

A new tree frog of the genus *Osteocephalus* from high altitudes in the Cordillera del Cóndor, Ecuador (Amphibia: Anura: Hylidae)

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A new species of *Osteocephalus* (*Osteocephalus duellmani*) is described from the Ecuadorian part of the Cordillera del Cóndor, an isolated sub-Andean mountain range along the Ecuadorian–Peruvian border. Apparently an endemic to these mountains, it is one of the few species in the genus reaching an altitude of almost 2000 m. It is distinguished from other species in the *O. buckleyi* complex in the lack of spinous dorsal tuberculation, a relatively small tympanum, uniformly coloured posterior surfaces of the thighs, lack of a row of tubercles on the lower jaw, and smooth fringes on the inner side of finger III and outer edge of finger IV.

Key words: *Osteocephalus buckleyi* complex, *Osteocephalus duellmani*, Peru

INTRODUCTION

The Cordillera del Cóndor is one of several sub-Andean mountain ranges stretching north to south for about 150 km parallel to the Andes along the border between Ecuador and Peru, its highest peaks reaching an altitude of about 2900 m. Unlike the main eastern cordillera of the Andes, which is built up of metamorphic and volcanic rock, it consists of sand- and limestone sediments uplifted in the Mesozoic and early Tertiary at about the same time as the Andes, but apparently disjunct from the Andean Cordillera Oriental (Neill, 2005; Missouri Botanical Garden, 2007). Several expeditions have shown that the Cordillera del Cóndor is a region of high biodiversity and endemism (Schulenberg & Awbrey, 1997; Neill, 2005; Missouri Botanical Garden, 2007; Conservation International, 2009).

Several amphibian species have been described from the Cordillera del Cóndor, mainly based on material collected by an expedition to the headwaters of Río Piuntza in 1972 (Lynch, 1974, 1976, 1979; Lynch & Duellman, 1980; Duellman & Lynch, 1988; Duellman & Simmons, 1988; Duellman & Pramuk, 1999). More recent expeditions to the Cordillera del Cóndor (Schulenberg & Awbrey, 1997; Conservation International, 2009) are also beginning to have an impact on the number of new species known from the area (e.g. Duellman, 2004; Cisneros-Heredia & McDiarmid, 2006; Cisneros-Heredia & Morales-Mite, 2008; Cisneros-Heredia et al., 2008; Teran-Valdez & Guayasamin, 2010). For species lists, see also Duellman & Lynch (1988), Almendáriz (1997), Reynolds (1997) and Reynolds & Icochea M. (1997).

Tree frogs in the genus *Osteocephalus* predominantly inhabit Amazonian and Guianan lowland rainforests rather than high elevations. Few species reach 1200 m in elevation, and only five species surpass 1500 m. One of these is *O. phasmatus* (1550 m) from Mount Ayanganna

in the Guiana Highlands (MacCulloch & Lathrop, 2005). On the eastern Andean slopes, *O. carri* reaches 1600 m in Colombia (specimens at ICN; Jungfer, 2010), *O. mimeticus* ascends to 1650 m in Peru (Jungfer, 2010), and *O. verruciger* from Ecuador and southern Colombia is reported from 1840 m a.s.l. (Trueb & Duellman, 1971). Some specimens of *O. verruciger* at KU collected later than 1971 are from 1910 m above sea level. A species similar to *O. verruciger* occurring in the Cordillera Oriental in northern Peru and southern Ecuador (*O. "festae"* of Ron et al., 2010) reaches an altitude of 2200 m (Jungfer, 2010: 41; Ron et al., 2010). The aim of this paper is to describe a new species in the *O. buckleyi* complex from similarly high elevations (1910 m) from the Cordillera del Cóndor.

MATERIALS AND METHODS

Measurements taken follow Duellman (2001), except that foot length is the distance from the bent tibiotarsal articulation to the tip of the fourth toe. Terminology of skin texture is as described by Duellman & Lehr (2009) for strabomantid frogs. Webbing formula is that of Savage & Heyer (1967), as modified by Myers & Duellman (1982). Enumeration of diagnostic characters follows Jungfer (2010). For ease of comparison unknown characters are also stated. Abbreviations are as follows: ED: eye diameter; EN: distance from eye to naris; FD: diameter of finger disc on third finger; FL: foot length; HL: head length; HW: head width; IN: internarial distance; SVL: snout–vent length; TD: tympanum diameter; TE: distance between tympanum and eye; TL: tibia length. Measurements were made using digital callipers or the ocular micrometer of a dissecting microscope if less than 5 mm; all measurements are in mm. Museum abbreviations follow Frost (2011). The appendix of specimens examined lists those species not already included in Jungfer (2010).

RESULTS

***Osteocephalus duellmani* n. sp.**

Holotype. KU 147172, an adult male of 48.6 mm SVL (Fig. 1), collected in the Cordillera del Cóndor, Río Piuntza, 1910 m asl, about 3°25'S, 78°27'W, Provincia Morona-Santiago, Ecuador, by John E. Simmons on 5 January 1972.



Fig. 1. Holotype of *Osteocephalus duellmani* n. sp. (KU 147172) in dorsal and ventral view, lateral view of head and cloacal region with posterior surface of thigh.

Paratype. KU 147171, a subadult of 34.0 mm SVL (Fig. 2), collected on 4 January 1972, otherwise with same data as holotype.

Diagnosis and comparisons. The coarse dorsal skin, areolate flanks, angular dentigerous processes of the vomers and size distinguish *O. duellmani* from other hyloid frog genera in southeastern Ecuador and northeastern Peru. Within the genus it resembles *O. buckleyi* and *O. festae* in having a rounded and curved canthus rostralis and coarsely areolate flanks (Jungfer, 2010). It may be diagnosed as 1) a medium sized species in males (48.6 mm SVL) (females unknown); 2) skin on dorsum of (non-breeding) males shagreen; 3) skin on flanks coarsely areolate; 4) rounded canthus rostralis curved inward; 5) frontoparietal ridges not visible externally; 6) dentigerous processes of vomers angular; 7) moderately thick, tuberculate supra-tympanic fold from the posterior edge of the orbit sloping in an arch towards the arm insertion; 8) web on inner edge of third finger reaching to penultimate subarticular tubercle, continued to ultimate subarticular tubercle as a fringe; 9) distal subarticular tubercle on finger IV barely bifid or single; 10) dorsum tan with irregular dark tan blotches, posterior part sometimes with minute light spots; 11) throat, chest and venter creamy tan to creamy



Fig. 2. Subadult paratype of *Osteocephalus duellmani* n. sp. (KU 147171). Note bold dark brown dorsal blotches and light supralabial markings.

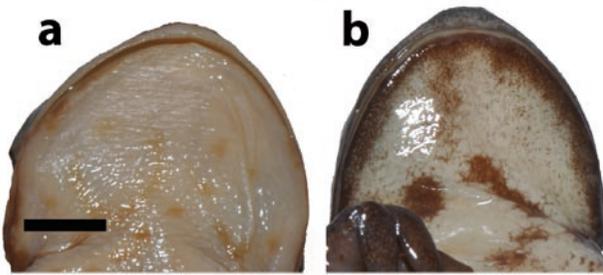


Fig. 3. Ventral view of head of a) *Osteocephalus duellmani* (holotype, 48.6 mm SVL) and b) *Osteocephalus* sp. (*O. "festae"* of Ron et al., 2010) (MUSM 19224, 49.9 mm SVL). Note the pointed lower jaw and less protruding snout in *O. duellmani*, which also has a proportionately wider head. Bar equals 5 mm.

white with irregular tan spots; 12) one or two white supralabial marks; 13) flanks creamy white without dark tan blotches, areolae outlined dark tan; 14) position of vocal sacs paired, protruding ventral to angles of jaws; 15) juvenile coloration unknown; 16) tadpole habitat (most likely in streams) and labial tooth row formula unknown; 17) colour of tibiofibular bones white in preservative.

Osteocephalus duellmani differs from other species in the *O. buckleyi* complex (Jungfer, 2010) as follows (characters of *O. duellmani* in parentheses): *Osteocephalus buckleyi* has a large tympanum with TD/HL 0.23–0.26 in males (medium-sized, TD/HL 0.15–0.16), posterior surfaces of the thighs tan with or without dark brown and/or light marbling or irregular crossbars (light tan, uniform), and webbing on the inner side of finger III without fringe from penultimate subarticular tubercle to intercalary tubercle (fringe present). *Osteocephalus cabrerai* has a row of tubercles on the lower jaw (absent) and an irregular, deep fringe on the outer edge of finger IV (smooth, shallow fringe). *Osteocephalus festae* has a large tympanum in males with TD/ED 0.23–0.25 (medium-sized, TD/HL 0.15–0.16) and a row of low tubercles on the outer edge of finger IV (smooth, shallow fringe). The dorsal surface of the head, inclusive of the orbits, of *O. festae* is tuberculate interspersed with several larger tubercles (uniformly tuberculate). *Osteocephalus* sp. (*O. "festae"* sensu Ron et al., 2010) from the Andes of southern Ecuador and northern Peru has large tubercles on the dorsum in breeding and non-breeding condition (shagreen without large tubercles in non-breeding male). It further differs in having a rounded lower jaw (slightly pointed tip of lower jaw) and a protruding snout in ventral view (less protruding) (Fig. 3). In *O. inframaculatus* the dorsal surfaces of the head and canthus rostralis are covered with small, irregular tubercles and there are larger tubercles on the orbits (uniformly tuberculate). The posterior surfaces of the thighs are tan with light, short vermiculation (light tan, uniform).

Other species of *Osteocephalus* from the Andean slopes between 600 and 2000 m differ as follows: *Osteocephalus carri* is shagreen to weakly tuberculate in the subcloacal area (warty). Males of *Osteocephalus mimeticus*, *O. mutabor* and *O. verruciger* have tuberculate dorsa with spinous tubercles with (breeding) or without keratinized tips (non-breeding) (shagreen in non-breeding male) (Jungfer, 2010; Jungfer & Hödl, 2002; Trueb & Duellman, 1971).

Other *Osteocephalus* species in the western Amazonian lowlands adjacent to the Cordillera del Cóndor differ from *O. duellmani* as follows: *Osteocephalus deridens* differs in the smaller size of males, to 40.0 mm SVL (48.6 mm), dorsum with scattered low tubercles (absent) and axillary membrane absent (present) (Jungfer et al., 2000); *O. fuscifacies* in the absence of an axillary membrane (present), and less webbing on the foot that does not reach the intercalary tubercle on the outer side of toe III (to intercalary tubercle) (Jungfer et al., 2000); *O. leoniae* in having a straight, angular canthus rostralis (curved inward, rounded), a thin dark line on the lower lip (absent), and less webbing, just or barely reaching proximal edge of proximal subarticular tubercle on the inner side of finger III (to proximal subarticular tubercle and continued to intercalary tubercle as a fringe) (Jungfer & Lehr, 2001). *Osteocephalus planiceps* is considerably larger, males up to 67.8 mm SVL, and with a straight, angular canthus rostralis (concave, rounded). *Osteocephalus taurinus* with males up to 89.3 mm SVL and *O. yasuni* with males up to 56.0 mm SVL are larger species (48.6 mm) and males of both species have tuberculate dorsa with (breeding) or without keratinized tips (non-breeding) (shagreen in non-breeding male) (Trueb & Duellman, 1971; Ron & Pramuk, 1999; Jungfer, 2010).

Description of holotype. The snout is bluntly rounded in dorsal and lateral view. The head is longer than wide (HL/HW 1.06). The lateral edges of the frontoparietals are not visible through the skin. The canthus rostralis is concave, rounded. The loreal region is oblique, concave. The nostrils are elevated, opening posterolaterally. The lips are flared. The dentigerous processes of the vomers are angular, separated from each other, bearing nine teeth on the left and 10 on the right. The processes are situated between the choanae, their anterior edges at midlevel of the choanae, their posterior edges reaching beyond the posterior edges of the choanae. They are somewhat asymmetrical (length on the right 2.3 mm, on the left 1.8 mm) in this specimen. Together, they are slightly wider than the narrowest interchoanal distance. The choanae are large, oblique, ovoid, and somewhat angular anteriorly. The tongue is elliptical, about 1.3 times wider than long.

The postocular area is barely oblique, almost vertical. There is a moderately heavy, tuberculate supratympanic fold from posterior to the orbit following the shape of the tympanum from 11 to three (tympanum of the left side visualized as a clock face), and then curving towards the midlevel of the arm insertion. The tympanum is elliptical (height 89% of width), with a distinct tympanic annulus that is partly concealed dorsally by the supratympanic fold. It is medium-sized, its diameter about 93% of the

width of the disc of finger III and 49% of the eye diameter. Dorsal surfaces of the head, orbits, loreal region and postorbital area are evenly weakly tuberculate. Posteroventral to the tympanum, tubercles are larger than those anteriorly. Dorsally, the skin of the body is shagreen. The flanks are coarsely areolate from above the arm insertion to the groin. The gular area is shagreen anteriorly, becoming areolate posterolaterally. The vocal sacs are paired and protrude ventral to the angles of the jaws. The arms are finely shagreen dorsally and ventrally. A few outer ulnar tubercles are flat and indistinct. An axillary membrane is conspicuous in ventral view, covering one fourth of the upper arm proximally in dorsal view. The proximal two thirds of the thighs are finely areolate ventrally and lateral from the cloacal opening, shagreen dorsally, the other surfaces are smooth. There are three to four minute, flat tubercles on the heel. The outer edge of the metatarsus is smooth. A few minute tubercles are present on the outer edge of toe V. Lateral to the cloacal opening, which is situated almost at the upper level of the thighs and opens posteriorly, there are numerous tubercles that extend to the posterior surfaces of the thighs. The subcloacal area is warty. A cloacal sheath is weak (Fig. 1).

The finger discs are ovoid. A large elliptical thenar tubercle is present. Small, flat supernumerary tubercles are present on the bases of all fingers. The distal subarticular tubercle on finger IV is barely bifid. The inner side of finger III and the outer edge of finger IV bear narrow, smooth fringes. The relative lengths of the adpressed fingers are $I < II < IV < III$. The webbing formula is $I \text{ basal } II \text{ } 2 - 3\frac{1}{4} \text{ } III \text{ } 3^+ - 2\frac{2}{3} \text{ } IV$ (Fig. 4).

On the foot there is a large elliptical inner and a small flat, rounded outer metatarsal tubercle. The plantar tubercles are low and flat. Supernumerary tubercles on the proximal segments of toes III–IV are small and low. There

are a few small tubercles on the metatarsus to the penultimate subarticular tubercle. The subarticular tubercles are single and conical. Distally a narrow smooth fringe extends at least to the intercalary on the inner side of toe II and both sides of toes III and IV. The relative lengths of the adpressed toes are $I < II < V < III < IV$. The webbing formula is $I \text{ } 1\frac{1}{3} - 2 \text{ } II \text{ } 1^+ - 2 \text{ } III \text{ } 1\frac{1}{3} - 2^- \text{ } IV \text{ } 2^- - 1^+ \text{ } V$ (Fig. 4).

Measurements: SVL 48.6; HL 17.2; HW 16.8; TL 26.1; FL 34.2; ED 5.1; TD 2.8; FD 2.6; EN 4.6; IN 4.1; TE 3.5.

Colour in preservative. The ground colour of head and dorsum is tan, irregularly interspersed by darker tan blotches. There is a creamy white supralabial mark. Postocular, sub- and post-tympanic areas are dark tan, the tympanum is lighter tan. Dark tan blotches are present anteroventrally from the eye, on the orbits, medially on the head posterior to the orbits, and there are two paired median blotches in the shoulder area. Posteriorly the pattern becomes an anastomosis of tan interspersed by minute light tan spots. The shoulders are lighter tan towards the arm insertions. Transversal furrows on the shoulders are dark brown. The flanks are creamy white with areolae outlined in dark brown. There is a light tan crossbar on each wrist. Dorsal surfaces of the arms and legs are, like the posterior part of the back, an anastomosis of tan, interspersed by light tan spots. Irregularly shaped, slightly darker tan crossbars are visible. Hidden surfaces of the limbs are creamy tan to creamy white, except for the posterior surfaces of the thighs, which are uniformly light tan (Fig. 1). Ventrally, the frog is creamy tan to creamy white with a few irregular tan spots on throat, chest and abdomen. Large subcloacal warts are creamy white (Fig. 1).

Paratype. A subadult specimen of 34.0 mm SVL varying little from the holotype in morphology and proportions. Some of the differences might be explained by smaller size. Characters of the holotype are in parentheses for comparison. The snout is truncate (bluntly rounded) in dorsal and bluntly rounded in lateral view. The choanae are ovoid (angular). The supratympanic fold is smooth (tuberculate). The tympanum diameter is about 70% (93%) of the width of the disc on finger III. The head is finely shagreen dorsally (areolate). Outer ulnar tubercles are absent (indistinct). The distal subarticular tubercle on finger IV is barely bifid, as in the holotype, on the left, but single on the right. Measurements: SVL 34.0; HL 13.4; HW 12.6; TL 18.1; FL 24.3; ED 4.2; TD 2.0; FD 1.4; EN 3.5; IN 3.3; TE 2.8.

In preservative, the paratype is more boldly blotched dark tan dorsally, and the crossbars on the limbs are conspicuous. There are two white supralabial marks on both sides, the latter extending to the posterior edge of the upper lip. Bold tan blotches also extend to the flanks (Fig. 2). Two photos of the live paratype, though not good enough for publication, indicate that live coloration more or less equals that of the preserved specimen.

Distribution and habitat. The new species is only known from the type locality in the Cordillera del Cóndor in

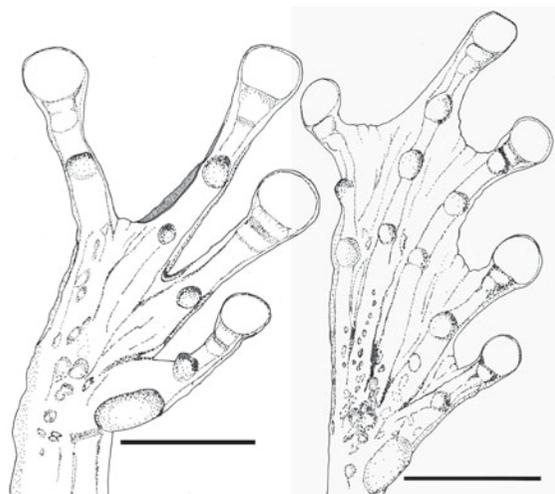


Fig. 4. Hand (left) and foot of *Osteocephalus duellmani* n. sp. in ventral view (KU 147172, holotype). Bars equal 5 mm.

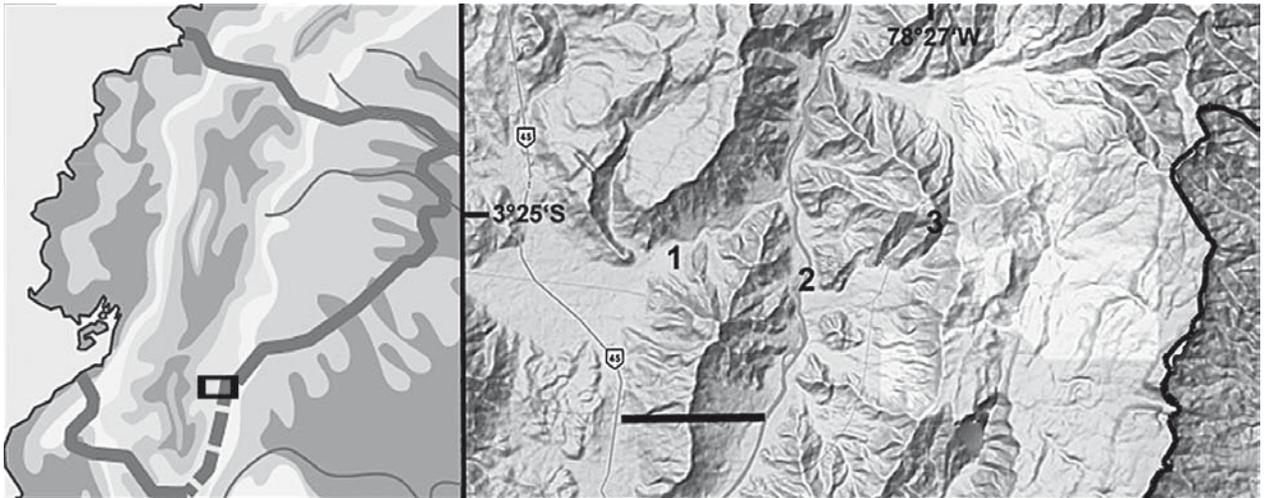


Fig. 5. Map of Ecuador (left). The rectangle indicates the position of the enlarged region, the middle Río Zamora area, Morona-Santiago Province, Ecuador (right). 1) Town of Bomboiza ($3^{\circ} 26'S$, $78^{\circ} 31'W$). 2) Río Zamora. 3) Area of type locality at about $3^{\circ} 25'S$, $78^{\circ} 27'W$. Bar equals 5 km. Solid black line on the right indicates the international border with Peru.

Ecuador, close to the Peruvian border. Duellman & Simmons (1988) provided a map of the area that showed the position of their campsite to be very near the type locality of *O. duellmani*, but 80 m lower in elevation, indicating its coordinates as “approx. $3^{\circ} 30'S$, $78^{\circ} 20'W$ (...) Provincia Morona Santiago, Ecuador”. While these coordinates indicate a site in Peruvian territory, the map allows their position to be corrected slightly to the northwest of their coordinates, at about $3^{\circ} 25'S$, $78^{\circ} 27'W$, by Google Earth (Fig. 5).

The area 80 m lower in elevation was described as wet, dense cloud forest with branches of trees covered by spongy mosses and supporting many epiphytes (Duellman & Simmons, 1988; see more details there).

Etymology. The specific name is a patronym for William E. Duellman on the occasion of his 80th birthday on 6 September 2010 for his outstanding achievements in neotropical herpetology.

DISCUSSION

Only two specimens of the new species exist, and we have insufficient knowledge about the variation in potentially species-specific traits in adult males within the genus *Osteocephalus*, such as tuberculate dorsa, sometimes tipped by keratinized spines and nuptial excrescences of various extent and coloration. Although the adult male holotype was not preserved while in breeding condition, the species is tentatively placed with the *O. buckleyi* complex due to the rounded and curved canthus rostralis and the coarsely areolate flanks that most closely resemble the two other members of the complex, *O. buckleyi* and *O. festae* (Jungfer, 2010). Given the isolated locality and

occurrence at high elevation and distinct morphological features, *O. duellmani* is distinct from all other species in the *buckleyi* complex, and the whole genus.

There are several more species of anurans collected during the memorable Río Piuntza expedition and later described as new, whose type locality data might be affected by the changed coordinates, namely *Oreobates simmonsii* (Lynch, 1974), *Noblella lochites* (Lynch, 1976), *Pristimantis condor* (Lynch & Duellman, 1980), *P. pecki* (Duellman & Lynch, 1988), *Hyloxalus mystax* and *H. shuar* (Duellman & Simmons, 1988), *Pristimantis exoristus* and *P. infraguttatus* (Duellman & Pramuk, 1999). At least the Ecuadorian type locality of the latter two species, indicated as $3^{\circ} 52'S$, $78^{\circ} 15'W$, actually in Peruvian territory, has to be amended.

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APPENDIX

Specimens examined and not yet listed by Jungfer (2010)

Osteocephalus deridens

ECUADOR: *Napo*: Estación Biológica Jatun Sacha: EPN-H 6655 (holotype); EPN-H 6656 (paratype); SMF 78742-3 (paratypes).

PERU: *Loreto*: Río Napo at Río Mangua: KU 192021; Carretera Iquitos – Nauta km 26.5–30.5: MUSM uncat. (6 ex.).

COLOMBIA: *Amazonas*: Carretera Leticia – Tarapaca km 15: ICN 11300; Leticia: Río Calderón: ICN 35636, ICN 35640, ICN 35648-9; Tarapaca: Río Putumayo, caño Alambre: ICN 35642; Leticia, Río Pure: ICN 46518-21; Leticia: Comunidad Jitoma: ICN 46884.

Osteocephalus duellmani

ECUADOR: *Morona-Santiago*: Cordillera del Cóndor, Río Piuntza, 1910 m asl, about 3°25'S, 78°27'W: KU 147171 (paratype), 147172 (holotype).

Osteocephalus fuscifacies

ECUADOR: *Napo*: Estación Biológica Jatun Sacha: EPN-H 6657 (holotype); Rucullacta, 2 km NNW Archidona: EPN-H 4774-5 (paratypes). *Sucumbios*: San Pablo de Kantesiya: MHNG 2366.73, 2373.91 (paratypes).
PERU: *Loreto*: Teniente Lopez, 310 m: KU 221943.

Osteocephalus leoniae

PERU: *Pasco*: Pozuzo (10°04'10"S/75°31'42"W, 1000 m NN): MUSM 20350 (holotype), SMF 80365 (paratype). *Huánuco*: Panguana: ZMH 915-916. *San Martín*: Río Cainarache, 33 km NE Tarapoto on road to Yurimaguas: KU 209447-53; 14 km ESE Shapaja, 360 m: KU 212180.

Osteocephalus mutabor

ECUADOR: *Napo*: San Pablo de Kantesiya: MHNG 2260.4-6, 2260.97, 2366.43, 2366.45, 2366.48, 2366.53, 2366.61-63, 2366.67, 2373.84, 2373.86-87, 2556.57. *Pastaza*: Canelos, 530 m: KU 120915; Locación Petrolera Garza 1, NE Montalvo, 300 m: KU 217747-9. *Sucumbios*: Limoncocha, 200 m; KU 99210-6; Santa Cecilia, 340 m: KU 105210-20, 109509-11, 111971, 122964-87, 123169, 150494-5, 152277.

PERU: *Loreto*: San Jacinto, 175-190 m: KU 221928; 1.5 km N Teniente Lopez, 310-340 m: KU 221929-32.

Osteocephalus phasmatus

GUYANA: *District 7*: NE plateau of Mount Ayanganna, 1490–1550 m: ROM 43855, 43858.

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Osteocephalus sp. (*O. "festae"* of Ron et al., 2010)

PERU: *Cajamarca*: San Ignacio: El Sauce: MUSM 19224.

Osteocephalus verruciger

COLOMBIA: *Huila*: Acevedo, Río Suaza, Río Aguas Claras near San Adolfo, 1400 m: FMNH 69709-10; Palestina: ICN 01542. *Caquetá*: Municipio de Florencia: Escuela Tarqui, carretera Altamira-Florencia km 48–49: ICN 23648; Municipio de Florencia: 35.2 km arriba de Florencia: ICN 23943; Municipio de Florencia: Vereda Tarqui 38.8–39.0 km: ICN 23944-5, ICN 23948, ICN 23952, ICN 23954; Municipio de Florencia: Vereda Tarqui 13.2 km arriba de Florencia: ICN 23946; Municipio de Florencia: 39.3 km arriba de Florencia: ICN 23947. *Putumayo*: 10.3 km W El Pepino, 1440 m: KU 169586-7, 169589-93, 169595-6, 169599, 169601-4, 169606-7.

ECUADOR: *Cotopaxi*: Las Pampas (in error): MHNG 2259.20, 2560.62, 2560.64-68. *Napo*: El Reventador: MHNG 2259.18, 2273.28, 2485.65-70, 2560.63; 2 km SSW Río Reventador, 1700 m: KU 164408, 164414, 164416-9, 164421, 164423-4, 164426; 3.2 km NNE Oritoyacu, 1910 m: KU 178839-44; Río Azuela, 1740 m: KU 143210-2, 143215-7, 143219-24, 164434; Río Azuela, 9.5 km W of Reventador, 1630 m: KU 217750-1; Río Salado, 1 km upstream from Río Coca, 1420 m: KU 164437, 164442, 178844, 178846-7; 0.7 km NE Río Salado bridge on Lago Agrio road, 1380 m: KU 190054; San Rafael: MHNG 2259.19, 2272.98-99; S slope Cordillera del Due, 1150 m: KU 123181, 123186; 11.1 km NE Santa Rosa, 1900 m: KU 19004953; 16.5 km NNE Santa Rosa, 1700 m: KU 143209. *Pastaza*: 9.5 km NW Mera, 1270 m: KU 178848. *Tungurahua*: 11 km E Río Negro, 1170 m: KU 146469-70. No specific locality: ZMH-A946.

Osteocephalus yasuni

ECUADOR: *Orellana*: Río Yasuní, 150 km upstream from Río Napo, 180 m: KU 175196, KU 175198; Río Yasuní, 200 km upstream from Río Napo, 180 m: KU 175205-6.

PERU: *Loreto*: Explorama Lodge, jct. Río Yanamono and Río Amazonas, 210 m: KU 220894.

COLOMBIA: *Amazonas*: Parque Nacional Natural Amacayacu, quebrada Matamata: ICN 20493, ICN 46478; Río Pure: ICN 46477, ICN 46479-87; Carretera Leticia – Tarapaca km 14: ICN 46506.