

## Distribution extension of *Chiasmocleis mantiqueira* Cruz, Feio and Cassini, 2007 (Amphibia, Anura, Microhylidae) in state of São Paulo

Matheus Toledo Moroti<sup>1,\*</sup>, Mariana Pedrozo<sup>2</sup>, Ibere Farina Machado<sup>3</sup> and Diego José Santana<sup>4</sup>

The genus *Chiasmocleis* Méhely, 1904 is composed of 29 described species (Frost, 2016), of which 10 species occur in the Atlantic Forest (Fonseca et al., 2013) and are divided into two distinct morphological clades (Cruz et al., 1997). The *C. leucosticta* clade includes species in which males have well-developed interdigital membranes, whilst species in the *C. shubarti* clade lack such developed interdigital membranes (Cruz et al., 1997). The frog *Chiasmocleis mantiqueira* belongs to the *C. leucosticta* group and is characterized by its average size as compared to other species of the genus (snout-vent length: 15.4–17.9 mm in males and 19.9–22.8 mm in females) (Cruz et al., 2007). Although there is great similarity between *C. mantiqueira* and *C. leucosticta*, these species can be distinguished by the color pattern of the gular region: the gular region in *C. mantiqueira* is white with brown spots following the same coloration pattern of the belly, while the gular region in *C. leucosticta* has a black coloring (Cruz et al., 2007).

*Chiasmocleis mantiqueira* was described from the Parque Estadual da Serra do Brigadeiro, in the

municipality of Ervália, state of Minas Gerais (Cruz et al., 2007), and had its geographical distribution extended to include the Parque Municipal da Lajinha, in the municipality of Juiz de Fora, also in state of Minas Gerais (Fonseca et al., 2013). There is also an additional record of the species from the Parque Nacional da Serra da Bocaina, municipality of São José do Barreiro, state of São Paulo (Garey et al., 2014). Besides these records, tadpoles and calls of *C. mantiqueira* had been described from type locality and some information about reproductive patterns were mentioned (Santana et al., 2012a), but no further data on its natural history is known.

According to the IUCN (Angulo, 2008) and the Brazilian red lists of threatened species (MMA, 2014), *C. mantiqueira* is classified as data deficient. The species has been listed on lists of species of the state of São Paulo, but proper locations were not mentioned (Araújo et al., 2009; Rossa-Feres et al., 2011). In fact, specific coordinates were given for only one record in the state of São Paulo (Garey et al., 2014). Given the few distribution records and the lack of knowledge about this species, as well as its unknown conservation status, here we present a new record of *C. mantiqueira* in the state of São Paulo.

We collected a male specimen of *C. mantiqueira* (permit SISBio number 48620-2) during a field expedition on January 13, 2016, carried out at the Parque Natural Municipal Augusto Ruschi (PNMAR), municipality of São José dos Campos, state of São Paulo. The voucher specimen is housed in the “Coleção Zoológica de Referência da Universidade Federal do Mato Grosso do Sul” (ZUFMS-AMP 03738; SVL 16.28 mm). The adult individual was found on the flooded leaf litter (Figure 1a) inside a temporary pond (Figure 1b) in a secondary forest area (-23.0714°S, -45.9313°W, WGS-84). In the same expedition, we observed several

<sup>1</sup> Instituto de Pesquisa e Desenvolvimento, Universidade do Vale do Paraíba, Avenida Shishima Hifumi 2911, CEP 12244-000, São José dos Campos, São Paulo, Brazil

<sup>2</sup> Instituto de Ciências Exatas e Biológicas, Universidade Federal de Ouro Preto, Rua Quatro 786, CEP 35400-000, Ouro Preto, Minas Gerais, Brazil

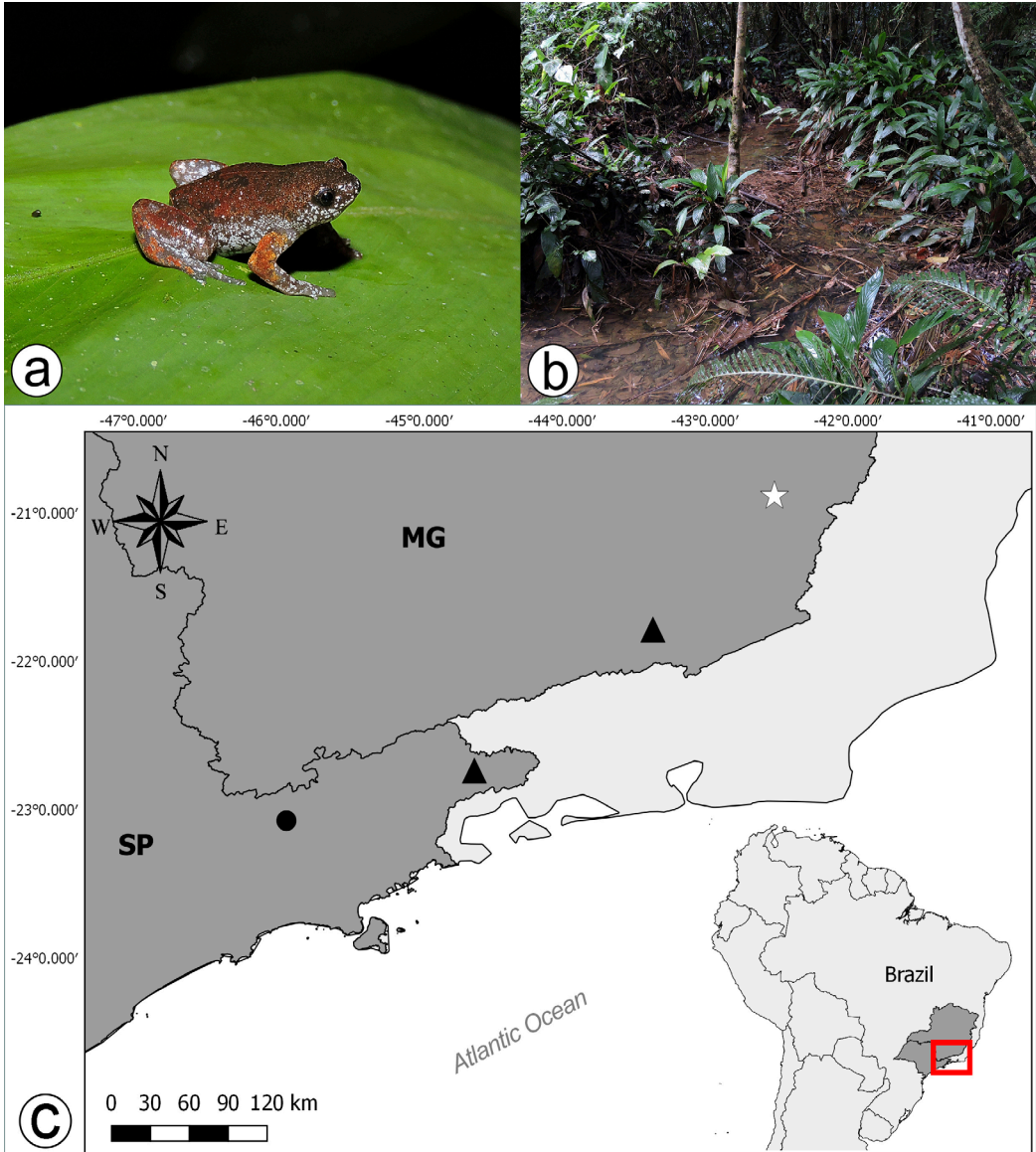
<sup>3</sup> Instituto Boitatá, Avenida 136 Qd. F-44, CEP 74093-250, Goiânia, Goiás, Brazil

<sup>4</sup> Centro de Ciências Biológicas e Saúde, Laboratório de Zoologia, Universidade Federal de Mato Grosso do Sul, Cidade universitária, CEP 79002-970, Campo Grande, Mato Grosso do Sul, Brazil

\* Corresponding author: mmoroti@gmail.com

tadpoles of this species in the same pond, and we collected two tadpoles in stage 27 (Gosner, 1960) (lot ZUFMS-AMP 03739) as vouchers. The area where the

adult specimen and tadpoles were collected comprises a small fragment of ombrophilous dense forest located inside the Atlantic Forest domain.



**Figure 1.** (a) Adult male of *Chiasmocleis mantiqueira* (ZUFMS-AMP 03738; SVL: 16.28 mm), (b) the temporary pond where this specimen and tadpoles were found in the municipality of São José dos Campos, state of São Paulo (SP), Brazil (-23.0714°S, -45.9313°W, WGS-84), and (c) the distribution map of the known localities for *Chiasmocleis mantiqueira* based on the present study and literature records. White star is the type locality in the state of Minas Gerais (MG) (Cruz *et al.*, 2007) and black triangles are previous records from the states of Minas Gerais (Fonseca *et al.*, 2013) and São Paulo (Garey *et al.*, 2014). The black dot represents the new record at the Conservation Unit of Integral Protection Parque Natural Municipal Augusto Ruschi (PNMAR), São José dos Campos municipality, state of São Paulo, Brazil.

This new record contributes considerably to the knowledge of the geographical distribution of *C. mantiqueira* (Figure 1c), extending the species distribution 448 km southwest from the type locality (Cruz et al., 2007). In the state of São Paulo, the record extends the species distribution 150 km southwest from the nearest known record (Garey et al., 2014). The collected specimen and tadpoles belong to a population that is inserted into a conservation unit, similar to what occurs for previously known populations (Cruz et al., 2007; Fonseca et al., 2013; Garey et al., 2014). Considering that all known records of *C. mantiqueira* are within protected areas, and that its geographic range has increased considerably since its description (approximately 12,000 km<sup>2</sup>), we expect that its conservation status can be reassessed. Further surveys are likely to find additional populations inserted in the region of Serra da Mantiqueira and in the occurrence area of *C. mantiqueira*.

The new record of this data deficient frog species in the PNMAR, along with other records of species endemic to the Atlantic Forest in the same area (Moroti et al., 2016), shows the importance of this forest fragment for amphibian conservation in the Atlantic Forest hotspot. Other areas that share similar characteristics, such as fragment size and proximity to urban areas, have also revealed new species of anurans and the distribution expansion of some species (Moroti et al., 2016; Santana et al., 2008; Santana et al., 2012b). This statement highlights that even small fragments have an important role for maintaining and supporting poorly known endemic species of the Atlantic Forest.

**Acknowledgements.** We are grateful to the “Secretaria do Meio Ambiente de São José dos Campos” for the study permit in the areas of the Parque Natural Municipal Augusto Ruschi. To the Instituto Boitatá for the partnership through the “Amplexus Project”. To Jonas Alves Ferreira Neto, Rodrigo Dela Rosa, and Andrielle Cristina dos Santos for assistance in the field. To the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for scholarship aid and to the Scientific Initiation for accomplishment of this work (124633/2015-3).

## References

- Angulo, A. (2008): *Chiasmocleis mantiqueira*. IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Available at: <http://www.iucnredlist.org>. Accessed on 20 June 2016.
- Araújo, O.G.D.S., Toledo, L.F., Garcia, P.C.A., Haddad, C.F.B. (2009): The amphibians of São Paulo State, Brazil amphibians of São Paulo. *Biota Neotropica* **9**: 197–209.
- Cruz, C.A.G., Caramaschi, U., Izecksohn, E. (1997): The genus *Chiasmocleis* Mehely, 1904 (Anura, Microhylidae) in the Atlantic Rain Forest of Brazil, with a description of three new species. *Alytes International Journal of Batrachology* **15**: 49–71.
- Cruz, C.A.G., Feio, R.N., Cassini, C.S. (2007): Nova Espécie de *Chiasmocleis* Mehely, 1904 (Amphibia, Anura, Microhylidae) da Serra da Mantiqueira, Estado de Minas Gerais, Brasil. *Arquivos do Museu Nacional* **65**: 33–38.
- Fonseca, M.F., Neves, M.O.N., Santana, D.J., Rios, C.H.V., Carvalho, R.M.H. (2013): Distribution extension of *Chiasmocleis mantiqueira* Cruz, Feio and Cassini, 2007 (Anura, Microhylidae). *Herpetology Notes* **6**: 19–20.
- Frost, D.R. (2016): Amphibian Species of the World: an Online Reference. Version 6.0. Available at: <http://research.amnh.org/herpetology/amphibia/index.html>. Accessed on 20 June 2016.
- Garey, M.V., Provete, D.B., Martins, I.A., Haddad, C.F.B., Rossa-Feres, D.C. (2014): Anurans from the Serra da Bocaina national park and surrounding buffer area, southeastern Brazil. *Check List* **10**: 308–216.
- Gosner, K.L. (1960): A simplified table for staging anuran embryos and larvae with notes on identification. *Herpetologica*, **16**: 183–190.
- MMA – Ministério do Meio Ambiente (2014): Atualização das Listas de Espécies Ameaçadas. Available at: <http://www.mma.gov.br/biodiversidade>. Accessed on 18 September 2016.
- Moroti, M., Neto, J.A.F., Santos, A.C.C., Souza, R.D.R., Soares, C.P., Machado, I.F. (2016): Anura do Parque Natural Municipal Augusto Ruschi, São José dos Campos, São Paulo, Brasil. *The Field Museum, Chicago, USA* **733**.
- Rossa-Feres D.C., Sawaya, R.J., Faivovich, J., Giovanelli, J.G.R., Brasileiro, C.A., Schiesari, L., Alexandrino, J., Haddad, C.F.B. (2011): Anfíbios do Estado de São Paulo, Brasil: conhecimento atual e perspectivas. *Biota Neotropica* **11**: 1–20.
- Santana D.J., A.P. Motta, R.M. Pirani, E.T. Silva., R.N. Feio. (2012a): Advertisement Call and Tadpole of *Chiasmocleis mantiqueira* Cruz, Feio and Cassini, 2007 (Anura, Microhylidae). *Journal of Herpetology* **46**: 14–18.
- Santana, D.J., Fonseca, E.M., Neves, M.D.O., Carvalho, R.M.H. (2012b): A new species of *Adelophryne* (Anura: Eleutherodactylidae) from the Atlantic Forest, southeastern Brazil. *Salamandra* **48**: 187–192.
- Santana, G.G., Vieira, W.L., Pereira-Filho, G.A., Delfim, F.R., Lima, Y.C., Vieira, K.S. (2008): Herpetofauna em um fragmento de Floresta Atlântica no estado da Paraíba, Região Nordeste do Brasil. *Biotemas* **21**: 75–84.