



A new species of *Osornophryne* (Anura: Bufonidae) from the Andean highlands of northern Ecuador

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Abstract

We describe a new species of the genus *Osornophryne* from the vicinities of Laguna de Puruanta and Laguna de San Marcos in the Andean highlands of northeastern Ecuador. The new species is the largest known member of the genus (female snout-vent length = 40.5–47.1 mm; males unknown) and is remarkable for having a smooth dorsal skin lacking conical tubercles and interspersed with numerous glandular pustules. The new species has a clutch size of about 30 eggs and is likely nocturnal.

Key words: Andes, Anura, Bufonidae, Ecuador, new species, *Osornophryne*

Resumen

Describimos una nueva especie del género *Osornophryne* de los bosques montanos cercanos a la Laguna de Puruanta y la Laguna de San Marcos en los Andes del noreste del Ecuador. La nueva especie es la más grande del género (longitud rostro-cloacal = 40.5–47.1 mm en hembras; machos desconocidos) y se caracteriza por tener un dorso liso con algunas pústulas glandulares y que carece de tubérculos cónicos. Esta especie tiene una puesta de aproximadamente 30 huevos y probablemente es activa durante la noche.

Palabras claves: Andes, Anura, Bufonidae, Ecuador, especie nueva, *Osornophryne*

Introduction

The bufonid genus *Osornophryne* is distributed from the Andes of central Colombia to central Ecuador (Hoogmoed 1987, Mueses-Cisneros 2003) and currently contains six recognized species: *Osornophryne antisana* Hoogmoed, *O. bufoniformis* (Peracca), *O. guacamayo* Hoogmoed, *O. percrassa* Ruiz-Carranza and Hernández-Camacho, *O. sumacoensis* Gluesenkamp, and *O. talipes* Cannatella. Members of this genus share the following character states: reduced number of presacral vertebrae (5 or 6); lateral crests of coccyx that are broadly expanded and fused to sacral diapophyses; a firmisternal pectoral girdle; digits of hands and feet nearly obscured by extensive webbing; and absence of the posterolateral process of the hyoid plate, parotoid glands, and auditory structures (tympanum, tympanic annulus, and stapes). In addition, some species present fusion of the atlas and axis, reduction in the number of phalanges in the manus and pes, sexual dimorphism, and inguinal amplexus (Ruiz-Carranza & Hernández-Camacho 1976, Hoogmoed 1987, Gluesenkamp 1995, Gluesenkamp & Acosta 2001).

Collecting efforts in cloud forest and paramo habitats in central and northern Ecuador have resulted in the discovery of several new populations of the genus *Osornophryne*. Herein, we describe as a new species the populations discovered near Laguna de Puruanta and Laguna de San Marcos.

Materials and methods

Specimens were euthanized by immersion in chloretone, fixed in 10% formalin, and preserved in 70% ethanol (see Simmons 2002). Morphological measurements were taken with digital calipers to the nearest 0.1 mm, and are as follow: Snout-vent length (SVL = direct line distance from tip of snout to posterior margin of vent), Tibia length (TIB = length of flexed hind leg from knee to heel), Foot length (FL = distance from base of inner metatarsal tubercle to tip of fourth toe), Head length (HL = distance from tip of snout to articulation of jaw), Head width (HW = greatest width of head measured between jaw articulations), Interorbital distance (IOD = shortest distance between medial margins of upper eyelids), Internarial distance (IND = distance between internal borders of nostrils), Eye-nostril distance (EN = distance from anterior corner of eye to posterior border of nostril), Eye diameter (ED = distance between anterior and posterior corners of eye), Nostril-Rostrum distance (NR = distance from anterior margin of nostril to tip of rostrum), Upper eyelid width (EW = greatest width of eyelid measured perpendicular to medial axis of skull). Osteological data were obtained by examining cleared-and-stained (C&S) paratypes (adult females, QCAZ 7684 and 13320) and radiographs of the holotype (adult female, QCAZ 11471). Sexual maturity in females was determined by the presence of eggs or convoluted oviducts. We examined alcohol-preserved specimens (Appendix 1) from the herpetological collections at Museo de Zoología of the Universidad Católica del Ecuador, Quito (QCAZ); Museo de la Escuela Politécnica Nacional del Ecuador (EPN); Natural History Museum of the University of Kansas, Lawrence (KU); and United States National History Museum (USNM).

Osornophryne puruanta new species

Holotype.—QCAZ 11471 (Fig. 1), an adult female, obtained near Laguna de Puruanta (00°13' N, 77°57' W, 3000 m.a.s.l.), Cordillera de Pimampiro, Provincia de Imbabura, Ecuador, by A. G. Gluesenkamp and D. A. Gluesenkamp on 17 December 1997.

Paratypes.—QCAZ 7684–85, adult females, obtained near Laguna de Puruanta (00°13' N, 77°57' W, 3500 m.a.s.l.), Cordillera de Pimampiro, Provincia de Imbabura, Ecuador, by A. Vallejo, J. W. Izquierdo, and D. Almeida on 16 November 1996; QCAZ 13271, adult female, obtained near Laguna de San Marcos (00°07'35" N, 77°55'50" W, 3400 m.a.s.l.), on the border between Provincia de Sucumbíos and Provincia de Pichincha, Ecuador, by S. R. Ron and L. A. Coloma on 29 June 1999; QCAZ 13320, adult female, obtained near Laguna de San Marcos, by J. M. Guayasamin on 21 July 1999; EPN 7081–83, adult females, obtained near Laguna de San Marcos, by A. Almendáriz and V. Corte on 20 September 1999.

Diagnosis.—The following traits characterize *Osornophryne puruanta*: (1) females with large body size (SVL 40.5–47.1, $\bar{x} = 43.4 \pm 2.3$, $n = 8$), males unknown; (2) head rounded in dorsal view, rounded to slightly-pointed in lateral view (Fig. 2); (3) tip of snout usually bears papilla; (4) skin on dorsum and flanks relatively smooth, interspersed with numerous glandular pustules some forming ridges, and lacking conical tubercles (Fig. 2); (5) dorsum with discontinuous dorsolateral, parasagittal, paravertebral, and sacral ridges; (6) dorsum pale brown to reddish-brown in life (pale brown in preservative); (7) venter brown with yellowish-brown spots in life (dark gray with pale yellow pustules or pale yellow with grayish-brown reticulations in preservative); and (8) six presacral vertebrae (atlas not fused to Presacral Vertebra II).

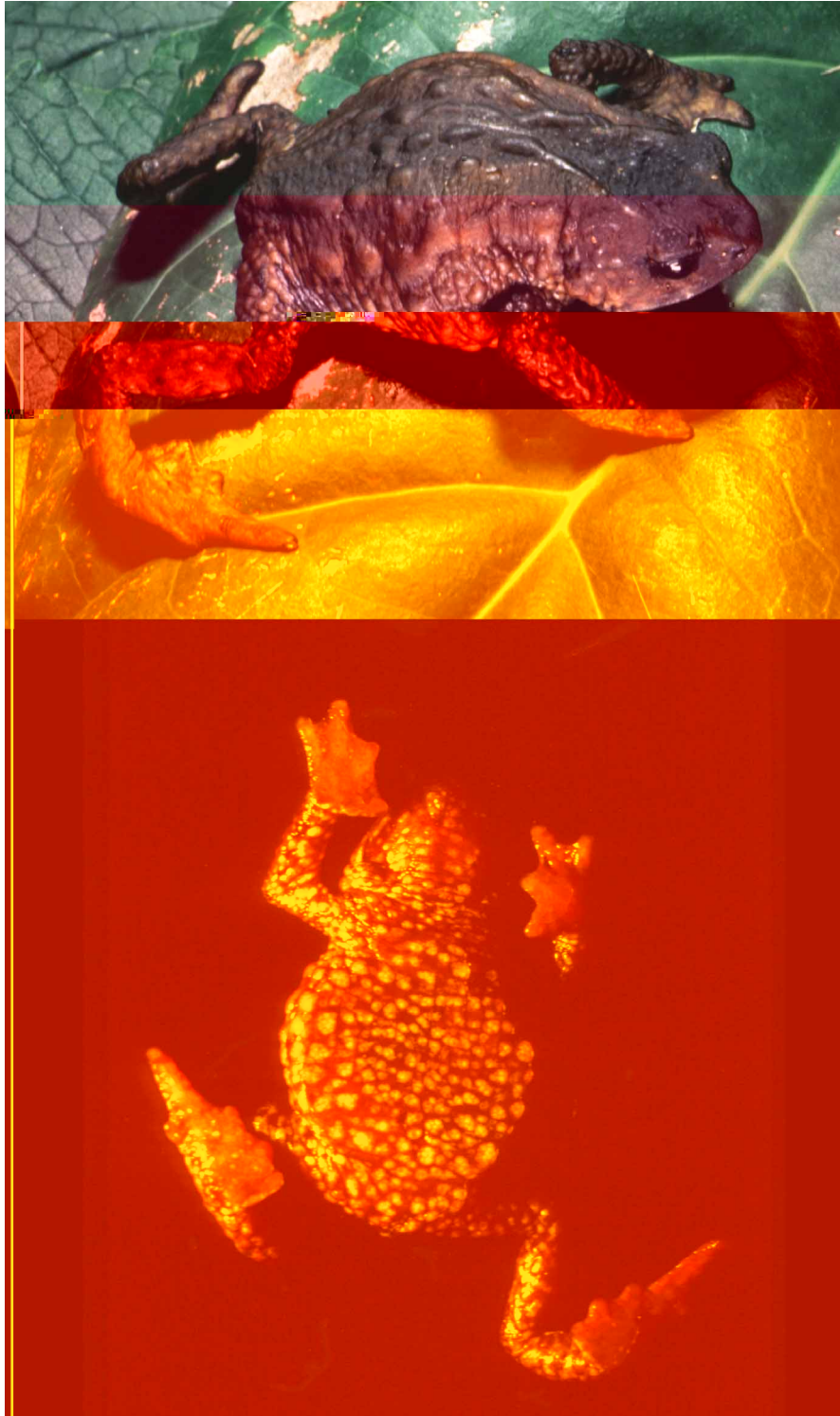


FIGURE 1. Dorsolateral and ventral views of living holotype of *Osornophryne puruanta* (QCAZ 11471, SVL 41.3 mm), adult female collected near Laguna Puruanta at 3000 m.a.s.l., Cordillera de Pimampiro, Provincia de Imbabura, Ecuador. Photographs by Luis Coloma.

Comparison with congeneric species.—*Osornophryne puruanta* can be distinguished from other members of the genus by its large body size (adult female SVL > 40 mm; < 40 mm in all other species) and skin that is pustular rather than rugose or tuberculate on dorsal and lateral surfaces of body. Moreover, *O. puruanta* differs from *O. antisana* in having six discrete presacral vertebrae (five in *O. antisana*), wrinkled skin in the occipital area (smooth and flat in *O. antisana*), and a relatively more rounded snout (pointed in *O. antisana*).

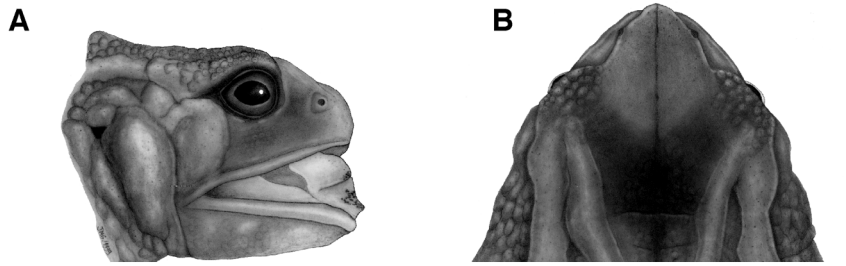


FIGURE 2. Dorsal (A) and lateral (B) views of the head (QCAZ 7685) and ventral views of palmer (C) and plantar (D) surfaces of *Osornophryne puruanta* (EPN 7083). Scale = 2 mm.

Osornophryne puruanta can be distinguished from *O. bufoniformis* by having a snout that is relatively more rounded in dorsal view (with a sharp angle at level of nostril in *O. bufoniformis*, Fig. 3), fleshy and wrinkled palmar and plantar surfaces (tuberculate in *O. bufoniformis*, Fig. 3), and a relatively narrower urostyle (Fig. 4; also, see Ruiz-Carranza & Hernández-Camacho 1976:Fig. 8).

Osornophryne puruanta can be distinguished from *O. guacamayo* by the presence of six discrete presacral vertebrae (five in *O. guacamayo*), a pustular upper eyelid (strongly tuberculate in *O. guacamayo*), elongate Toe IV (Toes IV and V elongate in *O. guacamayo*), and a mostly brown dorsum lacking dorsolateral lines (blackish brown, typically with two oblique yellow dorsolateral lines in adult female *O. guacamayo*).

Osornophryne puruanta differs from *O. percrassa* by a more rounded snout in lateral view (truncate in *O. percrassa*), dorsum smooth with interspersed pustules (covered with small and large pustules in *O. percrassa*), a ventral color pattern composed of small, yellowish cream pustules (composed of large, irregular yellowish gray blotches in *O. percrassa*), and a pale brown dorsum in preservative (black in *O. percrassa*).

Osornophryne puruanta differs from *O. sumacoensis* in having an atlas that is discrete and not fused to Presacral II (fused in *O. sumacoensis*), yellowish-brown or reddish-brown dorsum in life (dark brown or black in *O. sumacoensis*) and a venter that is brown with yellowish-cream pustules in life (black or blue with black spots in *O. sumacoensis*).

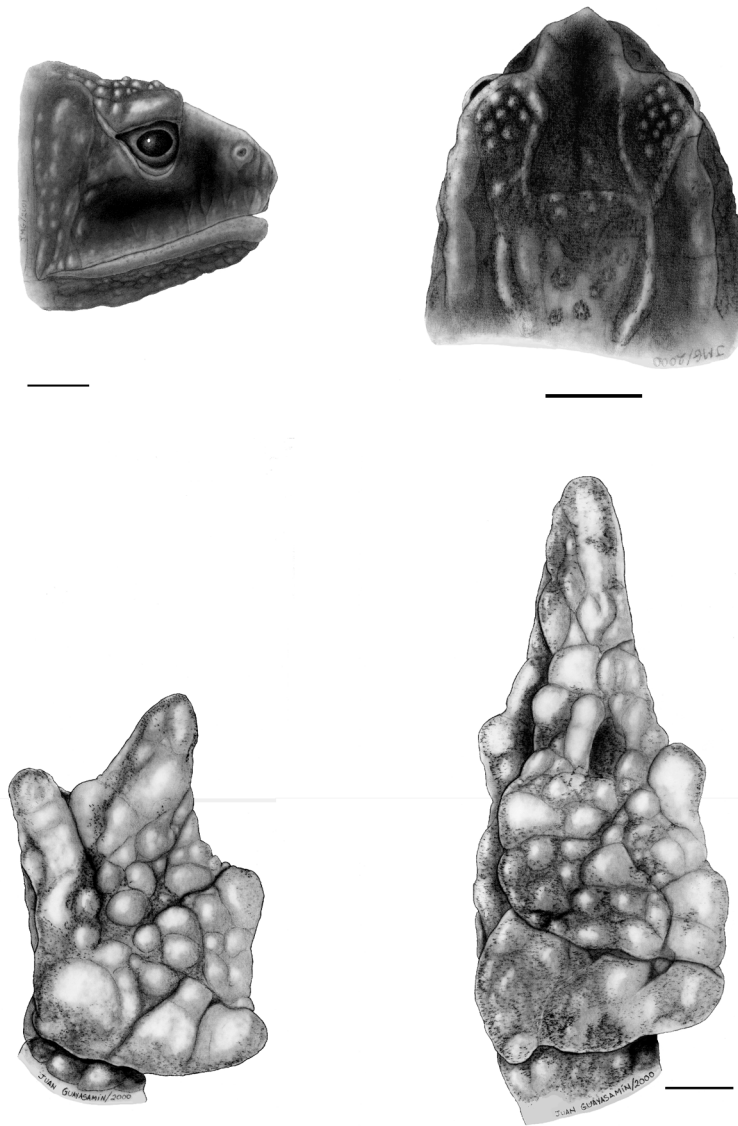


FIGURE 3. Dorsal (A) and lateral (B) views of the head (QCAZ 14082 and QCAZ 14080, respectively) and ventral views of palmar (C) and plantar (D) surfaces (QCAZ 14080 and QCAZ 14082, respectively) of *O. bufoniformis*. Scale = 2 mm.

Osornophryne puruanta differs from *O. talipes* by having a snout that is relatively more rounded in dorsal and lateral views (highly acuminate in *O. talipes*), and a head that is wider than long (about as wide as long in *O. talipes*).

Description of holotype.—Head wider than long (HL 91.85% HW). Snout with papilla at tip, rounded in dorsal and lateral views. Tip of snout extending slightly beyond anterior margin of upper jaw. Canthus rostralis prominent, forming a crest angled medially from anterior margin of orbit to narial region in dorsal view, convex in lateral view, widened around naris. Nostrils directed laterally. Interorbital region smooth, depressed. Upper eyelid weakly rugose with small, flat pustules and pustular margin forming a glandular ridge continuous with canthus rostralis. Infraorbital region smooth with few scattered, inconspicuous glandular pustules. Tympanum absent. Occipital region bearing large, glandular warts. Loreal region smooth, slightly concave. Lips smooth, prominent. Tongue oval, pigmented at base. Choanae small, round, vomerine teeth absent.

Skin on dorsum lacking conical tubercules, but interspersed with glandular pustules of different sizes. Some pustules forming conspicuous non-continuous ridges. Postorbital ridge oblique, extending from poste-

rior margin of eyelid to paravertebral ridge. Glandular ridge along iliac crest, continuous with paravertebral ridge. Dorsolateral ridge extending from posterolateral margin of eyelid to paravertebral ridge at superior margin of cloaca. Flank of abdomen rugose, bearing numerous small warts interspersed with few large, pustular warts. Venter slightly rugose with numerous clusters of small, round pustules. Gular fold pronounced. Cloaca directed posteroventrally, positioned on inconspicuous cloacal tube. Supracloacal wart azygous.

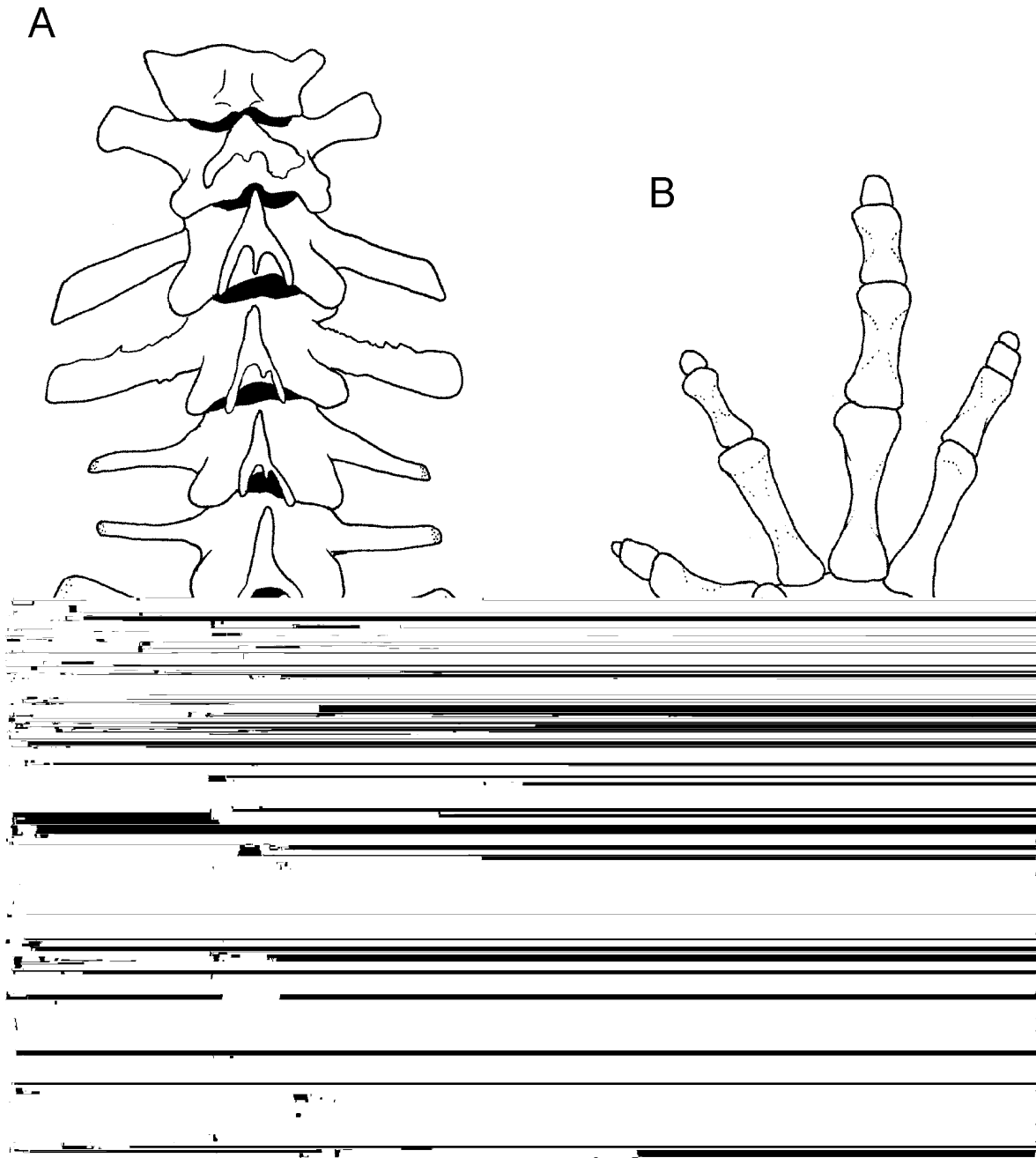


FIGURE 4. Dorsal views of vertebral column (A) and hand (B) of *Osornophryne puruanta* (QCAZ 13320, adult female).

Limbs slender. Skin on dorsal surfaces of limbs warty. Dorsal skin of forelimb with many small, tuberculate warts. Dorsal surface of hind limb with larger, pustular warts. Ventral surfaces of thighs covered with tuberculate warts; shanks with low, rounded, pustular warts. Palmar and plantar surfaces bearing numerous tubercles. Tips of fingers and toes free of webbing, fleshy pad on ventral surface of each tip. Length of fingers: III > IV > II > I; length of toes: IV > V > III > II > I. Inguinal fat bodies absent.

Color of the holotype in preservative.—Dorsum yellowish pale brown. Venter dark brown with yellowish clusters of pustules. Cloacal area black. Palmar and plantar surfaces reddish-brown.

Color of the holotype in life.—Dorsum yellowish-brown. Iris dark brown with few golden flecks. Venter reddish-brown with clusters of cream pustules. Flanks with clusters of yellow pustules on. Palmar and plantar surfaces pale pink.

Measurements of the holotype (in mm).—SVL = 41.3; TIB = 13.5; FL = 16.2; HW = 13.5; HL = 12.4; IOD = 5.0; IND = 3.5; EN = 2.7; ED = 2.9; NR = 2.4; EW = 3.0. Morphometric ratios for holotype are followed by ranges of seven paratypes in parentheses: TIB/SVL = 0.33 (0.29–0.34); HW/HL = 1.09 (1.09–1.25); HL/SVL = 0.3 (0.25–0.29); HW/SVL = 0.33 (0.30–0.34).

Osteological characteristics.—Six discrete presacral vertebrae present, atlas and axis free, width of transverse processes and sacral diapophyses: Sacrum = IV > III > V ≈ VI > II. Transverse processes nearly perpendicular to notochordal axis in Presacrals V and VI, directed anteriorly in Presacral II, and posteriorly in Presacrals III, IV. The bony sacral diapophyses are broadly expanded and fused to the urostyle, which is expanded laterally and bears a low dorsal crest throughout a third of its length (Fig. 4A). The carpus is composed of a radiale, ulnare, Element Y, Carpal 1, and a large postaxial element assumed to represent a fusion of Carpals 2–4. The prepollex is composed of one small bone that articulates with the proximal end of Metacarpal I. All carpal elements are tightly articulated. Phalangeal formula of hand: 2-2-3-3 (Fig. 4B); phalangeal formula of foot variable: 1-2-2-4-2 (QCAZ 7684) or 1-2-2-4-1 (QCAZ 13320). Posterior sternal elements covered by *m. vagina recti* (see da Silva and Mendelson 1999). Stapes absent.

Variation.—Snout without papilla at tip, rounded in dorsal and lateral views (QCAZ 7685). Snout slightly protruding in lateral view (EPN 7083). Atlas and presacral Vertebra II partially fused (QCAZ 7684). Variation in measurements and proportions is presented in Table 1. In preservative, tongue slightly pigmented at base (QCAZ 13320) or unpigmented (QCAZ 13271, EPN 7082–83); venter mostly dark gray with pale yellow pustules (QCAZ 7685, EPN 7083) or mostly pale yellow with grayish-brown reticulations (QCAZ 13271, QCAZ 13320, EPN 7081–82). In life, dorsum pale reddish brown (QCAZ 13271, QCAZ 13320); iris dark gray with white flecks (QCAZ 13271, QCAZ 13320, EPN 7082–83); palmar and plantar surfaces pink (QCAZ 13271, QCAZ 13320) or red (EPN 7082–83).

TABLE 1. Measurements taken from the type series (ranges in mm). See Materials and Methods for definitions of abbreviations.

Specimen	SVL	TIB	FL	HW	HL	IOD	IND	END	ED	NR	EW
QCAZ 7684	42.0	14.2	15.4	13.5	11.8	6.6	3.7	2.6	3.0	2.4	2.9
QCAZ 7685	42.5	13.5	15.0	12.7	11.2	6.4	3.6	2.2	3.4	2.3	3.2
QCAZ 11471	41.3	13.5	16.2	13.5	12.4	5.0	3.5	2.7	2.9	2.4	3.0
QCAZ 13271	45.4	13.6	15.6	14.2	11.4	6.0	3.6	2.4	3.5	2.5	3.2
QCAZ 13320	43.8	12.7	14.7	14.5	11.8	6.6	3.8	2.3	3.6	2.6	3.2
QCAZ 7083	47.1	14.5	15.8	14.2	13.0	7.1	4.2	2.4	3.8	2.9	2.9
EPN 7081	40.5	11.7	14.6	13.8	11.6	7.6	4.0	2.5	3.3	2.5	2.8
EPN 7082	44.9	13.1	14.5	14.5	12.3	7.0	3.7	2.7	3.5	2.5	3.0

Etymology.—The specific name is an indeclinable noun and refers to the Laguna de Puruanta (or Puruhanta) in the vicinity of the type locality.

Ecology.—*Osornophryne puruanta* is known from eight specimens, all adult females. Two specimens were collected active at night, one on an epiphytic bromeliad (QCAZ 7685) one on the ground (QCAZ 7684) and the remaining six specimens were found under logs (QCAZ 11471, QCAZ 13271, and QCAZ 13320) or in the bases of plants of the family Poaceae (EPN 7081–83) during the day. This species is probably nocturnal

since no individuals were observed active during the day despite extensive search efforts. It is likely that *Osornophryne* species are semi-fossorial, at least during the day.

Clutch size in *Osornophryne puruanta* is comparable to that reported for *O. guacamayo* (35–50 eggs; Gluesenkamp and Acosta, 2001). One specimen of *O. puruanta* (QCAZ 7684) had 30 mature ovarian eggs with a maximum diameter of 3.15 mm ($\bar{x} = 2.73 \pm 0.14$), and another (QCAZ 13320) had 31 mature ovarian eggs with a maximum diameter of 3.61 mm ($\bar{x} = 3.05 \pm 0.26$). *Osornophryne puruanta*, as other member of the genus, is presumed to have terrestrial eggs that undergo direct development (Ruiz-Carranza & Hernández-Camacho 1976). Stomach contents of QCAZ 7684 consisted of a beetle (Chrysomelidae), hymenopteran wings, a coleopteran larvae, and incidental plant material. Anurans present at the type locality include *Pristimantis buckleyi*, *P. trepidotus*, *Phrynopus brunneus*, and three unidentified species of *Pristimantis*.

Vegetation at Laguna de Puruanta consists of dense forest patches dominated by *Miconia* trees, which are covered with a variety of epiphytic plants including arboreal bromeliads of the genus *Tillandsia*, ferns of several genera (*Polipodium*, *Jamesonia*, and *Elaphoglossum*; Polypodiaceae), orchids (*Epidendrum* and *Pleurothallis*), and mosses. Patches of forest are surrounded by members of the Ericaceae (*Pernettya*, *Cavendishia*, *Psammisia*, and *Vaccinium*), Asteraceae (*Baccharis* and *Gynoxis*), and Melastomataceae (*Brachyotum*) families. Flat, wet areas are dominated by grasses (*Cortaderia* and *Festuca*), Hypericaceae (*Hypericum laricifolium*) and Asteraceae (*Loricaria*, *Hypochaeris*, and *Werneria*) (Museo Ecuatoriano de Ciencias Naturales 1987). Arborescent ferns (*Blechnum*) and terrestrial bromeliads (*Puya*) are present in the area.

The anuran community at Laguna de San Marcos includes *Pristimantis curtipes*, *P. devillei*, *P. trepidotus*, *Gastrotheca* sp., and *Atelopus ignescens* (not observed since 1985). The forest canopy reaches 12 m and is dominated by *Gaiadendorn punctatum* (Loranthaceae), *Weinmannia fagaroides* (Cunnoniaceae), *Oreopanax* sp. (Araliaceae), and *Miconia* sp. (Melastomataceae). Numerous epiphytes (primarily mosses, orchids, lichens, and bromeliads) cover the trees. The middle stratum of the forest is composed of the genera *Miconia* (Melastomataceae), *Berberis* (Berberidaceae), and *Gynoxys* (Asteraceae). The lower stratum includes terrestrial ferns and species of the genera *Piper* (Piperaceae), *Loricaria* (Asteraceae), *Pernettya* (Ericaceae), *Ribes* (Grossulariaceae), and *Brachyotum* (Melastomataceae) (S. R. Espinosa and R. Montúfar, pers. comm.). Both localities are in areas classified as Evergreen High Montane Forest (Valencia et al. 1999) or Very Wet Montane Forest life zone (Holdridge 1967), and have annual temperatures between 7 and 12°C and an annual rainfall of 1000–2000 mm (Cañadas-Cruz 1983).

Distribution.—This species is known only from Laguna de Puruanta (00°12' N, 77°57' W, 3000–3500 m) on the western slopes of the Cordillera de Pimampiro, Provincia Imbabura, and the vicinity of Laguna de San Marcos (00°07' 35" N, 77°55' 50" W, 3400 m). Laguna de San Marcos is located on the eastern slopes of the Filo de Talcas, approximately 6 km S Laguna de Puruanta, on the border between Provincia Pichincha and Provincia Sucumbíos (Fig. 5).

Discussion

Despite the fact that no male *O. puruanta* have been collected, it is likely that males of this species are similar to females in terms of skin texture (interspersed with numerous glandular pustules and lacking conical tubercles). Gluesenkamp and Acosta (2001) described sexual dimorphism in *O. guacamayo* and observed that adult males were virtually indistinguishable from subadult females in terms of skin texture and color pattern and that the most obvious differences between adult females and males was greater body size and aposematic coloration in the former. In other species, *O. antisana*, *O. bufoniformis*, and *O. sumacoensis*, adult males and females have similar skin texture and differ primarily in body size and the presence of a ventrally-directed cloacal tube in males. Also, males usually have an elongated snout, which is smaller or absent in females.

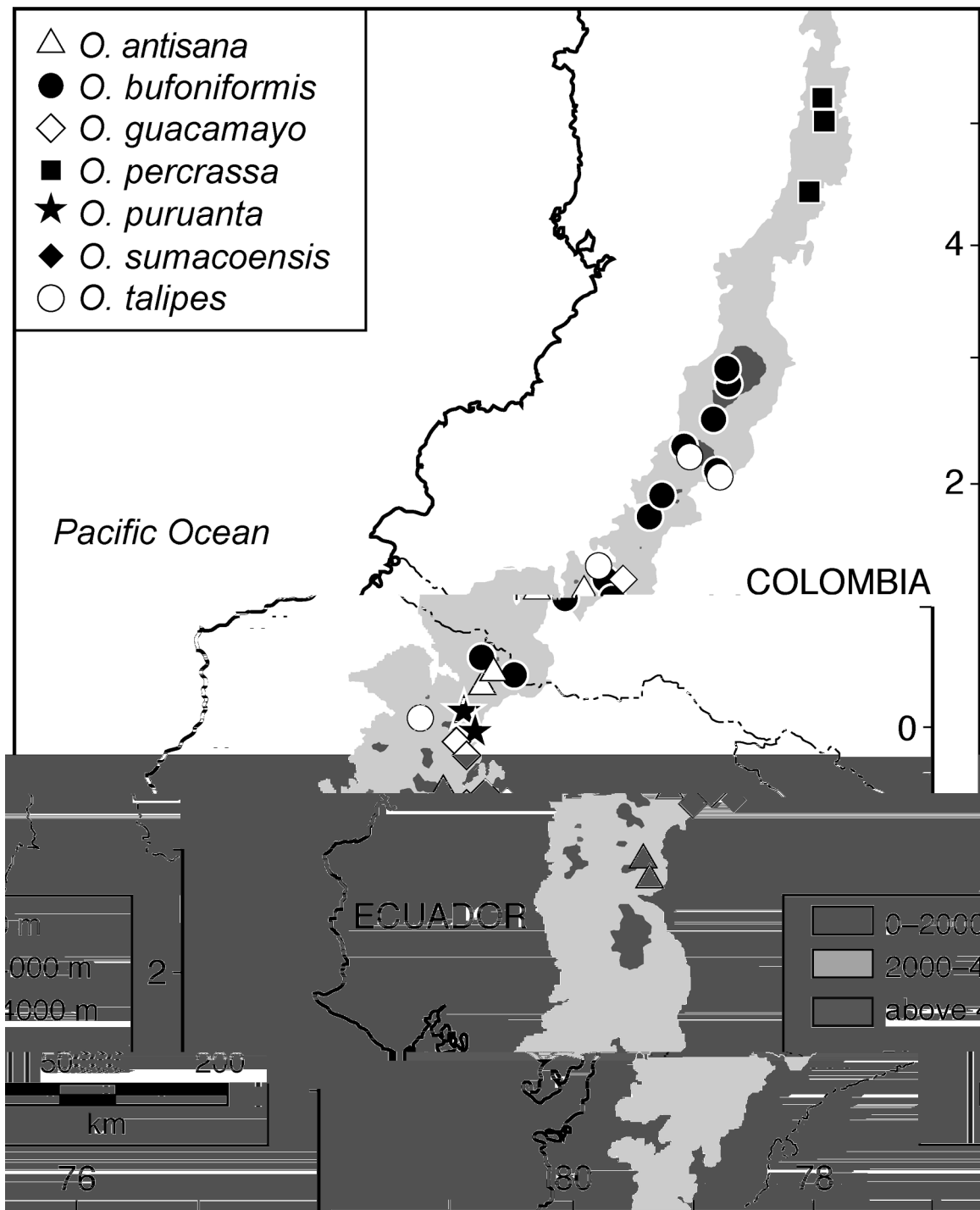


FIGURE 5. Schematic map showing the known distribution of species in the genus *Osornophryne*.

Laguna de Puruanta and Laguna de San Marcos are nested in the Cordillera Oriental of the Andes between Volcán Cayambe and the Colombian border. No obvious barrier exists between these localities and the known range of *Osornophryne bufoniformis*, yet specimens of *O. bufoniformis* from Santa Bárbara, near the type locality (exact location unclear but likely between Santa Bárbara and El Carmelo along the Río Pun on the Colombian border) are distinctive with respect to the new species in terms of coloration, skin texture, and body size. Peters (1973) described *O. bufoniformis* (then considered a member of the genus *Atelopus*) as having a very wide distribution, remarking that this species has “[broken] out of isolating mechanisms faced by [other] high altitude species” (Peters 1973:20). His conclusions were based on examination of specimens

from Colombia and Ecuador, including specimens from both slopes of the Andes as well as from the central Páramo de El Angel. It is now apparent that the specimens examined by Peters (1973) represent multiple taxa. Cannatella (1986) described individuals from Nudo de Mojanda (also examined by Peters) as a separate species, *Osornophryne talipes*. Additionally, comparison of a specimen from La Delicia referred to as *O. bufoniformis* (KU 132126) with specimens from the Cordillera Toisán (QCAZ 9318–21, 10141, 11471) suggests that some populations from the Pacific versant of the Andes represent a separate taxon. Mueses-Cisneros (2003) reported on recently discovered populations of *O. antisana*, *O. guacamayo*, and *O. talipes* from Colombia. These findings suggest that the genus *Osornophryne* is morphologically more diverse and widespread than currently recognized, and that further sampling in remaining intact habitat may result in the discovery of more species. Unfortunately, the propensity for endemism observed among members of this genus makes them highly susceptible to anthropogenic environmental changes. We suggest that *O. puruanta* should be classified as Endangered under IUCN criteria due to ongoing habitat loss and fragmentation throughout its limited range (see criteria A2c, B1a, B1biii; IUCN 2001).

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Appendix 1. Material examined

Osornophryne antisana: Ecuador: Napo: Vía Salcedo-Oriente, 3500-3600 m.a.s.l., QCAZ 1647–49, 9322. *Osornophryne bufoniformis*: Colombia: Cauca: Páramo Puracé, Laguna San Rafael, KU 144113–15, USNM 322775; Puracé, 3450 m.a.s.l., KU 145036–37; 23 km E Puracé, 3275 m.a.s.l., KU169134–35; 26 km E Puracé, 3180 m.a.s.l., KU 169136. Nariño: 12 km E Pasto, 3050 m.a.s.l., KU 169137, 169139–40. Ecuador: Carchi: 15 km ESE El Carmelo, USNM 193537; near La Angelina, by foot from Cerro Mongus, approx. 3200 m.a.s.l., 0° 27' N, 77° 51' W, QCAZ 10047; Páramo de El Angel, 23 km SW Tulcán, KU 117880. Sucumbios: 1 km NW of Santa Bárbara, USNM 193538; Santa Bárbara, 2650 m.a.s.l., 00° 38' N, 77° 31' W, KU 189945, QCAZ 14080, 14082, 11472. *Osornophryne guacamayo*: Ecuador: Napo: Cordillera de los Guacamayos, 2200 m.a.s.l., QCAZ 1268–69, 2735, 3266, 3274, 3908, 7387, 8940, 9310–11, 9313–15, 13939–40, AGG 347–48, 350, 355, 357, 360–61, 372, 376–78, 380, 382–83, 390–92, 395, 397, 406–07 (deposited in QCAZ); Volcán Sumaco, 2500 m.a.s.l., QCAZ 4577–84; Volcán Reventador, QCAZ 9314, AGG 426–30 (deposited in QCAZ); Sierra Azul, QCAZ 4121, 4889, 7402. *Osornophryne percrassa*: Colombia: Tolima: out of Manizales, on old road to Nevado de Ruiz, USNM 153125; Páramo de Herveo, E slope Cordillera Central, Municipio de Herveo, USNM 200467. *Osornophryne puruanta*: Ecuador: Imbabura: Laguna de Puruanta, Cordillera de Pimampiro, 3000 m.a.s.l., QCAZ 11471, 7684 (C & S), 7685. Border of Provincias Sucumbios and Pichincha: Laguna de San Marcos, 3400 m.a.s.l., QCAZ 13271, 13320, EPN 7081–83. *Osornophryne sumacoensis*: Ecuador: Napo: Volcán Sumaco, 2500 m.a.s.l., QCAZ 4570–72, 4576–84. *Osornophryne talipes*: Ecuador: Imbabura: Nudo de Mojanda, N slope, 3400 m.a.s.l., KU 131797–98.