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Cuad. herpetol. 36 (2): 233-235 (*2022)*

First record of myiasis in *Physalaemus cuvieri* Fitzinger, 1826 (Anura: Leptodactylidae) by Diptera

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Recibida: 21 Abril 2021
Revisada: 15 Junio 2021
Aceptada: 14 Febrero 2021
Editor Asociado: C. Borteiro

doi: 10.31017/CdH.2022.(2021-025)

ABSTRACT

Myiasis is a parasitic disease caused by some species of Diptera, whose larvae feed on their host's tissues. Records of myiasis in Brazilian anurans are scarce in the literature with single records in 12 species divided into 5 families. We report herein the observation of the first case of myiasis in the frog *Physalaemus cuvieri* from an individual found dead.

Key Words: Ecology; Interaction; Natural History; Parasitism.

Myiasis is a parasitic disease caused by larvae of some species of Diptera. In anurans, the most representative families of these parasites are Calliphoridae, Chloropidae, Muscidae, and Sarcophagidae (Eizemberg *et al*., 2008). The larvae feed on tissues of their host, frequently causing death, but in unusual cases individuals can survive (Eaton *et al.* 2008; Souza-Pinto *et al.* 2015).

Records of dipteran infestations are well documented in humans and domestic animals for the reason of their impacts in public health and economics (Hall and Wall, 1995). Despite several records of myiasis in wild animals have been made, studies on Neotropical amphibians are not so common (Travers and Townsend, 2010; Pinto *et al*., 2017). Among them, there are some records in anurans of the Brachycephalidae (*Brachycephalus ephippium*), Bufonidae (*Rhinella margaritifera, Rhinella pombali*), Leptodactylidae (*Leptodactylus latrans, Physalaemus albonotaus*), Hylidae (*Aplastodiscus arildae, Boana beckeri, Boana atlantica, Scinax fuscovarius, Scinax ruber, Dryaderces inframaculata*) and Ranidae (*Lithobates catesbeianus*) families (Schwartz and Sebben, 1992; Eizemberg *et al.* 2008; Souza Jr. *et al.* 1990; Carvalho-Filho *et al.* 2010; Mello-Patiu and Luna-Dias 2010; Oliveira *et al.* 2012, Müller *et al.* 2015; Souza-Pinto *et al.,* 2015; Pinto *et al.* 2017, Mulieri *et al.,* 2018). In this work we report the first case of myiasis in *Physalaemus cuvieri.*

Physalaemus cuvieri is widely distributed throughout Brazil, parts of Argentina, Bolivia, Paraguay, and Venezuela (Frost, 2021). On April 3, 2021, at 11:30 h, during fieldwork in the municipality of Pinheiros (-18,4111233, -40,3013780, WGS 84; 131 m), Espírito Santo state, southeastern Brazil, we found an individual of *P. cuvieri* (Fig. 1A) parasitized by larvae Diptera apparently of the Sarcophagidae family (Fig. 1B). The larvae were not collected, and for this reason specific identification of the specimens was not possible; only adult individuals of this dipteran family can be confidently identified (Mello-Patiu and Luna-Dias, 2010). The individual of *P. cuvieri* was found dead in the leaf litter. When handled, two larvae left the host (one through the mouth and another one through a hole on the left side of its abdomen) (Fig. 1C). During the observation of the event, many other juvenile individuals of *P. cuvieri* were jumping on the litter,

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Figure 1. A) Individual of *Physalaemus cuvieri* (juvenile) killed by the larvae of Diptera; B) Close view of parasitic larva; C) Larvae abandoning the anuran carcass from a hole on the left side of its abdomen; D) Live juvenile of *P. cuvieri* from the same locality.

which confidently allowed the identification of the host (Fig. 1D). The study locality is part of the Atlantic Forest biome domains (Garbin *et al.*, 2017), and corresponds to an understory area of dense ombrophylous forest with some invasive species such as *Acacia*. The climate is tropical humid with a monthly average of 95 mm (Governo-ES, 2021; Climatempo, 2021). There is also a small water body that flows into a permanent lake.

The frog *P. cuvieri* is the second species of the genus registered as parasitized by Diptera. Previously, *Physalaemus albonotatus*, was observed to be attacked by *Lepidodexia* (*Notochaeta*) *adelina* (Mulieri *et al.*, 2018). In South America, Sarcophagidae is the main cause of anuran myiasis (Kraus, 2007; Mello-Patiu and Luna-Dias, 2010). However, only three groups, one genus and two subgenera, were registered parasitizing amphibians: *Sarcophaga, Peckia* (*Sarcodexia*) and *Lepidodexia* (*Notochaeta*) (Souza *et al.,* 1989; Hagman *et al.*, 2005).

Records generally point to the death of the anuran by the end of the parasitic stage, or after the larvae abandonment (Lopes 1942; Crump and Pounds 1985; Eizemberg *et al.*, 2008). This fact is probably due to the voracity of the last larval instar, characteristic of dipterans, especially of parasitic and parasitoid species (Coupland and Barker, 2004). Mello-Patiu and Luna-Dias (2010) pointed to the rapid death of anurans, followed by the host abandonment of the larvae hours after capture. This occurrence, also observed in other works, suggests the possibility that parasites respond to the stress caused on the host (Muratori *et al.* 2010).

Acknowledgments

We are grateful for the consideration and guidance of Dr. Elidiomar Ribeiro, who made possible this paper, and we also thank the editors for their careful review.

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