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PRISTIMANTIS REICHLEI. EYE COLORATION. Among anurans, eye color is used as a reliable taxonomic character (Lynch and Duellman 1997. Univ. Kansas Nat. Hist. Mus. Spec. Publ. 23:1–236). This is a useful tool for the frogs in the genus *Pristimantis* where external morphology is highly variable across species groups and conservative in assemblages, and few reports show eye color variation (Duellman and Lehr 2009. Terrestrial-breeding frogs (Strabomantidae) in Peru. NTV Science, Münster, Germany. 382 pp.). *Pristimantis reichlei* was first described as having a metallic yellow-to-orange iris with a transverse bold black stripe (Padial and De la Riva 2009. Zool. J. Linn. Soc. 155:97–122) and this pattern is commonly found throughout its range (Melo-Sampaio and Souza 2009. Check List 6:385–386).

On 11 September 2009 at Fazenda Experimental Catuaba, municipality of Senador Guiomard, Acre, Brazil (10.0822°S, 67.0626°W, WGS 84; 180 m elev.), I observed, photographed, and collected an individual of *P. reichlei* (UFAC-RB 4594) with an unusual pattern of eye coloration. The eye was metallic silver in upper half of the iris, the center was tan, with less silver coloration in the lower part (Fig. 1). Other individuals from this site displayed typical diurnal and nocturnal eye coloration as described in Padial and De la Riva (2009, *op. cit.*) and Melo-Sampaio and Souza (2009, *op. cit.*). Although eye coloration is a useful diagnostic character in the genus *Pristimantis* and this variation appears to be rare, this fact should be evaluated within species accounts and/or descriptions.



FIG. 1. *Pristimantis reichlei* showing unusual eye coloration.

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RHINELLA ARENARUM (Argentine Toad). EGG PREDATION BY LEECHES. Leech predation on amphibians has been previously reported (Moore 1953. Not. Nat. Acad. Nat. Sci. Philadelphia 250:1–13; Cargo 1960. Chesapeake Sci. 1:119–120; Loebmann et al. 2008. Amphibia 7:31–34; Alvarez 2010. Bol. Asoc. Herpetol.



FIG. 1. Specimens of *Oxyptychus striatus* collected in the observation area.

Esp. 21:25–26; Tiberti and Gentili 2010. Acta Herpetol. 5:255–258). Amphibian egg predation by leeches has been reported in North and South America, Southeast Asia, Australia, and Europe (Burgin and Schell 2005. Acta Zool. Sinica 51:349–353; Gunzburger and Travis 2005. J. Herpetol. 39:547–571; Romano and Di Cerbo 2007. Acta Zool. Sinica 53:750–754; Soler et al. 2014. Cuad. Herpetol. 28:39–41). Previous reports of anuran eggs being predated by leeches in Argentina include an unidentified *Oxyptychus* feeding on eggs of *Rhinella dorbignyi* (Dorbigny's Toad) and *Hypsiboas pulchellus* (Montevideo Treefrog; Soler et al. 2014. *op. cit.*).

Herein we report a case of egg predation on at least two clutches of *Rhinella arenarum* by the leech *Oxyptychus striatus* (Ringuelet 1945. Fauna de agua dulce de la Republica Argentina. Volumen XVII Annulata, Fasciculo 1 Hirudinea. pp. 225–232; Fig. 1). The observations were made in a very slow flowing stream in San Luis, Departamento Conlara, Ruta Provincial 5, 15 KM NW Santa Rosa del Conlara, Argentina (32.2567°S, 65.3214°W, WGS 84, 717 m elev.), at ~2300 h on 19 January 2013. Several leeches (reference voucher specimens MACN-In 40169) were attached with their sucker to the gelatinous egg strings, surrounding and penetrating them with their mouths at the point where each egg was found (Fig. 2). After the eggs were consumed, the string was left completely empty (Fig. 3). Once each egg was consumed, the leech left a characteristic cylindrical projection perpendicular to the longitudinal axis of the string, as if the jelly was everted by the leech's mouth once it finished feeding on the egg (Fig. 3).

Oxyptychus is a hirudiniform genus of leeches with seven species distributed in Puerto Rico, Panama, Ecuador, and east of the Andes to the north of the extra-Andean Patagonia. Though they feed mainly on the blood of their hosts (Ringuelet 1945. *op. cit.*), recent observations suggest that they also prey on their eggs (Soler et al. 2014. *op. cit.*; present observation). Several similar cases have been observed among hirudiniforms: *Macrobdella ditetra* consumes blood and eggs of frogs (Moore 1953. *op. cit.*), and *M. diplotertia* has been observed attacking tadpoles and simultaneously consuming the eggs of *Lithobates clamitans* (Green Frog) and *L. sphenoccephalus* (Southern Leopard Frog) (Turbeville and Briggler 2003. J. Fresh. Ecol. 18:155–159). Hirudiniform leeches lack a proboscis, and to feed they employ their jaws to tear the skin of the host. In the case of egg predation, they manage to bypass the gelatinous capsules surrounding the eggs, perforating them with their jaws. There are different known ways to achieve this: (a) the leech *Bassianobdella fusca* specializes on this type of food, for which it enters the foam nest, then surrounds the egg using its ventral surface and swallows it



FIG. 2. An individual of *Oxytychus striatus* surrounding egg strings of *Rhinella arenarum*.



FIG. 3. Arrangement of egg strings of *Rhinella arenarum* with perpendicular eversions of the egg jelly (the arrow indicates one of these eversions).

wholly (Burgin and Schell 2005. *op. cit.*), and (b) *M. diplotertia* begins investigating the eggs with its head, and once it chooses an egg, it extends its body and secures its sucker to the gelatinous capsule of another egg to enter the selected one, and once inside, surrounds the egg and consumes it (Trauth and Neal 2004. *J. Ark. Acad. Sci.* 58:139–141).

Most bufonids have toxins (bufadienolides) from the egg stage to adulthood. The diversity and concentration of these molecules varies during ontogeny: the eggs contain the most toxin, with toxicity decreasing during larval development and increasing again after metamorphosis. The surrounding jelly coat that protects the eggs from predators lacks these toxins (Hayes et al. 2009. *J. Chem. Ecol.* 35:391–399). In Australia, deaths of native species of turtles and fish were reported after consuming eggs of *Rhinella marina* (Cane Toad) and, to a lesser extent, its tadpoles (Greenlees and Shine 2011. *Austral Ecol.* 36:53–58). Insects can also find the early stages of toads unpalatable: cases where Odonata larvae preferred not to consume tadpoles of *Rhinella spinulosa papillosa* (Sapo Espinosus) have been recorded (Jara and Perotti 2006. *Cuad. Herpetol.* 19:37–42). In contrast, Dytiscidae beetles prefer *R. marina* tadpoles to native Australian tadpoles or fish (Cabrera-Guzmán et al. 2012. *Biol. Cons.* 153:1–

9). However, there are reports of leeches that apparently are not affected by these toxins and consume eggs and tadpoles of bufonids (see revisions of Gunzburger and Travis 2005. *op. cit.*; Romano and di Cerbo 2007. *op. cit.*). Nevertheless, there are also cases where other species of leeches have been affected by these toxins, such as *Goddardobdella elegans* where the survival rate was significantly reduced after feeding on tadpoles of *R. marina* (Crossland and Alford 1998. *Aust. J. Ecol.* 23:129–137). In that same study, other invertebrates did not suffer lethal effects after consuming eggs or tadpoles. Litch (1969. *Am. Midl. Nat.* 82:296–298) also reported unpalatability of eggs of *Anaxyrus borealis* (Western Toad) by *Haemopsis* sp., showing a high aversion to egg compounds.

Leeches of the genus *Oxytychus* are likely natural predators of *Rhinella*. The specific mechanism that allows these leeches to tolerate the toxicity of egg compounds so that they may be consumed safely is unknown.

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RHINELLA SCHNEIDERI (Cururu Toad). EPIBIOSIS. Epibiosis is a facultative relationship between an epibiont and a basibiont (Wahl 1989. *Mar. Ecol. Prog. Ser.* 58:175–189). The term epibiont is used to designate individuals that colonize a free-living substrate and the term basibiont is used to describe individuals that host the epibiont (Taylor 2002. *Palaios* 17:522–525). Reports of tadpoles as basibionts in Brazil are very scarce, with only two published accounts, both for the toad *Rhinella crucifer* (Striped Toad) in Juiz de Fora municipality, Minas Gerais state, in the Atlantic Forest biome (Dias et al. 2009. *Parasitol. Int.* 58:471–474; Fernandes et al. 2011. *Zoologia* 28:777–783). Both studies identified the tadpoles involved as *Rhinella pombali* (Pombal's Toad), however Thomé et al. (2012. *BMC Evol. Biol.* 12:242) considered *R. pombali* a hybrid of *R. crucifer* and *R. ornata*, rather than a valid species. Accordingly, toads previously assigned to *R. pombali* are now considered to be either *R. crucifer* or *R. ornata*, depending on the locality. According to Frost (2015. <http://research.amnh.org/vz/herpetology/amphibia>; 23 Aug 2015), populations from Minas Gerais state should be considered *R. crucifer*. Ciliates of the genus *Trichodina* are reported as epibionts of many amphibian and fish species (Kreier and Baker 1991. *In* Sleigh [ed.], *The Nature of Protozoa*, pp. 1–53. Academic Press, San Diego; Xu et al. 1999. *Syst. Parasitol.* 42:229–237). Trichodinids mostly feed on bacteria present on tadpole skin mucous, but not from the host skin itself (Collymore et al. 2013. *Comp. Med.* 63:310–312). Possible pathogenic disturbance in amphibians might occur due to the spinning movements of attached ciliates in high intensity infestations, possibly causing tegument damage of the epithelial cells (Poynton and Whitaker 2001. *In* Wright and Whitaker [eds.], *Amphibian Medicine and Captive Husbandry*, pp. 193–221. Krieger Publishing Company, Malabar, Florida; Zanolio and