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New species and records of frog-biting midges from southern Brazil (Diptera: Corethrellidae)

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Abstract

Corethrella borkenti **sp. n.** is described, based on female and male adults, pupae and larvae, collected from tank bromeliads in the Atlantic Forest of southern Brazil. The larva and pupa of *C. alticola* Lane, 1939 are described for the first time. New distributional records for *C. alticola* and *C. vittata* Lane, 1939 extend their distributions to the southern Atlantic Forest. A key to pupae of *peruviana* group is given.

Key words: taxonomy, aquatic, bromeliad, Anura

Resumo

Corethrella borkenti **sp. n.** é descrita, com base em fêmea e macho adultos, pupas e larvas, coletadas em bromélias em área de Mata Atlântica no sul do Brasil. Larva e pupa de *C. alticola* Lane, 1939 são descritos pela primeira vez. Novos registros de *C. alticola* e *C. vittata* Lane, 1939 são feitos, estendendo suas distribuições para o sul da Mata Atlântica. Chave para pupas do grupo *peruviana* é fornecida.

Introduction

Corethrella is the only extant genus in the family Corethrellidae (Borkent, 2014) and are commonly known as frog-biting midges, due to the habit of females feeding exclusively on frog blood. There are 106 extant species known (Yu *et al.*, 2013, Borkent, 2014). Their worldwide distribution ranges from 50°N to 50°S but they are mainly found in tropical and subtropical regions, where frogs are more diverse and abundant (Borkent, 2008). Unlike most other biting flies, which are initially attracted to the CO_2 emanating from their hosts, corethrellids are attracted to frogs by their host's vocalization. They therefore primarily feed only on male frogs. At least some species are known to vector *Trypanosoma* parasites to their frog hosts.

The Atlantic Forest of Brazil has been recently listed among the five top hotspots for conservation priority in the world (Myers *et al.*, 2000). It is estimated that only about 12% of the Atlantic Forest's original cover remains (Ribeiro *et al.*, 2009). Amphibian declines are reported in this ecosystem (Eterovick *et al.*, 2004) and it is expected that *Corethrella* communities may be also threatened both directly and through the lost of their frog hosts.

Brazil is home to 28 species of *Corethrella* (Borkent 2008; 2014), 20 of which are found in the Atlantic Forest. Collections in lowland areas in Santa Catarina State, southern Brazil, revealed the presence of three species of *Corethrella*: *C. alticola* Lane, 1939; *C. vittata* Lane, 1939 and one new species closely related to *C. ananacola* Dyar, 1926. This publication describes all stages of the new species, *C. borkenti* **sp. n.**, based on reared larvae collected in bromeliads, describes the immature stages of *C. alticola* and gives new distributional records for *C. alticola* and *C. vittata* for the state of Santa Catarina.

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Conclusion

These are the first records of *Corethrella* from subtropical southern Brazil. At least seven other species have been sampled using frog-call traps in Santa Catarina State and these records and analyses of the interaction between frogs and *Corethrella* will be published soon (A.A. Ambrozio-Assis *et al.*, unpublished data). One-hour sampling of frog-call traps using *Leptodactylus latrans* (Steffen, 1815) (a common and apparently effective species to attract *Corethrella* in Santa Catarina) usually capture no more than 20 frog-biting midges, except for one collection at Porto Belo that attracted 290 specimens. Also, preliminary surveys in São Joaquim National Park (Urubici, Santa Catarina State) have provided interesting data on *Trypanosoma* transmission to frogs: *Trypanosoma* were detected only in male frogs, providing possible evidence of transmission by *Corethrella*, and female blood-fed *C. lopesi* are known from the gut content of *Scynax granulatus* (Peters, 1871), indicating a potential mechanism of oral infection (V.C. Rocha *et al.*, unpublished data). Our future efforts will investigate this unique interaction through multiple approaches.

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References

Borkent, A. (2008) The frog-biting midges of the world (Corethrellidae: Diptera). *Zootaxa*, 1804, 1–456.

Borkent, A. (2012) The pupae of Culicomorpha – Morphology and a New Phylogenetic Tree. *Zootaxa*, 3396, 1–98.

Borkent, A. (2014) World catalog of extant and fossil Corethrellidae (Diptera). *Zootaxa,* 3796 (3), 453–468. http://dx.doi.org/10.11646/zootaxa.3796.3.3

Dyar, H.G. (1926) Note on *Corethrella appendiculata* Grabham (Diptera, Culicidae). *Insecutor Insicitae Mentsruus,* 14, 150.

Dyar, H.G. (1928) A new *Corethrella* from Panama (Diptera: Culicidae). *Entomological News,* 39, 79–80.

Eterovick, P.C., Carnaval, A.C.O.Q., Borges-Nojosa, D.M., Silvano, D.L., Segalla M.V. & Sazima, I. (2005) Amphibian declines in Brazil: an overview. *Biotropica*, 37, 166–179. http://dx.doi.org/10.1111/j.1744-7429.2005.00024.x

Harbach, R.E. & Knight, K.L. (1980) *Taxonomists' Glossary of Mosquito Anatomy*. Plexus Publishing, Inc. Marlton, New Jersey, xi + 415 pp.

Lane, J. (1939a) Notes on non hematophagous Culicidae. *Boletim Biologico. Clube Zoologico do Brasil,* 4, 99–113.

Lane, J. (1939b) Non–hematophagous Culicidae. (second paper). *Boletim Biologico. Clube Zoologico do Brasil*, 4, 386–393.

Lane, J. (1942) Dixinae e Chaoborinae, Revisão das espécies neotropicais (Diptera, Culicidae). *Revista de Entomologia,* 13, 81–148, pls. 1–4.

Lane, J. (1943) Aditamento e corrigenda ao meu trabalho sobre Dixinae e Chaoborinae (Dipt.). *Revista de Entomologia,* 14, 162–166.

Lane, J. (1953) *Neotropical Culicidae. Vol. 1*. University of São Paulo, São Paulo, 548 pp. [Brazil]

Lane, J. & Cerqueira, N.L. (1958) Amazonian Chaoborinae (Diptera, Culicidae). *Studia Entomologia,* 1, 561–566.

Myers, N., Mittermeier, R.A., Mittermeier, C.G., Fonseca, G.A.B. & Kent, J. (2000) Biodiversity hotspots for conservation priorities. *Nature,* 403, 853–858. http://dx.doi.org/10.1038/35002501

Ribeiro, M.C., Metzger, J.P., Martensen, A.C., Ponzoni, F.J. & Hirota, M.M. (2009) The Brazilian Atlantic Forest: how much is left, and how is the remaining forest distributed? Implications for conservation. *Biological Conservation,* 142 (6), 1144–1156. http://dx.doi.org/10.1016/j.biocon.2009.02.021

Shannon, R.C. & Del Ponte, E. (1928) Los Culicidos en la Argentina. *Revista del Instituto Bacteriologico,* 5, 29–147.

Sæther, O.A. (1969) Some Nearctic Podonominae, Diamesinae, and Orthocladiinae (Diptera: Chironomidae). *Bulletin of the Fisheries Research Board of Canada,* 170, 1–154.

Yu, Y.-X., Huang, E.-J. & Zhang, J.-Q. (2013) A new species of Corethrellidae in China-Corethrella feipengi sp. nov. (Diptera: Corethrellidae) *Acta Parasitology et Medica Entomologica Sinica*, 20, 261–264. [in Chinese, English summary]