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Observations on the natural history and body size of the poorly known Brazilian treefrog *Hypsiboas secedens* (Hylidae: Hylinae: Cophomantini)

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Hypsiboas secedens (Lutz, 1963) is a poorly known species of hylid frog from the Brazilian Atlantic rainforest. This species was described (as *Hyla secedens*) by Lutz (1963) from a locality called Barro Branco (later identified to be in the municipality of Duque de Caxias; see Weber et al. 2009), in the state of Rio de Janeiro. Lutz (1963) reportedly obtained 13 specimens of this treefrog, but she presented data on only five (apparently all males, ranging from 55 to 57 mm in SVL), which constituted her type series. Bokermann (1966) extended the species' known distribution to the municipality of Linhares, in the state of Espírito Santo, but Caramaschi et al. (2004) attributed this record to misidentified specimens. Lutz (1973) redescribed the species and added data for two more specimens (45 and 50 mm SVL, respectively) from the Parque Nacional da Serra dos Órgãos (located about 50 km east of the type locality). According to Lutz (1973), these specimens were presumably subadults, even though she mentioned that the smaller one had a "sharp pollex rudiment" (i.e., a prepollical spine), which suggests it may have been an adult male. She also observed that, unlike the type specimens, these lacked appendages on the heels and had "some fuscous dots on the throat". These observations suggest to us that these later specimens might belong to a taxon distinct from, but similar to, *H. secedens*. Unfortunately, it may not be possible to verify this, as Lutz (1973) does not mention if these two individuals were deposited in an institutional collection and, thus, they cannot now be located.

For nearly 40 years, no further specimens of *H. secedens* were mentioned in the literature, until Weber et al. (2009) reported this species from two other localities in the state of Rio de Janeiro, extending its known distribution by ca 60 km eastwards (these authors did not comment on the two specimens reported by Lutz (1973) from the Parque Nacional da Serra dos Órgãos). Their specimens were an unsexed young individual (SVL = 37.8 mm) and an adult male (SVL = 53.6 mm) from the Reserva Ecológica de Guapiaçu (REGUA), municipality of Cachoeiras de Macacu, and an adult male (SVL = 55.1 mm) from the Estação Ecológica do Paraíso, municipality of Guapimirim (a picture of this specimen in life is shown in Vrcibradic et al. 2011). The currently known distribution of this species is thus restricted to lowland areas in the state of Rio de Janeiro.

Nothing is currently known of the biology and ecology of this species. Here we provide the first data on calling sites, female size, clutch size, and diet of *H. secedens* based on eight specimens (seven males, one female) collected by us in February of 2011 and January of 2012 at the REGUA. All our specimens were measured with a digital calliper (to the nearest 0.1 mm), dissected for examination of stomachs and gonads, and later deposited in the amphibian collection of the Museu Nacional, Rio de Janeiro (MNRJ).

All specimens reported herein were collected at night. Five of them (all males) were collected on a temporary pond within a forest fragment of ca 130 ha. This site was regularly visited for one day per month in December of 2009, April of 2010, from November of 2010 through February of 2011, and from October of 2011 through February of 2012. However, active *H. secedens* were recorded there on only two occasions during that period: in February of

Table 1. Data on eight specimens of *Hypsiboas secedens* from the Reserva Ecológica de Guapiaçu (REGUA), state of Rio de Janeiro, Brazil. Given for each individual are: voucher number, SVL (in mm), sex (M – male; F – female), observation of calling activity (for males), date of collection, coordinates and altitude of collection site, type of perch used, and height above ground/water.

Specimen	SVL	Sex	Calling	Date	Coordinates	Altitude	Type of perch	Height
MNRJ 86331	50.2	M	yes	15 Jan 2012	22°27'29.5" S, 42°45'25.4" W	65 m	Herbaceous vegetation	ca 1 m
MNRJ 86332	52.0	M	yes	15 Jan 2012	22°27'29.5" S, 42°45'25.4" W	65 m	Herbaceous vegetation	ca 1 m
MNRJ 86333	52.2	M	yes	15 Jan 2012	22°27'29.5" S, 42°45'25.4" W	65 m	Herbaceous vegetation	ca 1 m
MNRJ 86334	52.8	M	yes	15 Jan 2012	22°27'29.5" S, 42°45'25.4" W	65 m	Herbaceous vegetation	ca 1 m
MNRJ 86337	50.0	M	yes	4 Feb 2011	22°27'29.5" S, 42°45'25.4" W	65 m	Epiphytic vegetation	ca 3 m
MNRJ 87549	64.0	F	–	17 Jan 2012	22°25'01.7" S, 42°44'14.0" W	170 m	Tree branch	2.3 m
MNRJ 87550	56.0	M	yes	18 Jan 2012	22°25'03.0" S, 42°44'17.0" W	170 m	Herbaceous vegetation	>1 m
MNRJ 87551	48.7	M	no	18 Jan 2012	22°24'33.1" S, 42°44'9.2" W	250 m	Shrub	0.5 m

2011, we observed one calling male (MNRJ 86337) perched on epiphytic vegetation at a height of ca 3 m above the ground, and in January of 2012, we observed a chorus of at least ten individuals and collected four (MNRJ 86331–34), all of them vocalizing on herbaceous vegetation about 1 m above the water surface (Table 1). Of the three remaining specimens collected in January of 2012, one (MNRJ 87550, adult male) was collected perched on vegetation above flooded terrain at the edge of the continuous forest of the reserve, and the remaining two (MNRJ 87549, adult female and 87551, subadult male) near the margin of a fast-flowing rocky river within the continuous forest (Table 1).

Observations in January of 2012 were made during a period of heavy rains (53 mm just on 8 January and at least 294.8 mm of total accumulated rain during the month – data from Cbmerj for Cachoeiras de Macacu, available from http://www.simerj.com/tabela-pluviometro/tabela-pluviometro_jan_2012.gif). The association of its activity with a stormy period, coupled with the few occasional observations of vocal activity at one site (considering that surveys were conducted there during several months) and with calling males making use of temporary ponds suggest that *H. secedens* likely employs an explosive breeding strategy (sensu Wells 1977).

The reproductive mode of *H. secedens* is currently unknown. Haddad et al. (2013) characterized it as mode 2 sensu Haddad & Prado 2005 (i.e., eggs and exotrophic tadpoles in flowing water), but with a question mark to indicate uncertainty. It is unclear on which basis Haddad et al. (2013) suggested this reproductive mode for *H. secedens*, but it may be due to the fact that several species of the *H. pulchellus* group (to which *H. secedens* was referred by Faivovich et al. 2005) seem to present this mode. However, many other species of *Hypsiboas* (including some in the *pulchellus* group) lay eggs in still water (i.e., reproductive mode 1 of Haddad & Prado 2005) or may exhibit both modes (see Haddad et al. 2013). All adult males of *H. secedens* recorded by us at REGUA were calling while perched above still water, which suggests that this species may reproduce in lentic habitats. The other two individuals we recorded, a female and a subadult male, were collected near a lotic habitat, but they were not recognizably engaged in reproductive activity (although the female had several mature oocytes in the ovaries, see below).

No adult females of *H. secedens* have previously been reported in the literature, and the previous maximum SVL recorded for the species is 57 mm (for three of the male paratypes; Lutz 1963). Female MNRJ 87549 (SVL = 64 mm; Table 1) represents the maximum size currently known for *H. secedens*. This suggests that this species is sexually dimorphic, with females growing larger than males (Fig. 1), as is the norm for anurans in general (Shine 1979).

Female MNRJ 87549 contained 1771 pigmented oocytes in her ovaries, a number that is similar to the clutch size of some congeners of similar (*H. pugnax*: Chacón-Ortiz et al. 2004; *H. raniceps*: Prado & Haddad 2005) or larger body size (*H. faber*: Martins & Haddad 1988), and larger than those of some larger (*H. rosenbergi*: Höbel 2000) and similar-sized/smaller congeners (*H. goianus*: Menin et al. 2004; *H. albopunctatus*: Muniz et al. 2008, Guimarães et al. 2011; *H. albomarginatus*: Hartmann et al. 2010; *H. atlanticus*: Camurugi & Juncá 2013; *H. cinerascens*: Telles et al. 2013 and included references). On the basis of the single known clutch, *H. secedens* appears to produce clutches that are relatively large for the genus. Like most other spe-

Figure 1. Adult female (MNRJ 87549, SVL = 64 mm; left) and adult male (MNRJ 87550, SVL = 56 mm; right) of *Hypsiboas secedens* in preservative, illustrating the size difference between the sexes.

cies in the genus, *H. secedens* produces pigmented oocytes (unpigmented oocytes have been reported for four species so far; Nali et al. 2014).

Two individuals (both males) had prey in their stomachs: MNRJ 86333 contained a blattodean and MNRJ 87550 an orthopteran. These individuals represent 33% of the six males collected during calling activity. Males of some hylid frogs are known to reduce food consumption during calling activity (Solé & Pelz 2007). However, our small sample size does not allow any conclusive statement about the feeding habits of *H. secedens*.

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