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Notes on Geographic Distribution

Amphibia, Anura, *Brachycephalus didactylus* (Izecksohn, 1971) and *Zachaenus parvulus* (Girard, 1853): Distribution extension

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Abstract: We report geographic range extensions for two anuran species, *Brachycephalus didactylus* (Bachycephalidae) and *Zachaenus parvulus* (Cycloramphidae), recorded during a short-term herpetofaunal survey carried out at mid-elevation (600-900 m) Atlantic Forest sites at the Serra das Torres mountains (21°00' S, 41°13' W), in the state of Espírito Santo, SE Brazil. These two species are reported for the first time in Espírito Santo, representing the northernmost records for both of them and raising to 135 the number of anuran species currently known to occur in the state.

The state of Espírito Santo is one of the smallest Brazilian states (total area about 46,000 km^2) and its whole territory is situated within the Atlantic Rainforest Biome. Nevertheless, only about 11% of the state's original forest cover remains nowadays (SOS Mata Atlântica 2005). The amphibian fauna of Espírito Santo is still insufficiently known and, until recently, a documented species list was still lacking for that state (Gasparini *et al*. 2007). Amphibian species lists exist for just a few rainforest areas (*e.g*. Ramos and Gasparini 2004; Prado and Pombal 2005; Rödder *et al*. 2006; Ferreira and Mendes 2010; Tonini *et al.* 2010) and for two municipalities (Rödder *et al.* 2007; Ferreira *et al*. 2010) in Espírito Santo. Also, preliminary lists of amphibians based on short-term surveys exist for three "restinga" (coastal sand-dune scrublands) areas in the state (*e.g.* Rocha *et al*. 2008). Within the last ten years several distribution range extensions and new state records (*e.g.* Gasparini, 2002; Ferreira and Vrcibradic 2005; Teixeira and Vrcibradic 2005; Vrcibradic *et al*. 2006; Silva *et al*. 2007, 2008; Cassimiro *et al*. 2008; Oliveira *et al*. 2009; Silva-Soares *et al*. 2009; Verdade *et al*. 2009; Peres *et al*. 2010), as well as descriptions of new species (Peixoto 2002; Heyer and Juncá 2003; Pombal *et al*. 2003; Caramaschi *et al*. 2004, 2009; Cruz *et al*. 2005; Napoli 2005; Almeida and Angulo 2006; Caramaschi and Pombal, 2006; Pombal and Gasparini, 2006; Canedo and Pimenta 2010; Faivovich *et al*. 2010) have added to the knowledge of the state's anurofauna. Recently, Almeida *et al*. (2011) compiled the first checklist of anuran species of Espírito Santo, recording 133 species for the state (including the exotic ranid *Lithobates catesbeianus* (Shaw, 1802)). Nevertheless, those authors remarked that only 48 of the 78 municipalities of the state were represented by vouchered records, and that most of those municipalities are currently undersampled. This illustrates how incompletely known the amphibian fauna of Espírito Santo still is, and suggests that data on the richness and distribution of frog species in the state will keep increasing steadily as more field studies are carried out, as predicted by Pimm *et al*. (2010).

The Serra das Torres, a chain of mountains ranging up to 1,200 m high, comprise an area of approximately 14,300 ha included in the municipalities of Atílio Vivácqua, Muqui and Mimoso do Sul, on the southern portion of Espírito Santo state. Vegetation is composed of seasonal semidecidual, dense ombrophilous sub-montane and dense ombrophilous montane forests (Magnago *et al*. 2008). The better preserved forests are found mainly on the higher portions (above 600 m) of the mountains, with the lower portions being mostly dominated by anthropically disturbed habitats as a result of agricultural practices. No herpetological surveys have been previously carried out in this area, as far as we know. The present note reports distribution extensions for two anuran species recorded during a herpetofaunal survey carried out by four of us (JCFO, LC, RVP and EP) between June 2009 and March 2010 at a portion of the Serra das Torres mountains located in the municipality of Atílio Vivácqua (21°00' S, 41°13' W) (Figure 1). Fieldwork was carried out at altitudes between 600 and 900 m. Collection permits were granted by the SISBIO/IBAMA (permit # 19743-2/2009). Voucher specimens were deposited at the Museu Nacional, Rio de Janeiro (MNRJ).

Brachycephalus didactylus (Izecksohn, 1971) (Figure 2a), an inhabitant of the forest floor leaf litter, is possibly the world's smallest tetrapod, with adults reaching only 7-10 mm SVL (Estrada and Hedges 1996; Almeida-Santos *et al*. 2011). This species is abundant at the Serra das Torres, and several individuals were collected throughout the period of study (MNRJ 68127-183). *Brachycephalus didactylus* was previously known from five localities, all in

Rio de Janeiro state (Izecksohn 1971; Rocha *et al*. 2001; Carvalho-e-Silva *et al*. 2008; Siqueira *et al*. 2009). The present record is the first for the state of Espírito Santo, and represents a range extension of 200 km to the northeast of the nearest previous record, in the municipality of Cachoeiras de Macacu (22°25' S, 42°35' W), state of Rio de Janeiro (Siqueira *et al*. 2009).

Zachaenus parvulus (Girard, 1853) (Figure 2b), a forest floor leaf litter-dwelling cycloramphid, is currently known only from Rio de Janeiro state and northern coastal São Paulo state (Verdade *et al*. 2009). On 17 July 2009 and 23 January 2010 two individuals of this species (MNRJ 66587, 66713) were collected at altitudes between 700 and 800 m in the Serra das Torres. This represents the first record of *Z. parvulus* for Espírito Santo state. It is also the northernmost record for the species, extending its distribution about 180 km north of the nearest locality where it was previously known to occur: the Reserva Biológica União (22°25' S, 42°02' W), in the municipality of Rio das Ostras, state of Rio de Janeiro (Verdade *et al*. 2009).

Figure 1. Landscape of the forests of the Serra das Torres mountains, in the municipality of Atílio Vivacqua, Espírito Santo state, SE Brazil. Photo: Rafael Andrada.

We had previously published a distribution range extension and first state record for the hylid *Phasmahyla guttata* (Lutz, 1924), based on an individual collected by us during our study in the Serra das Torres (Oliveira *et al*. 2009). Here, we present distribution extensions and new state records for two additional frog species based on results from the same study (Figure 3), raising to 135 the number of anuran species reported for the state of Espírito Santo (see Almeida *et al*. 2011). It is possible that the Serra das Torres may represent (or be close to) the northern limit of distribution for some anuran species such as *Phasmahyla guttata*, *Brachycephalus didactylus*, and *Zachaenus parvulus*. Continued fieldwork at the Serra das Torres is likely to produce more interesting amphibian records, adding yet more evidences of the importance of that region for the conservation of such animals.

Figure 3. Location of the Serra das Torres mountains in Espírito Santo state (the star) and the closest localities with previous records of *Brachycephalus didactylus* (1) and *Zachaenus parvulus* (2) in Rio de Janeiro state, SE Brazil.

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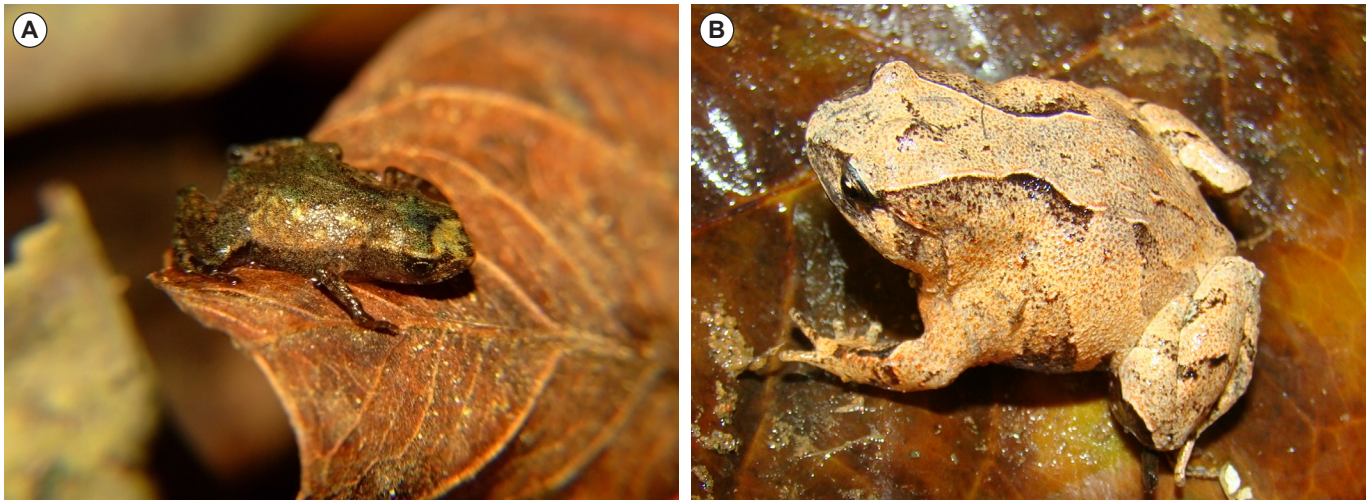

Figure 2. Specimens of (a) *Brachycephalus didactylus* (photo: Leandro Novaes Venerano) and (b) *Zachaenus parvulus* (photo: João Alberto Maia Linhares) from the Serra das Torres mountains, municipality of Atílio Vivacqua, Espírito Santo state, SE Brazil.

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