New record of the glassfrogs *Hyalinobatrachium cappellei* (Van Lidth de Jeude, 1904) and *Cochranella adenocheira* Harvey and Noonan, 2005, (Anura: Centrolenidae) in Volta Grande do Xingu, north Pará state, Brazil

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The Neotropical family Centrolenidae Taylor, 1951, comprises species popularly known as glassfrogs, which are found from Central America to south Brazil, occurring in the Andes and forests in central Brazil (Guayasamin et al., 2009; Cintra et al., 2013; Frost, 2014). Currently, 12 genera and 149 species are known (Pyron and Wiens, 2011; Frost, 2014), of which 11 occur in Brazil (Frost, 2014; Segalla et al., 2014).

Hyalinobatrachium cappellei (van Lidth de Jeude, 1904) is a medium size glassfrog (adult males SVL = 18.6-24.9 mm), described from only one individual collected on the Saramacca expedition in Suriname (van Lidth de Jeude, 1904; Castroviejo-Fisher et al., 2011). This species occurs from Venezuela to French Guiana, through Guiana Shield (Castroviejo-Fisher et al., 2011), with recent new records in Brazilian Amazonia by Simões et al. (2012) in Amazonas state, and by Rodrigues et al. (2010) (as *H. crurifasciatum* Myers and Donnely, 1997, junior synonym) and Noronha et al. (2012) in Mato Grosso state. Morphological characters (snout truncated in dorsal and lateral views, tympanic membrane and annulus not appreciable in life), call parameters (dominant frequency and call structure), and molecular evidence allows differentiation of *H. cappellei* from others in the genus that occurs in South America (Castroviejo-Fisher et al., 2009, 2011).

Cochranella adenocheira Harvey and Noonan, 2005 is a medium size glassfrog (holotype male SVL = 22.4 mm) described from individuals collected in the Parque Noel Kempff Mercado, Santa Cruz, Bolívia. The species occurs in Bolivia (type locality) and Brazil, in the south of Mato Grosso, south of Pará and north of Rondônia State (Toledo et al., 2009; Oliveira et al., 2012). The species is allocated into *C. ocellata* species group according to the original description, which is characterised by a truncated snout and smooth dermal folds. The colour of visceral and parietal peritoneum, dorsal coloration, presence of tarsal and ulnar folds, absence of supernumerary tubercles, and size of the digital pads, distinguish *C. adenocheira* from the other species of the *C. ocellta* species group (Harvey and Noonan, 2005).

In March 2014, during the Herpetofauna Monitoring Environmental Programme from UHE Belo Monte region (Altamira, Brasil Novo and Vitória do Xingu municipalities, northern Pará State), we found *Hyalinobatrachium cappellei* and *Cochranella adenocheira* individuals (Figure 1). One male of *H. cappellei* was recorded to aid in species determination. We used a Tascam DR-100 digital audio recorder with a unidirectional Yoga HT-81 microphone. Calls were analysed at a resolution of 16 bits and 48 kHz sampling rate, mono channel using Raven Pro 1.3 (Cornell Lab of Ornithology, 2008) with a Fast Fourier Transformation of 256 points, 50% overlap for an entire call and Window Hamming. Terminology of temporal and acoustic parameters follows Heyer et al. (1990). Voucher specimens were deposited in Herpetological Collection from Universidade Federal de Goiás (ZUFG).

Many males of *H. cappellei* were found at night, calling in streams located inside the forest (3° 31' S and 51° 40' W). They were perched on the underside of leaves (Figure 2a) overhanging streams. Several males were found calling on leaves containing egg clutches (Figure 2c), at 1-6 m height. Species identity was determined from behavioural, morphology and call character. One male was recorded and collected as voucher specimen (ZUFG 8477, SVL = 20.9 mm).

The advertisement call (N = 15, air temperature = 25.6 °C; air humidity = 88%) of the recorded male is compatible with the description provided by Castroviejo-Fisher et al. (2011). The call is composed by a single multi-pulsed note, that presents frequency modulation, increasing and decreasing, giving the shape of a saw (Castroviejo-Fisher et al., 2011). The call duration range is 0.254-0.288 s (0.278 ± 0.0086 s, N=15) and dominant frequency 4306-4823 Hz (4593 ±140 Hz, N=15).

Three individuals of *C. adenocheira* were found and collected as voucher specimens (ZUFG 8478, ZUFG 8479 and ZUFG 8480), but many others were heard in

the study area. The specimens were found perched on the upper surface of leaves (Figure 2b), at 1.5 m height, in a flooded area associated with a stream inside a forest fragment (3° 31' S and 51° 40' W).

This new data represents a new state record of *H. cappellei* in Pará sate, Brazil and extends *C. adenocheira* distribution about 800 km (approximate straight distance) northeast from Jacareacanga, the nearest record in Pará state.

The type locality of *H. cappellei* is not clear. Van Lidth de Jeude (1904) states that the holotype was "collected by the Saramacca-expedition" and in Castroviejo-Fisher et al. (2011) the type locality is "River Saramacca and neighbouring

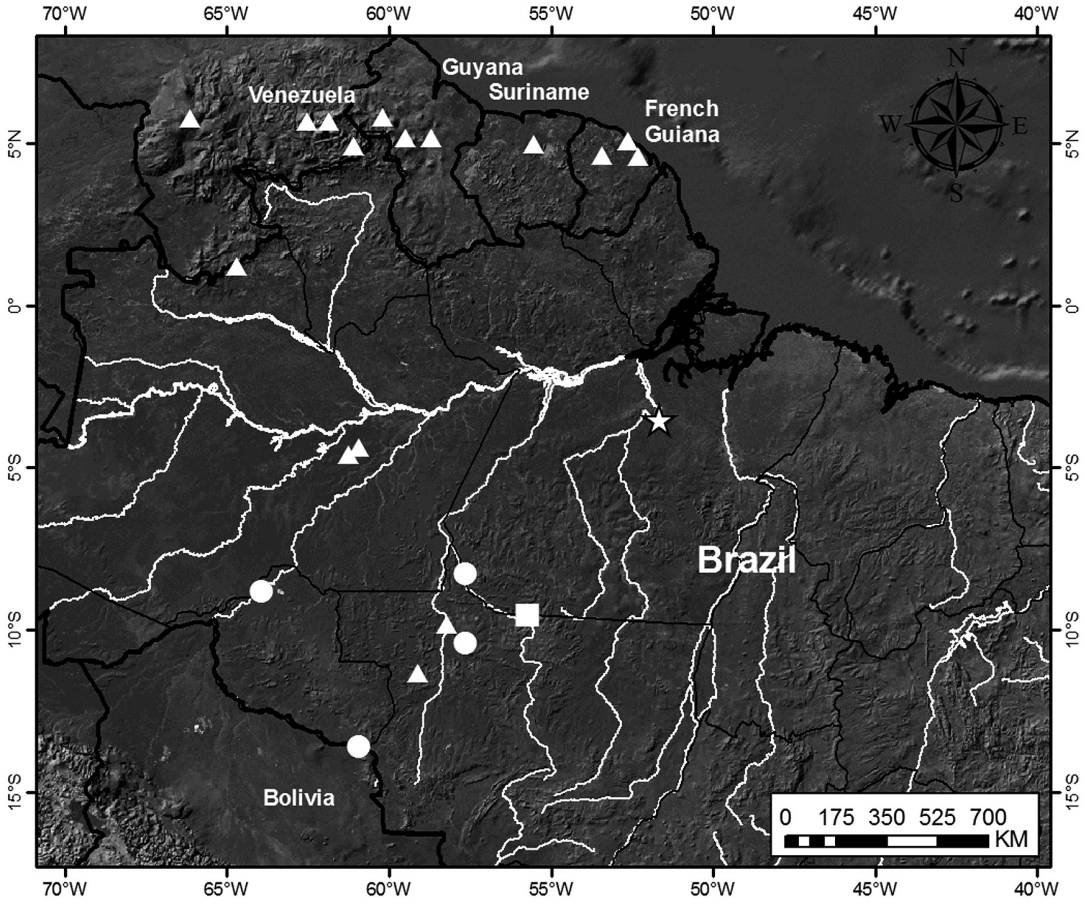

Figure 1. Known records of *Hyalinobatrachium cappelei* (triangles), *Cochranella adenocheira* (circles), common location for both species (square) and new data for both species (star) in Xingu River, Altamira, Pará, Brazil. Data source of *H. cappellei* distribution: Rodrigues et al. (2010), Castroviejo-Fisher et al. (2011), Noronha et al. (2012) and Simões et al. (2012). Data source of *C. adenocheira* distribution: Harvey and Noonan (2005), Toledo et al. (2009) and Oliveira et al. (2012).

Figure 2. (a) Recorded male of *Hyalinobatrachium cappellei* (ZUFG 8477) calling on underside of leaf. Individual found March 2014 in Altamira, Pará. (b) *Cochranella adenocheira* (ZUFG 8478) collected in March 2014 in Altamira, Pará. (c) Two males of *H. cappellei* found calling on underside of leaves with egg clutches.

areas, Suriname". The length of the river is approximately 460 km, emerging from central Suriname and extending to the coast (Amatali, 1993). Thus, it is difficult to know where the exact type locality of the species is.

The recent records of Centrolenidae evidences that the occurrence area of glassfrogs in South America is probably underestimated and that future research will contribute to clarify the real distribution of the species.

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