

First records of *Rhinella poeppigii* (Tschudi 1845) from Ecuador, with a distribution map (Anura: Bufonidae)

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The *Rhinella marina* species group is a Neotropical clade of ten species of toads: *R. achavali*, *R. arenarum*, *R. cerradensis*, *R. icterica*, *R. jimi*, *R. marina*, *R. poeppigii*, *R. rubescens*, *R. schneideri*, and *R. veredas* (Frost 2014). With the exception of *R. marina*, which reaches southern Texas, the group is endemic to South America, where it extends as far south as Argentina (Vallinoto et al. 2009). Unlike others groups of the genus (e.g., *R. spinulosa* and *R. veraguensis*) that are endemic to the Andes, species of the *R. marina* group are predominantly inhabitants of lowlands with few species reaching the Andean foothills (Duellman & Schulte 1992). *Rhinella poeppigii* (Tschudi 1845), is one of the oldest described members of the *R. marina* species group with a problematic taxonomic history and geographic distribution (De La Riva 2002). De La Riva (2002) published the last and more comprehensive taxonomic review of *R. poeppigii*. According with this review, *R. poeppigii* inhabits primarily cloud forests in the central Andes of Peru and Bolivia reaching lowlands adjacent to the Andes, at elevations of 260–1,800 m (De La Riva 2002).

There are undocumented reports of *R. poeppigii* from Ecuador. Frost (1985, 2014) reports it from the cloud forest of the Andean slopes of Ecuador at elevations of 800–1670 m and Almendariz (1991) includes *R. poeppigii* in her list of Ecuadorian amphibians. The aforementioned authors did not cite voucher specimens or publications to document the presence of the species. The checklists of Ecuadorian amphibians by Miyata (1982) and Coloma (1991) do not include *R.*

poeppigii and the same is true for the AmphibiaWeb (AmphibiaWeb 2014) and AmphibiaWebEcuador (Ron et al. 2014) websites. Furthermore, Angulo et al. (2004) explicitly questioned the presence *R. poeppigii* in Ecuador. Therefore, whether *R. poeppigii* occurs or not in Ecuador is uncertain.

Herein we present the first confirmed records of *R. poeppigii* for Ecuador based on specimens collected at localities in Provinces of Morona-Santiago, Sucumbios, Tungurahua, and Zamora-Chinchipec. Specimens are deposited at Museo de Zoología, Pontificia Universidad Católica del Ecuador (QCAZ).

In July 2014, on a survey at Reserva Río Jambué, Province of Zamora-Chinchipec in southeastern Ecuador (S 4.0946, W 78.9423, 948 m a. s. l.), we collected two males *Rhinella poeppigii* (QCAZ 57554–55; Fig. 1 A-D). The specimens were found at night in a pasture for cattle near a creek. After the collection of these specimens, we reviewed the specimens of *R. marina* deposited in the QCAZ collection and found 10 additional specimens of *R. poeppigii* from Ecuador collected between 1972 and 2014 (Appendix I). All of them were misidentified as *R. marina*. They exhibit the diagnostic characters of *R. poeppigii* (De La Riva 2002; Fig. 1 A-F): (1) males with rugose skin with many tubercles of similar size, each covered by many keratinized spicules; (2) parotoids subtriangular, flattened or moderately flattened with poorly defined borders; (3) males bearing extensive nuptial excrescences on Fingers I, II and III (QCAZ 2268, 57107, 57555); and (4) venter uniformly pale. The snout-vent length (SVL) in the specimens from Ecuador is close to the maximum SVL reported by De La Riva (2002) with the largest female with 132 mm of SVL and the largest male with 112 mm of SVL. *Rhinella poeppigii* differs from Amazonian populations of *R. marina* (in parenthesis) in having males always with more tuberculate dorsal skin, with many tubercles of similar size each covered by many keratinized spicules (texture of the skin variable in amount, size, and disposition of tubercles), smaller, subtriangular, flattened parotoid glands, and with poorly defined borders in *R.*

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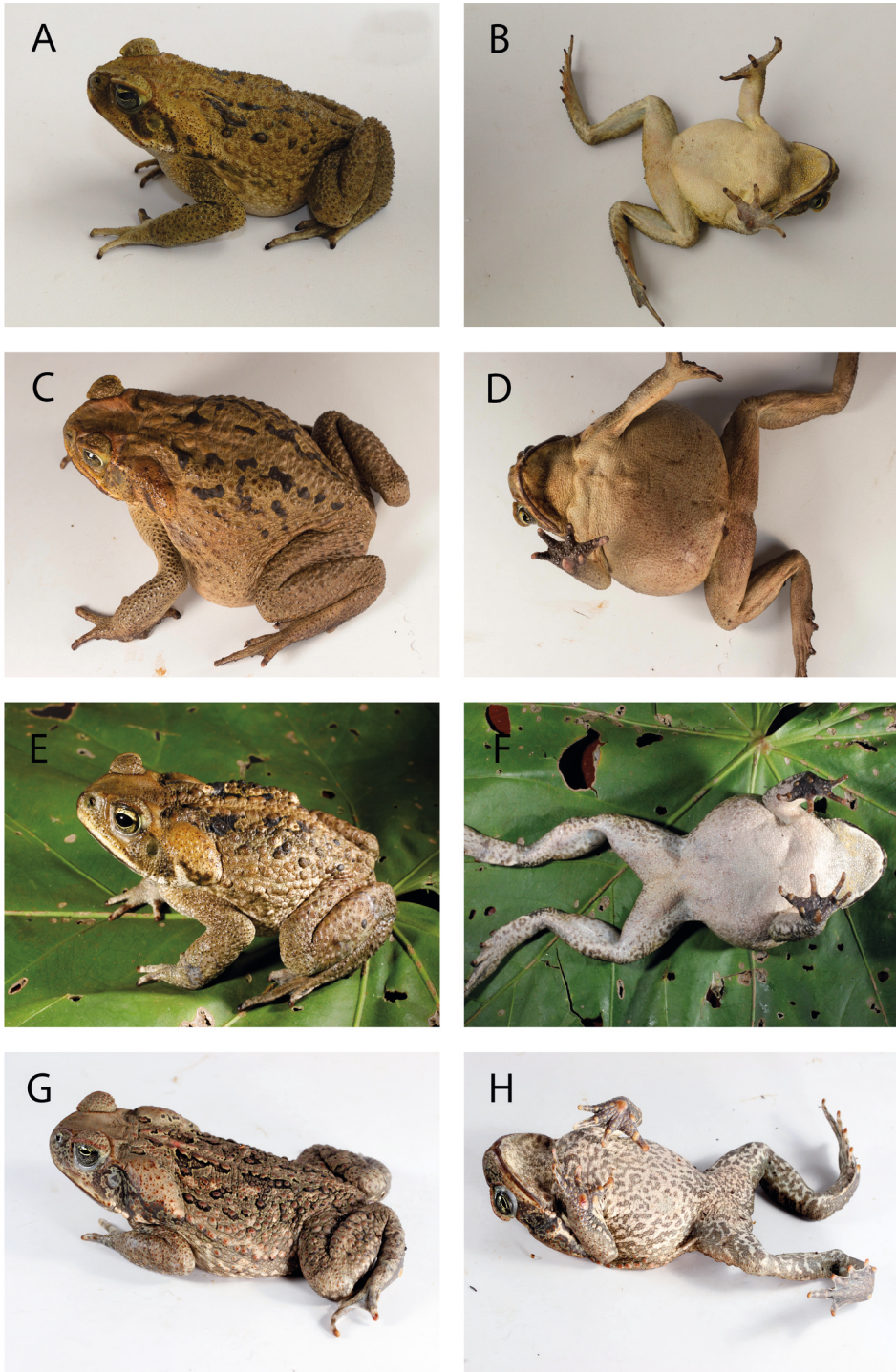


Figure 1. Specimens of *Rhinella poeppigii* and *R. marina* collected in Ecuador and Peru: A-B Adult male of *R. poeppigii* (QCAZ 57555) from Reserva Río Jambué, Province of Zamora-Chinchipe, Ecuador (photo by P. J. Venegas); C-D adult female of *R. poeppigii* (QCAZ 57554) from Reserva Río Jambué, Province of Zamora-Chinchipe, Ecuador (photo by S. R. Ron); E-F adult male of *R. poeppigii* (MUSM 22559) from the road of Moyobamba-Tarapoto, Region of San Martín, Peru (Photo by S. R. Ron); G-H adult female of *R. marina* (QCAZ 57193) from Huasquila Lodge, Province of Napo, Ecuador (Photo by S. R. Ron).

poeppigii (larger, protuberant and well defined; Fig. 1 G), and pale venter coloration without dark marks (gray or dark gray marks, often with a marbled pattern; Fig. 1 H). Additionally, *R. marina* is considerably larger than *R. poeppigii*. Duellman (2005) reported males with 100–187 mm of SVL (mean = 157 mm) and females 205–287 mm of SVL (mean = 230 mm) in the Peruvian Amazon; while the SVL of our reviewed specimens of *R. poeppigii* are 81–111 mm (mean = 95.3 mm) in adult males (n=9) and 122–128 mm (mean = 116 mm) in adult females (n=3).

We found some variation in color pattern of the specimens from Zamora compared to other specimens from Ecuador. Specimens from Zamora differ from specimens from Morona Santiago, Tungurahua, and Sucumbíos in having a dark brown tympanic region and dark brown sides of the parotoid glands. In addition, there are some scattered dark brown marks on the dorsum that are absent in the other specimens. This pattern is common in specimens from northeastern Peru (Fig. 1 E-F), but absent in specimens from central and southern Peru. Furthermore, adult males from Morona-Santiago Province (QCAZ 26419 and 32795), Sucumbíos (QCAZ 213 and 2268), and Tungurahua (QCAZ 21277) differ from the specimens from Zamora by having some scattered faint pale gray marks in the belly and ventral surfaces of thighs. The ventral marks

on both specimens are inconspicuous compared to those of *R. marina*.

Localities of *R. poeppigii* in Ecuador (Fig. 2) range as far north as Santa Cecilia, Sucumbíos (QCAZ 213), where this species is sympatric with *R. marina*. This new record extends the known distribution range ca. 940 km N from the previously northernmost known record at Nuevo Tocache, San Martín Region, northeastern Peru (see Appendix I in De La Riva 2002).

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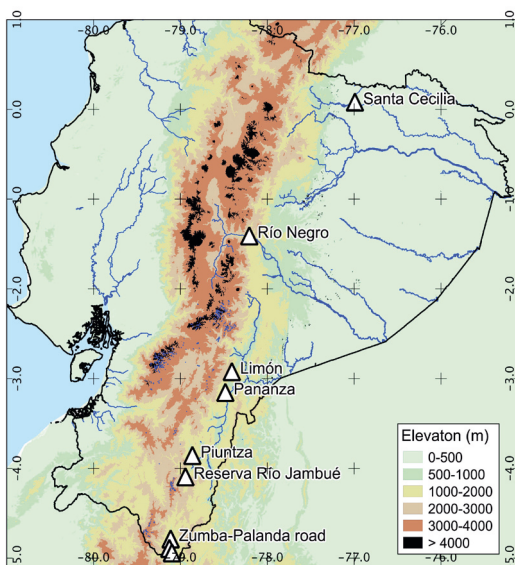


Figure 2. Map of Ecuador indicating the localities (triangles) of *Rhinella poeppigii* reported in this paper (see Appendix I).

Appendix I. Examined material (all coordinates are in WGS 84).

ECUADOR:

Province of Zamora-Chinchipe:

QCAZ 35873 an adult female collected by day death on the road from via Zumba-Palanda (-4.78725, -79.112444; 1206 m) in 18 July 2002 by U. Kuch, A. Freire and F. Ayala;

QCAZ 40785 an adult male collected by day in a farm of bull frog at Piuntza village (-3.85704, -78.86213; 881 m) in 18 June 2008 by O. Torres-Carvajal, E. Arbeláez, A. Carvajal-Campos, and D. Salazar-V;

QCAZ 57091–92 adult male and female respectively collected by night in a river at Río Zumbayacu, 3 km S Zumba vía a El Chorro (-4.89315, -79.1279; 950 m) in 9 April 2014 by D.A. Paucar, D. Almeida, G. Galarza, and D. Pareja;

QCAZ 57107 an adult male collected by night in a pond close to the road at La Chonta, 1 Km N vía a El Chorro (-4.94144, -79.09776; 1112 m) in 10 April 2014 by D.A. Paucar, D. Almeida, G. Galarza, and D. Pareja;

Province of Morona Santiago:

QCAZ 26419 an adult male collected by night in a trail at Pananza (-3.15471, -78.48267; 1127 m) in 12 August 2003 by E. Wild;

QCAZ 32795 adult male collected by night in a stone quarry close to the road at Gral. Leonidas Plaza Gutiérrez (Limón), 6.6 km río Napinaza (-2.923, -78.408; 1100 m) in 28 December 2006 by A. Merino-Viteri, D. Salazar-V, P. Peña, and L. Falconi;

Province of Sucumbios:

QCAZ 213 an adult male collected by night at Santa Cecilia (0.080541, -76.99061; 340 m) in 2 July 1972 by M.L. Crump and J.E. Simmons;

QCAZ 2268 an adult male collected Near Tapuy in 25 August 1989 by L.E. Lopez;

Province of Tungurahua:

QCAZ 21277 an adult male collected at Río Negro (-1.40991, -78.206805; 1200 m) in 28 July 2002 by C. Proaño B;

PERU:

Region of San Martín: Province of Lamas:

MUSM 22559 An adult male collected at Road to Moyobamba-Tarapoto to 17 km of Tarapoto (6.47884, 76.5125; 253 m) in 25 March 2005 by D. Cannatella, S.R. Ron, and C. Aguilar.