

First country records of *Pristimantis luscombei* (Duellman and Mendelson) and *Syncope tridactyla* (Duellman and Mendelson) in eastern lowlands of Ecuador (Amphibia: Anura: Strabomantidae, Microhylidae)

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The Upper Amazon Basin is located closer to Andes along the Equator, at eastern lowlands of Colombia, Ecuador and Peru, which receives one of the highest levels of rainfall within all lowland Amazonia (Vigle 2008). These environmental conditions seem to favor the presence of the highest known species richness and complex herpetological communities (Dixon and Soini 1975; Duellman 1978; Duellman and Mendelson 1995; Lynch et al. 1997; Duellman 1999; Lynch 2005; Vigle 2008). For long time Amazonia was considered as one of the best studied regions in South America (Lynch 2005). Anyway, despite intense effort our knowledge of the Amazonian herpetofauna is far from being complete (Duellman and Mendelson 1995). Central Amazonian lowlands of Ecuador are not an exception and many areas remain unexplored and several species unreported or undescribed (Cisneros-Heredia and Meza-Ramos 2007; McCracken et al. 2007; Elmer and Cannatella 2008; Vigle 2008; Cisneros-Heredia et al. 2009; Ortega-Andrade 2009). Herpetological studies by Ecuadorian institutions through past fifteen years in the Amazonian lowlands of Ecuador resulted in the collection of novel species for the country, which we are glad to report herein.

All specimens were reviewed from following institutions: Museo Ecuatoriano de Ciencias Naturales (DHMECN), Fundación Herpetológica Gustavo Orcés (FHGO), Museo de Zoología, Pontificia Universidad Católica del Ecuador (QCAZ), Quito, Ecuador, and American Museum of Natural History (AMNH), New York, United States of America. Morphometric measurements are in millimeters. Map, elevations and geographic coordinates were determined from the author's field notes, DHMECN, QCAZ and FHGO databases, and physical map of the Republic of Ecuador (IGM 2008), developed in ARCVIEW 3.2 (ESRI 1999). We follow the terminology of vegetal formations according with the classification system proposed by Palacios et al. (1999) to Ecuador. The research authorization (N°001-IC-FAU/FLO-DRFN-P/MA) was issued by the Ministerio del Ambiente de Ecuador, Tena, Ecuador.

Pristimantis luscombei (Duellman and Mendelson 1995) was known from a series collected from type locality at Teniente López and nearby areas from San Jacinto, Departamento Loreto, northern Peru. This small to medium sized (23.1–27.9 mm in two females; 17.7–21.3 mm in five males, Table 1) and pale orange frog can be recognized from other Amazonian *Pristimantis* frogs by: (1) iris orange, finely reticulated with black; (2) skin of dorsum shagreen with scattered pustules in females and W or \ / shaped dermal ridges in scapular region of males; venter granular in males, areolate in females; (3) snout with white blotches (cream interorbital stripe or stains in some males); and, (4) dorsal color pattern without marks or longitudinal stripes. In addition, we found the presence of small tubercles along the outer edge of tarsus in males DHMECN 3365– 3366, not mentioned on the original description, useful for identification. Color in life: Dorsum greenish–brown with some reddish stains in scapular region; snout with

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Figure 1. Adult male (A-B: DHMECN 3365) and adult female (C: DHMECN 4448) of *Pristimantis luscombei* from Amazonian lowlands, Republic of Ecuador.

white blotches, upper lips with dark brown diagonal stripes; cream interorbital stripe or stains in some males. Groin yellowish-tan; anterior and posterior surfaces of thighs uniform brown. The belly is cream. Iris orange, finely reticulated with black (Figs. 1, 2). Color in preservative: Dorsum dark brown to metallic green (DHMECN 4448), with cream tubercles and low dermal ridges. Dorsal surfaces of thighs with dark brown transversal stripes; anterior and posterior surfaces of thighs uniform brown. Snout and interorbital stripe

cream. Belly white with brown flecks.

Seven specimens were collected along Evergreen lowland forest from Amazonia of Ecuador, at elevations between 195 and 300 m a.s.l. Specimen QCAZ 10131 was collected on 20 February 1996 by O. Torres, Ma. C. Terán and X. Cisneros; specimens FHGO 5252-5254 were collected by M. Read, E. Carrillo, S. Aldaz and F. Ayala (no date related); specimens DHMECN 3365-3366 were collected on 22 August 2005 and DHMECN 4448 on 2 June 2007, all by H. M. Ortega-Andrade.



Figure 2. *Pristimantis luscombei* from Amazonian lowlands, Republic of Ecuador: (A–B) DHMECN 3366, juvenile; (C) DHMECN 3365, adult male; (D–E) DHMECN 4448, adult female.

Table 1. Measurements (in mm) of specimens of *Pristimantis luscombei* from Amazon Basin of Ecuador.

| Museum number | DHMECN 3365 | DHMECN 3366 | DHMECN 4448 | FHGO 5252 | FHGO 5253 | FHGO 5254 | QCAZ 10131 |
|------------------------|----------------|----------------|----------------|--------------|--------------|--------------|---------------|
| Sex (status) | Male | Male | Female | Female | Male | Male | Male |
| Snout-vent length | 21.3 | 18.7 | 27.9 | 23.1 | 17.7 | 19.3 | 18.4 |
| Head length | 9.6 | 8 | 11.3 | 10.3 | 7.8 | 8.1 | 7.2 |
| Head width | 7.7 | 7.1 | 9.6 | 8.5 | 7 | 7.2 | 7.2 |
| Tibia length | 12.4 | 10.3 | 14.7 | 13.6 | 9.8 | 10 | 9.7 |
| Foot length | 15.4 | 12.8 | 17.6 | 18.1 | 12.9 | 13.2 | 12.6 |
| Inter-orbital distance | 2.3 | 1.4 | 1.4 | 3.3 | 2.6 | 3 | 2.3 |
| Horizontal eye | 2.8 | 2.4 | 3.5 | 2.9 | 2.5 | 2.6 | 2.3 |
| Horizontal tympanic | 1.4 | 0.9 | 1.4 | 1.2 | 0.9 | 1.2 | 0.8 |
| Eye-nostril distance | 2.6 | 2.4 | 4.5 | 3.2 | 2.6 | 2.6 | 2.3 |

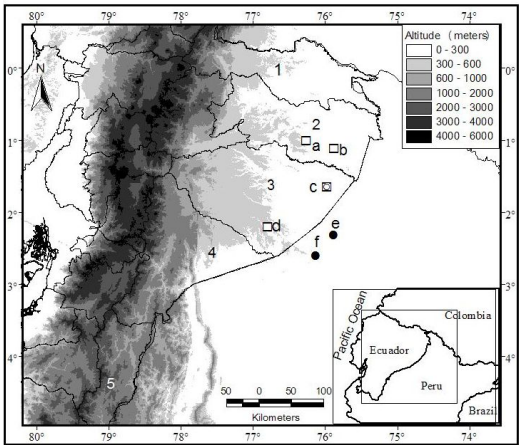


Figure 3. Map of Ecuador showing the locations of new records for *Pristimantis luscombei* (open squares) and *Syncope tridactyla* (open circle) in the Upper Amazon Basin: (a) Km 95 on Pompeya Sur – Iro road (=Maxus road); (b) Obe Oriental, Parque Nacional Yasuní; (c) Lorocachi; (d) Bufeo. Black dots are type localities: (e) San Jacinto; (f) Teniente López. Provinces in eastern Ecuador: (1) Sucumbios; (2) Francisco de Orellana; (3) Pastaza; (4) Morona Santiago; (5) Zamora Chinchipe.

Collections from Km 95 of Pompeya Sur – Iro road (=Maxus road), province of Francisco de Orellana, are recognized as northernmost locality, ca. 153 km NW from San Jacinto, Departamento Loreto, Peru. Bufeo, province of Pastaza is the westernmost locality, ca. 89 Km NW from Teniente López, Departamento Loreto, Peru (Fig. 3). This species was commonly found on leaves of heliconia, herbs and bushes (0.3– 1.5 m) in terra firme forest, at night (HMOA pers. obs.).

Syncope tridactyla (Duellman and Mendelson 1995) has been known from two localities in Amazonian Lowlands of Northern Loreto, Peru and from Tabatinga, Amazonas, Brazil (Duellman and Mendelson 1995; Da Silva and Meinhardt 1999; Frost 2009). Specimens reviewed (Fig. 4, Appendix I) agree with description and diagnosis provided by Duellman and Mendelson (1995) and Da Silva and Meinhardt (1999) to assign it to genus *Syncope*. This species can be differentiated from *Syncope antenori* (Walker) and *Syncope carvalhoi* (Nelson) by present Finger II not visible externally,

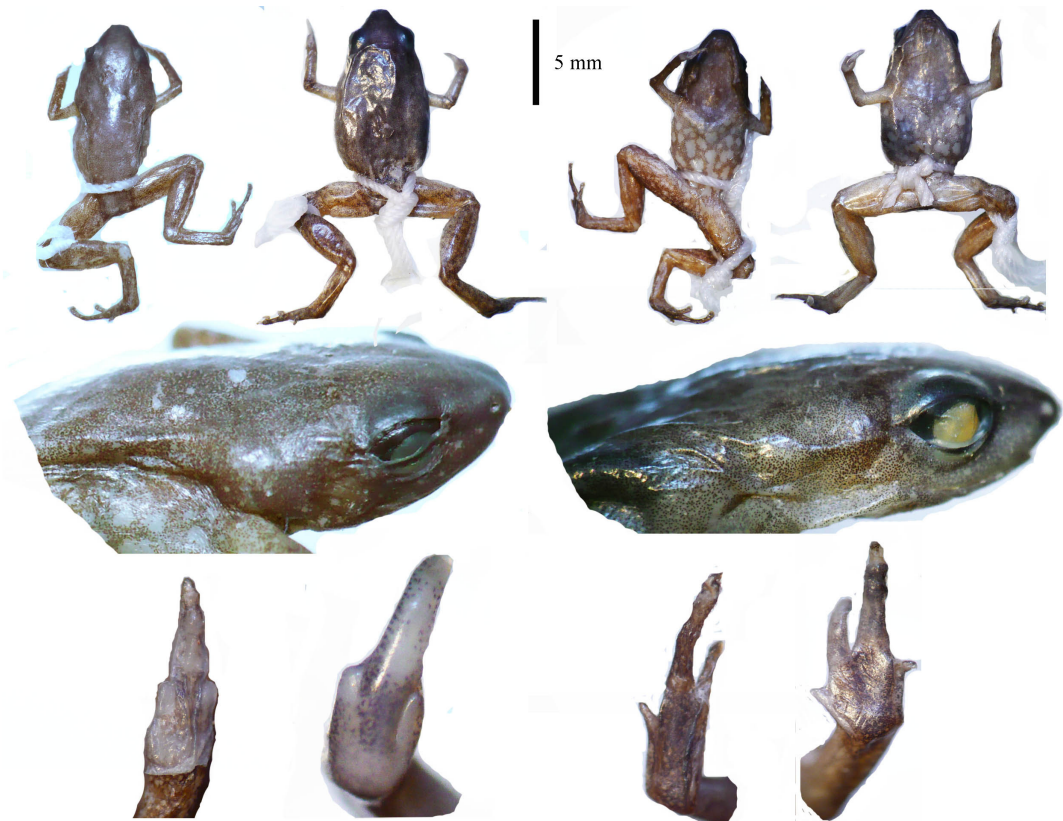


Figure 4. Body views of dorsum, belly, lateral profiles, hands and feet of *Syncope tridactyla* (QCAZ 9577, male, left; QCAZ 9520, adult female, right) from Lorocachi, province of Pastaza, Republic of Ecuador.

Fingers III and V visible as small bumps (Fingers II and V are longer in both previously species), Toe I not visible, Toe II visible only as small bump, tympanum present and visible externally (not differentiated in *S. antenori*). *Noblella myrmecoides* (Lynch) and *Adelophryne adiastrata* (Hoogmoed and Lescure) differs from *S. tridactyla* mainly by the presence of a short, but visible, four finger and five toes with tips expanded or only slightly expanded; *N. myrmecoides* also has the tips of at least toes III–IV acuminate. Although Duellman and Mendelson (1995) reported teeth in this species, we saw none in both reviewed specimens, match with observations made by Da Silva and Meinhardt (1999) on material available for their synonymy. Also, coloration in life of *S. tridactyla* is quite different from type series, according with Duellman and Mendelson (1995) description: “*KU 221992- Dorsum of head, body, and limbs dark brown with cream flecks and narrow cream canthal and dorsolateral stripes; flanks and belly black with cream spots; throat and ventral surfaces of limbs brown with cream flecks; anterior and posterior surfaces of upper arm orange-tan; iris red*”. In preservative, specimens reviewed had their dorsum uniformly brown, head some darker than dorsum; flanks brown with creamy- white flecks; throat, chest, belly and ventral surfaces of limbs with white blotches, variable in size. Variation in coloration is referred to specimens from Ecuador by lacking cream canthal and dorsolateral stripes described for holotype (Duellman and Mendelson 1995).

We report the presence of *S. tridactyla* (Fig. 3) in Ecuador, based on specimens QCAZ 9520 (female) and QCAZ 9577 (male), collected from Lorocachi, Pastaza province by Ma. C. Terán, O. Torres-Carvajal and X. Cisneros, between 18 to 24 February 1996. Lorocachi is located on Evergreen lowland forest from Amazonia of Ecuador, 200 m a.s.l. This is the fourth known record and comprises the westernmost locality for *S. tridactyla* in its distributional range, ca. 73.8 Km NW from its closest locality, San Jacinto, Departamento Loreto, Peru. One adult female (QCAZ 9520, 11.2 mm in SVL) contained three eggs in its oviduct. Both specimens are slightly shorter than holotype and paratype (up to 12.4 mm in SVL) reported by Duellman and Mendelson (1995): QCAZ 9520, female (QCAZ 9577, male): Snout-vent length 11.3 mm (10.3 mm); head length 4.2 mm (4.2 mm); head width 4.1 mm (4.0 mm); femur 5.2 mm (5.3 mm); tibia length 5.1 mm (5.0 mm); foot length 7.2 mm (7.1 mm); inter-orbital distance 1.7 mm (1.7 mm); horizontal eye diameter 1.5 mm (1.5 mm); eye-nostril distance 1.1 mm (1.3 mm).

After decades of intensive research on Upper Amazon Basin herpetofauna (e.g., Crump 1974; Dixon and Soini 1975; Duellman 1978; Lynch and Duellman 1980; Almendáriz 1987; Duellman and Mendelson 1995; Lynch 2005; Cisneros-Heredia 2006; Vigle 2008), the knowledge of amphibians and reptiles in this megadiverse area is still so far to be completed (Lynch 2005) that Central Amazonia of Ecuador can be considered as truly understudied region. More studies are urgently necessary to understand biology, biogeography and ecology of cryptic species, as those reported herein.

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Appendix I

- Pristimantis luscombei*: ECUADOR: Orellana province: Obe Oriental, -1.10111 S, -75.86778 W, 216, DHMECN 3365, 3366; Parque Nacional Yasuní, -0.99408 S, -76.24797 W, 275 m a.s.l, FHGO 5252-5254. Pastaza province: Bufeó, -2.18728 S, -76.78577 W, 311 m a.s.l., DHMECN 4448; Lorocachi, -1.63 S, -75.967 W, 195 m a.s.l., QCAZ 10131.
- Syncope antenori*: ECUADOR: Morona Santiago province: Río Cusime, -2.540 S, -77.730 W, 320 m a.s.l., AMNH 94212.
- Syncope tridactyla*: ECUADOR: Pastaza province: Lorocachi, -1.63 S, -75.967 W, 195 m a.s.l., QCAZ 9520, QCAZ 9577.