular, and first subocular; four superciliaries, first expanded onto dorsal surface of head; two preoculars (right) and one (left), in contact with first superciliary in both sides; palpebral eye-disc made up of a single (right) and divided into two transparent scales (left); suboculars five; postoculars two; temporal rugose polygonal; supratemporals two, first largest; ear opening oblong, tympanum recessed; supralabials seven; infralabials six. Mental wider than long, in contact with first infralabial and postmental posteriorly; postmental single, pentagonal, posterior suture angular with point directed posteriorly, in contact with first and second infralabials and first pair of genials; two pairs of genials, anterior pair in contact with second and third infralabials, second genials in contact with third and fourth infralabials; two pairs of chin shields, sepa-

rated by irregular pregulars; four rows of pregular scales; gular scale rows three; collar fold distinct; lateral neck scales granular.

Dorsals hexagonal, longer than wide, with posterior margins slightly curved, imbricate, with a single high, rounded keel, in 34 transverse rows, oblique rows absent; longitudinal dorsal scale rows 25 at fifth transverse ventral scale row, 27 at tenth transverse ventral scale row, 17 at fifteenth transverse ventral scale row; small, slightly keeled lateral scale series, two scales wide, approximately half the size of dorsals, ovoid, smaller and more numerous rounded lateral scales at limb insertion regions; lateral fold present. Ventral scales smooth, squarish with rounded posterior margins, imbricate, in 17 transverse rows; longitudinal ventral scale rows at midbody six; anterior precloacal plate paired, three scales on posterior precloacal plate. Scales on tail like those on body; dorsal and dorsolateral caudal scales hexagonal and keeled, ventral and ventrolateral caudal scales square, smooth.

Limbs pentadactyl; digits clawed; dorsal brachial scales polygonal, subequal in size, imbricate, keeled; ventral brachial scales much smaller than dorsal scales, round, juxtaposed, smooth; dorsal antebrachial scales polygonal, subequal in size, multicarinate; ventral antebrachial scales polygonal, subequal in size, smooth. Scales on dorsal surface of manus polygonal, smooth, subimbricate; scales on palmar surface of manus small, rounded, subimbricate, domelike; thenar scales two, smooth; finger length formula IV > III > II > V > I; scales on dorsal surfaces of fingers smooth, quadrangular, covering dorsal half of digit, overhanging supradigital lamellae 4 on I, 6 on II, 8 on III, 9 on IV, 5 on V; subdigital lamellae 6 on I, 10/9 on II, 13/13 on III, 14/14 on IV, and 9/9 on V. Scales on anterodorsal surface of thigh large, polygonal, keeled, imbricate; scales on posterior surface of thigh small, rounded, subimbricate; scales on ventral surface of thigh large, rounded, flat, smooth; femoral pores nine (right) and 10 (left); precloacal pores absent; scales on anterior surface of crus polygonal, keeled, subimbricate, decreasing in size distally; scales on anterodorsal surface of crus polygonal, subimbricate, keeled; scales on ventral surface of crus large, polygonal, smooth, flat, and imbricate. Scales on dorsal surface of pes polygonal, keeled, subimbricate; scales on palmar surface of pes small, rounded, subimbricate, domelike; toe length formula IV > III > V > II > I; scales on dorsal surface of digits single, quadrangular, smooth, of varying sizes, overhanging supradigital lamellae 3 on I, 6 on II, 9 on III, 10 on IV, and 7 on V; subdigital lamellae single and tuberculate along the toes, 6/6 on I, 10/11 on II, 15/16 on III, 18/18 on IV, and 15 on V; limbs overlapping when adpressed against the body.

Coloration of holotype in life: Dorsal and lateral surfaces of head brown; a distinct cream stripe initiates on the ventral most portion of second supralabial scale and continues through all supralabials onto body, after second supralabial the stripe bends dorsally across third supralabial and to the top of supralabials 4, 5, 6, and 7, then the stripe bends ventrally in a straight line to the bottom of the auricular opening, onto the body as a ventrolateral stripe. Dorsal surface of body brown. Faint light brown dorsolateral stripes from first superciliary onto tail. Lateral surface of body chocolate brown; lateral stripe from head continues over forelimb insertion, ending at hind limb insertion. Nine black ocelli with cream center, from neck to hind limb insertion, and six ocelli on the base of tail. Dorsal surface of forelimbs same color of dorsum, with a faint ocellus of creamy brown center on dorsal surface of ante brachium; dorsal surfaces of manus brown with cream pigmentation on some scales. Dorsal surfaces of hind limbs brown with an ocellus near hind limb insertion and few creamy brown spots; dorsal surfaces of pes brown with coppery brown pigmentation on some scales. Dorsal tail coloration brown with scattered light brown and black marks. Lateral surfaces of tail brown.

Ventral surface of head and neck pinkish gray. Venter yellowish orange. Ventral surface of forelimbs yellow, ventral surface of hind limbs pale orange with dark gray flecks. Ventral surface of tail orange becoming cream towards the end. Iris brown.

Coloration of holotype in preservative (ethanol 70%): Dorsum darker brown; faint light brown dorsolateral stripes light gray and barely distinct from dorsum coloration; flanks lighter brown. Ventrally head, neck, chest, and venter are dark gray and ventral surface of limbs and tail dirty cream.

Variation: Measurements and scale counts of *Cercosaura doanae* are presented in Table 1. Supraoculars usually three; one specimen (CORBIDI 00659) has two supraoculars on left side and three on right side. Usually four superciliaries; only specimen CORBIDI 00662 presents three superciliaries on each side. Seven supralabials in most specimens; 6/6 in specimens CORBIDI 00662, 00648, and 15088 (15%), and 7/6 in specimens CORBIDI 15075, 15076 (10%). Usually six infralabials; 5/4 in CORBIDI 15075, 5/5 in CORBIDI 00652, 00654, 15074, and 15076 (20%), 5/6 in CORBIDI 00656, 15088 (10%), 6/5 in CORBIDI 00648, 00662 (10%), and 6/7 in CORBIDI 00658. Specimen CORBIDI 00659 (5%) has 3/2 postocular scales. Usually 3/3 supratympanic temporals (50%); specimens CORBIDI 00649, 00652, 00655, 00658, 00661 have 4/4 (25%), specimens CORBIDI 15074, 16076, 15088 have 4/3 (15%), and CORBIDI 00653 has 3/4. Specimen CORBIDI 15075 has only one pair of genials. Sexual dimorphism present in number of cloacal plates; male specimens have two anterior and three posterior cloacal plates (88%), only CORBIDI 00654 has four anterior plates. Female specimens have usually two anterior and five posterior cloacal plates (67%); CORBIDI 00659 has four anterior plates and CORBIDI 00649 has four posterior plates. Palpebral disc transparent, undivided in specimens CORBIDI 00648,

Table 1. Variation in scutellation, sexual dimorphism in SVL (mm), and color pattern of *Cercosaura doanae* **sp. nov.**, *C. manicata manicata*, and *C. manicata boliviana*. Range followed by mean ± standard deviation is given for quantitative characters if applicable.

Character	*Cercosaura doanae* (*n* = 20)	*Cercosaura manicata manicata* (*n* = 15)	*Cercosaura manicata boliviana* (*n* = 3)
Supraoculars	3	3	3
Superciliaries	3–4 3.95 ± 0.22	3–4 3.87 ± 0.35	4
Genials	1–2 1.95 ± 0.22	2	2–3 2.67 ± 0.58
Supralabials	6–7 6.85 ± 0.37	5–7 5.53 ± 0.83	5–7 6.33 ± 1.15
Infralabials	4–7 5.65 ± 0.67	4–5 4.4 ± 0.51	5
Transverse dorsal scale rows	32–36 33.1 ± 1.07	34–41 37.33 ± 2.41	35–40[1]
Longitudinal dorsal scale rows	22–30 24.8 ± 1.88	29–35 32.67 ± 1.91	26–27 26.33 ± 0.58
Transverse ventral scale rows	16–19 17.4 ± 0.82	17–21 19.13 ± 1.06	19(18)[1]–23 21 ± 1.15
Longitudinal ventral scale rows	6–8 7.9 ± 0.45	6[1]–8	8
Scales around midbody (at 10th transverse ventral scale row)	34–42 37.45 ± 1.93	41–50 45.4 ± 2.29	33–41[1]
Lateral scale rows	0–3	0–4	
Femoral pores per hind limb in males	9–12 10.5 ± 1.19	10–14 11.83 ± 1.33	7
Femoral pores per hind limb in females	0–9 6 ± 3.11	8–13 10.33 ± 2.52	3
Posterior cloacal plates in males	3	2–3	4
Posterior cloacal plates in females	4–5 4.86 ± 0.38	4–5	4
Lamellae on 4th toe	15–18 16.7 ± 0.86	15–17 15.73 ± 0.8	19–23
Lamellae on 4th finger	10–13 11.55 ± 0.76	10–13 11.33 ± 0.82	13–15 14 ± 1
Maximum SVL in males (mm)	52.06	61.62	56[1]
Maximum SVL in females (mm)	55.59	59.35	58[1]
Collar scales at midline	Two conspicuous and widened	Two conspicuous and widened	Three or four, enlarged
Beginning and extent of labial stripe	Before the eye, on first or second supralabial, continuing along the ventrolateral region up to hind limb insertion	First supralabial, continuing along the ventrolateral region up to hind limb insertion	Under eye and ending before collar fold
Color on dorsal surface of forelimbs	Dark brown	Brown with a white broad line on brachium, antebrachium and fingers I, II, III	Brown

[1]Data from Uzzel (1973).

00652, 00653, 00660, 00662, 15074–76, 15088 (45%), and divided in two or three sections in CORBIDI 00649, 00650, 00654–59, 00661, 00663(55%).

Dorsal coloration is identical in all specimens, including juveniles. Faint ocelli, with white or creamy brown center, on dorsal surface of antebrachium and few or several creamy brown spots are present in adults and juveniles. Ventral coloration of head and venter in males vary from grayish pink and pale orange, respectively, like in the holotype, to complete white throat and venter (CORBIDI 15088). Adult females differ from adult males by having the ventral surface of head, throat, and venter pinkish brown, and the ventral surface of tail yellow. Lateral ocelli present in male specimens CORBIDI 00651, 00654, 0657, 00661, 15088 (25%), and female CORBIDI 00659 (5%). Ocelli on hind limb present in two specimens (CORBIDI 15088 and holotype).

Distribution and natural history: *Cercosaura doanae* is known only from three localities in the head waters of the Huayabamba basin, San Martin department, at elevations of 1,788–1,888 m, along the Amazon slope of the extreme northern portion of Central Andes in northern Peru (Fig. 7). It inhabits the Amazonian premontane forest in the Yungas ecoregion (500–2,300 m) according to Brack (1986) and Peñaherrera del Aguila (1989), and Peruvian Yungas ecoregion according to Olson et al. (2001). The new species was found active on sunny days in pasturelands for cattle surrounded by forest in Añasco Pueblo and Lajasbamba (Fig. 8A). All observed individuals were moving through the herbaceous vegetation, and hiding in it when disturbed. At Laguna Negra, the new species was very abundant, moving at day through the leaf litter in primary forest (Fig. 8B). When disturbed, individuals run and hid within leaf litter, fallen trees, and in roots at the base of trees. Female specimen CORBIDI 00659, collected on 4 February 2008, contained two oviductal eggs, right egg was 12.1 mm × 6.6 mm and left egg 12.3 mm × 6.7 mm, and their respective volumes as 279.86 mm³ and 291.38 mm³.

Etymology: The specific epithet is a noun in the genitive case and patronym for Tiffany Doan, in recognition of her contribution to the systematics of gymnophthalmid lizards (e.g., Doan 2003; Doan and Castoe 2005), and to the knowledge of the herpetofauna from southern Peru.

Discussion

The Neotropical genus *Cercosaura* is a poorly sampled taxa that surely has several undescribed species. In a recent molecular phylogeny of *Cercosaura* and related taxa, Torres-Carvajal et al. (2015) showed distinction between *C. doanae* **sp. nov.** (cited as *Cercosaura* sp.) and *C. manicata manicata* (cited as *C. manicata*) as sister species with strong support (PP = 1.00), and separated

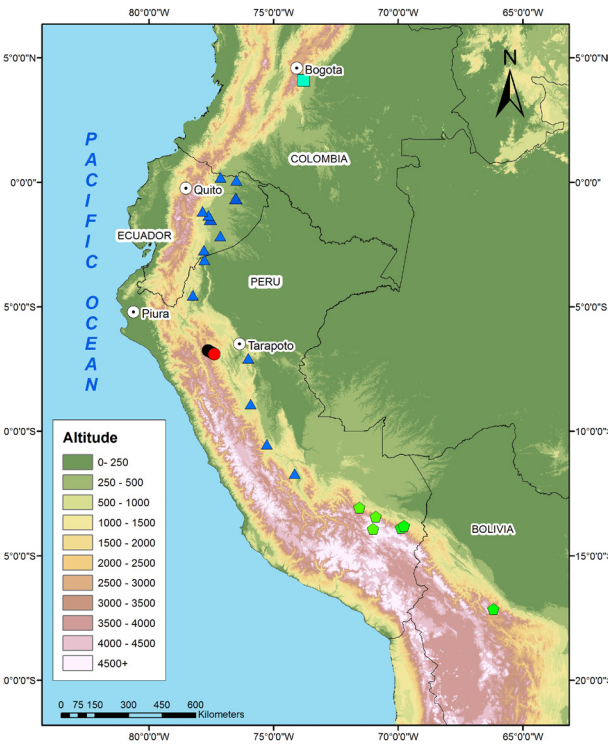

Fig. 7. Distribution of *Cercosaura doanae* **sp. nov.** (circles), *C. manicata boliviana* (green pentagons), *C. manicata manicata* (blue triangles), and *C. hypnoides* (sky blue square). Red circle indicates the type locality of the new species. Locality data from the literature (Doan and Lamar 2012; Uzzel 1973) and specimens deposited at Centro de Ornitología y Biodiversidad (CORBIDI) and Museo de Zoología of Pontificia Universidad Católica del Ecuador.

by branches that are similar in length to other branches separating sister species among *Cercosaura*. Additionally, the position of both species within the *Cercosaura* clade is strongly supported (PP = 1.00) as a basal subclade. However, the genetic distance values between the new species and *C. manicata manicata* are lower (12S = 0.015, 16S = 0.016, ND4 = 0.032, and c-mos = 0.004) than the interspecific ranges reported by the authors. For example, the genetic distance values between two largely recognized species as *C. eigenmanni* and *C. ocellata* are 0.031 for 12S, 0.019 for 16S, 0.060 for ND4, and 0.007 c-mos. We are confident in the separation of *C. doanae* **sp. nov.** and *C. manicata manicata*, since the morphological differences between both species are clear (i.e., the absence versus presence of tuberculate lamellae and the coloration of forearms; see diagnosis above and Figure 5C), and support the phylogenetic distinction. Although, samples of *C. manicata boliviana* are not included in the phylogenetic tree of Torres-Carvajal et al. (2015), clear differences can be recognized between the new species and *C. manicata boliviana* (e.g., beginning of labial stripe, size, and number of collar scales at midline and the number of posterior cloacal plates; see diagnosis above and Figures 4–5).

Uzzel (1974) gave clear differences between *C. manicata boliviana* and *C. manicata manicata*, all of them confirmed in the specimens examined by us. Both subspecies can be easily distinguished from each other morphologically (see Figures 4–6) and occur in allopatry (see Figure 7). In fact, we consider that there is enough morphological evidence to consider *C. manicata boliviana* as a distinct taxa, but it needs to be confirmed with robust molecular data. We believe that *Cercosaura doanae* **sp. nov.** and both subspecies of *C. manicata* represent a species complex.

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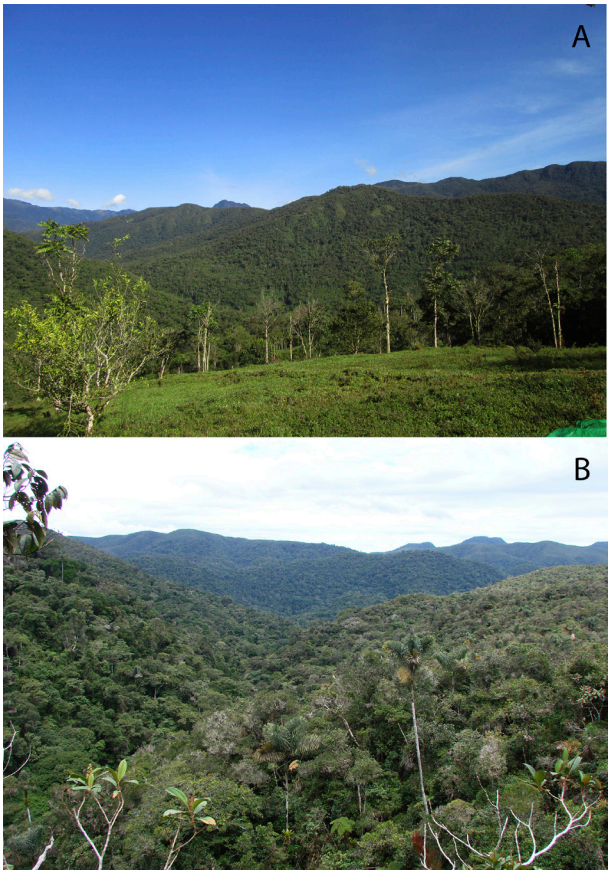

Fig. 8. Habitat of *Cercosaura doanae* **sp. nov.**: (A) landscape of Lajasbamba showing the pasturelands for cattle and montane forest (*photograph taken on October 2014 by L.Y. Echevarría*); (B) landscape of the primary forest at the type locality. *Photograph taken on February 2008 by P.J. Venegas.*

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Appendix I

Specimens examined

Cercosaura manicata manicata.—ECUADOR: Provincia Pastaza: Campo Oglán (AgipOil), QCAZ 5793, 5821; Pablo López de Oglán Alto, QCAZ 11818; Campamento K10, Campo Villano (AgipOil), 1°28'32.12"S, 77°32'5.53" W, QCAZ 11831. PERU: Departamento Loreto: Provincia Datem del Marañon: Pongo Chinim, 3° 6' 46.8"S, 77° 46' 34.4" W, 365 m, CORBIDI 09406. Departamento San Martin: Provincia Picota: Puesto de Control 16 Chambirillo (PN Cordillera Azul), 7°4'8.9"S, 76°'0'55.2"W, 1,122 m, CORBIDI 08796, 08797, 08836, 08837, 09217, 10419, 10421, 10422; rio Chambira, CORBIDI 03659; Shamboyacu, CORBIDI 06774.

Cercosaura manicata boliviana.—PERU: Departamento de Cusco: Capire 13° 25' 22.27 "S, 70°54'12.16" W, 1,237 m, CORBIDI 14272; Pitumarca, 13° 55' 5.64 "S, 71°0'43.81" W, 4,889 m, CORBIDI 14704; San Pedro, 13° 3' 51.012 "S, 71°33'37.44" W, 1,560 m, CORBIDI 16500.

Pholidobolus dicra.—ECUADOR: Provincia Morona Santiago: Guarumales, 2° 34' 0.0006" S, 78° 30' 0" W, 1,700 m, QCAZ 5292, 5304. Provincia Tungurahua: Río Blanco, Vía Baños-Puyo, 1° 23' 55.6434" S, 78° 20' 24" W, 1,600 m, QCAZ 6936, no locality data QCAZ 8015.

Pholidobolus hillisi.—ECUADOR: Provincia Zamora-Chinchipe: near San Francisco Research Station on Loja-Zamora road, 3°57'57"S, 79°4'45"W, WGS84, 1,840 m, QCAZ 4998-99, 5000; San Francisco Research Station, 3°58'14"S, 79°4'41"W, 1,840 m, QCAZ 6840, 6842, 6844.

Pholidobolus vertebralis.—ECUADOR: Provincia Carchi: Chilma Bajo, 0°51'53.83"N, 78°2'59.26", W, 2,071 m, QCAZ 5057, 8671-8673, 8678, 8679,8717, 8724, 0°51'50.31"N, 78°2'50.05" W, 2022, QCAZ 8684-8689. Provincia Pichincha: Mindo, 0°3'2.41"S, 78°46'18.77" W, 1,700 m, QCAZ 2911, 2912, 2915, 0°4'40.98"S, 78°43'55.02" W, 1,601 m, QCAZ 7528; Cooperativa El Porvenir, El Cedral 0°6'50.40"N, 78°34'11.75" W, 2297 m, QCAZ 5081, 5082; Santa Lucia de Nanegal, 0°6'48.70"N, 78°36'48.60" W, 1,742 m, QCAZ 10667, 0°7'8.51"N, 78°35'58.70" W, 1900 m, QCAZ 10750.

Lourdes Y. Echevarría graduated in Biological Sciences from Universidad Nacional Agraria La Molina, Lima, Peru, in 2014. As a student, she collaborated constantly in the order and management of the herpetological collection of Centro de Ornitologia y Biodiversidad (CORBIDI) developing a great interest in reptiles, especially lizards. For her undergraduate thesis, Lourdes worked on the "Review of the current taxonomic status of *Petracola ventrimaculatus* (Cercosaurini: Gymnophthalmidae) using morphological and ecological evidence." She has continued to work as a researcher at the Museo de Zoología (QCAZ), Pontificia Universidad Católica del Ecuador in Quito in 2015. Lourdes is preparing a monograph on the systematics of the *Petracola ventrimaculatus* complex based on the results of her undergraduate thesis, as well as other papers about the taxonomy of lizards and snakes.

Andy C. Barboza graduated in Biological Sciences from Universidad Nacional de Trujillo, La Libertad, Peru in 2012. She works as collection manager of the amphibian collection of Centro de Ornitología y Biodiversidad (CORBIDI). For her undergraduate thesis she worked on the "Composition and altitudinal distribution of amphibians from Otishi National Park," in collaboration with Missouri Botanical Garden (GMB). Her current research interest is focused on the systematics, diversity, and conservation of Neotropical herpetofauna, particularly from Peru, and the evolutionary history and behavior of amphibians facing climate change.

Pablo J. Venegas graduated in Veterinary Medicine from Universidad Nacional Pedro Ruiz Gallo, Lambayeque, Peru, in 2005. He is currently curator of the herpetological collection of Centro de Ornitologia y Biodiversidad (CORBIDI) and worked as a researcher at the Museo de Zoología QCAZ, Pontificia Universidad Católica del Ecuador in Quito in 2015. His current research interest is focused on the diversity and conservation of the Neotropical herpetofauna with emphasis in Peru and Ecuador. So far he has published more than 40 scientific papers on taxonomy and systematics of Peruvian and Ecuadorian amphibians and reptiles.