

## FIRST REPORT OF MYIASIS (DIPTERA: SARCOPHAGIDAE) IN ANURAN OF LEPTODACTYLIDAE (AMPHIBIA)

### PRIMER REGISTRO DE MIASIS (DIPTERA: SARCOPHAGIDAE) EN ANUROS DE LEPTODACTYLIDAE (AMPHIBIA)

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#### Key words:

Anura,  
Brazil,  
*Leptodactylus latrans*,  
parasitism.

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#### Abstract

This note is the first report of myiasis caused by Sarcophagidae flies in an anuran of Leptodactylidae. The frog, identified as *Leptodactylus latrans* (Steffen, 1815), was collected in Atlantic forest bioma, southern Brazil. The frog had extensive muscle damage and orifices in the tegument caused by presence of 21 larvae, identified as Sarcophagidae. Ecological interactions between dipterans and anuran are poorly known. The impact of sarcophagid flies in anuran populations requires further study.

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#### Palabras Clave:

Anura,  
Brasil,  
*Leptodactylus latrans*,  
parasitismo.

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#### Resumen

Esta nota es el primer registro de ocurrencia de miasis generada por moscas Sarcophagidae en anuro de la familia Leptodactylidae. El anfibio, identificado como *Leptodactylus latrans* (Steffen, 1815), fue recolectado en el bioma Mata Atlántica, en el sur de Brasil. La rana presentaba extensas lesiones musculares y orificios en el tegumento generados por la presencia de 21 larvas, identificadas como Sarcophagidae. Las interacciones ecológicas entre insectos dípteros y anuros son poco conocidas. El impacto de las moscas Sarcophagidae en las poblaciones de anuros requiere más estudio.

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#### INFORMACIÓN

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## Introduction

Populations of several amphibians have recently declined overall in the world, due mostly to reduction and fragmentation of their habitats, besides the exacerbation of ecological modifications like predation and parasitism (BECKER *et al.*, 2007; CAMPIÃO *et al.*, 2009). Parasites have an important role in ecosystems, directly affecting their host population, influencing the diversity of animal communities (MARTINEZ-BAKKER and HELM, 2015).

Parasites of anuran amphibians may belong to several groups, like helminths (*e.g.* CAMPIÃO *et al.*, 2014), mites (*e.g.* BEATY *et al.*, 2013) and fly larvae (*e.g.* OLIVEIRA *et al.*, 2012). The infestation of vertebrates by dipteran larvae feeding on their living or dead tissues is called myiasis (MARCONDES, 2009). Myiasis is usually caused by flies belonging to Calliphoridae, Sarcophagidae and Muscidae, and their occurrence has been reported mostly in mammals and birds.

Infestation by fly larvae has been reported in 11 anuran families: Alytidae, Brachycephalidae, Bufonidae, Cycloramphidae, Dendrobatidae, Hylidae, Limnodynastidae, Myobatrachidae, Pelobatidae, Ranidae e Strabomantidae (KRAUS, 2007; GÓMEZ-HOYOS *et al.*, 2012).

## Case report

A anuran specimen was collected in May 15, 2015, at 4:20 p.m. in a forest fragment (28°23'35.20" S and 54°22'38.90" W); the fragment area was constituted approximately by 50.5 ha of Mixed Ombrophilous Forest, belonging to Atlantic Forest biome, localized in the municipality of Vitória das Missões, state of Rio Grande do Sul, Brazil.

The specimen was found near a small stream less than 1 m wide, where many tadpoles could be seen. With the use of tweezers, the larvae were removed from the frog and preserved in 70% ethanol. They were subsequently examined in the laboratory for identification with a stereoscopic microscope and a key from GUIMARÃES *et al.* (1983). All the material (frog and larvae) is preserved in the Zoological Collection of Farroupilha Federal Institute, Panambi Campus.

The frog was identified as *Leptodactylus latrans* (Steffen, 1815), belonging to Leptodactylidae. The specimen was found dead, but the good preservation of their ocular globes indicated a recent death. In the lab, frog was identified as *Leptodactylus latrans* (Steffen, 1815), belonging to Leptodactylidae. The parasitized frog, a female with 10.1 cm snout-vent length, presented three orifices in the ventral face (Fig. 1 and 2). One

orifice in the posterior extremity and three on the head. Dissection of the animal showed muscular lesions extending from the orifice in the posterior region up to the orifices in cephalic region. Altogether were collected 21 larvae, with an average length of 15.6 mm, identified as Sarcophagidae. Identification of flies in this family cannot be done to the level of genus or species by the observation of morphology of larvae alone, and more than 800 species of the family have been reported in the Neotropical region (LOPES and LEITE, 1989).

Leptodactylidae is a Neotropical anuran family, with approximately 1,100 species distributed among 50 genera (POUGH *et al.*, 1998). This family is ranked in fourth position in population decline, with some species in serious extinction risk. However, due to its wide distribution (South America), *L. latrans* ("butter frog") is not considered as in extinction risk, but as subjected to population decline (BOGART, 1974; KWET and DI-BERNARDO, 1999; STUART *et al.*, 2004). Moreover, BLAUSTEIN *et al.* (2011) considered that the reduction of Amphibia populations is caused by multiple factors, besides their distribution. Occurrence of apparently uncommon parasitosis, like the presently observed, may indicate the reduction of fitness of population to resist to stressing agents that may indicate a risk for this group.



Figure 1. Larvae of Sarcophagidae leaving in the dorsal region of the *L. latrans*.



Figure 2. Larvae of Sarcophagidae leaving in the ventral region of the *L. latrans*.

Even having *L. latrans* a predominantly nocturnal activity, not coincident to the diurnal one of Sarcophagidae flies, females of this frog present a very strong parental care for their tadpoles (RODRIGUES *et al.*, 2011; Rocha *et al.*, 2015), which can expose them to larviposition at any moment of the day. In the literature, three genera (*Sarcophaga*, *Sarcodexia* e *Lepidodexia*) of Sarcophagidae have been reported as causing myiasis in amphibians, all of them including diurnal flies (ROY and DASGUPTA, 1977; HAGMAN *et al.*, 2005).

Interactions between flies and anuran in the Neotropical region are poorly known, and the rapid decomposition of affected carcasses jeopardizes the observation of infestations. This is the first report of myiasis by Sarcophagidae on anuran of Leptodactylidae, and studies on the impact of this infestation on populations of these vertebrates need to be carefully evaluated.

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### References

- BEATY, L.E.; ESSER, H.J.; MIRANDA, R.; NORTON, R.A. 2013. First report of phoresy by an oribatid mite (Thrypochthoniidae: *Archezogozetes magnus*) on a frog (Leptodactylidae: *Engystomops pustulosus*). International Journal of Acarology 39 (4):325-326.
- BECKER, C.G.; FONSECA, C.R.; HADDAD, C.F.B.; BATISTA, R.F.; PRADO, P.I. 2007. Habitat Split and the Global Decline of Amphibians. Science 314(5857):1775-1777.
- BOGART, J.P. 1974. A Karyosystematic Study of Frogs in the genus *Leptodactylus* (Anura: Leptodactylidae). American Society of Ichthyologists and Herpetologists 3:728-737.
- BLAUSTEIN, A.R.; HAN, B.A.; RELYEA, R.A.; JOHNSON, P.T.J.; BUCK, J.C.; GERVASI, S.S.; KATS, L.B. 2011. The complexity of amphibian population declines: understanding the role of cofactors in driving amphibian losses. Annals of the New York Academy of Sciences 1223 (1):108-119.
- CAMPIÃO, K.M.; SILVA, R.J.; FERREIRA, V.L. 2009. Helminth parasites of *Leptodactylus podicipinus* (Anura: Leptodactylidae) from South-eastern Pantanal, State of Mato Grosso do Sul, Brazil. Journal of Helminthology 83:345-349.
- CAMPIÃO, K.M.; MORAIS, D.H.; DIAS, O.T.; AGUIAR, A.; TOLEDO, G.M.; TAVARES, L.E.R.; SILVA, R.J. 2014. Checklist of Helminth parasites of Amphibians from South America. Zootaxa 3843 (1):001-093.
- GÓMEZ-HOYOS, D.A.; SUÁREZ-JOAQUI, T.; MARÍN-GÓMEZ, O.H. 2012. Flesh fly myiasis (Diptera: Sarcophagidae) in *Pristimantis thecopternus* (Anura: Strabomantidae) from Colombia. Herpetology Notes 5:27-29.
- GUIMARÃES, J.H.; PAPAVERO, N.; PRADO, A.P. 1983. As Míases na Região Neotropical (Identificação, Biologia, Bibliografia). Revista Brasileira de Zoologia 1 (4):239-416.
- HAGMAN, M.; PAPE, T.; SCHULTE, R.; 2005. Flesh fly myiasis (Diptera, Sarcophagidae) in Peruvian poison frogs genus *Epipedobates* (Anura, Dendrobatidae). Phyllomedusa 4 (1):69-73.
- KWET, A.; DI-BERNARDO, M. 1999. *Anfibios - Amphibien-Amphibians: Serra Gaúcha*. EdiPUCRS. Porto Alegre, Brasil.
- KRAUS, F. 2007. Fly parasitism in Papuan frogs, with a discussion of ecological factors influencing evolution of life-history differences. Journal of Natural History 41(29-32):1863-1874.
- LOPES, H.S.; LEITE, A.C.R. 1989. Morphology of egg of *Sarcodexia lambens* (Diptera: Sarcophagidae). Memórias do Instituto Oswaldo Cruz 84 (4):497-500.

- MARCONDES, C.B. 2009. *Doenças Transmitidas e Causadas por Artrópodes*. Editora Atheneu. São Paulo, Brasil.
- MARTINEZ-BAKKER, M.; HELM, B. 2015. The influence of biological rhythms on host-parasite interactions. *Trends in Ecology & Evolution* 30 (6):314-326.
- OLIVEIRA, R.M.; MENDES, C.V.M.; RUAS, D.S.; SOLÉ, M.; PINHO, L.C.; REBOUÇAS, R. 2012. Myiasis on *Hypsiboas atlanticus* (Caramaschi and Velosa, 1996) (Anura: Hylidae) from southern Bahia, Brazil. *Herpetology Notes* 5:493-494.
- POUGH, F.H.; ANDREWS, R.M.; CADLE, J.E.; CRUMP, M.L.; SAVITZKI, A.H.; WELLS, K.D. 1998. *Herpetology*. Prentice-Hall. New Jersey.
- ROCHA, C.F.D.; SIQUEIRA, C.C.; ARIANI, C.V.; VRCIBRADIC, D.; GUEDES, D.M.; KIEFER, M.C.; ALMEIDA-GOMES, M.; GOYANNES-ARAÚJO, P.; BORGES-JÚNIOR, V.N.T.; VAN SLUYS, M. 2015. Differential success in sampling of Atlantic Forest amphibians among different periods of the day. *Brazilian Journal of Biology* 75 (2):261-267.
- RODRIGUES, A.P.; GIARETTA, A.A.; SILVA, D.R.; FACURE, K.G.; 2011. Reproductive features of three maternal-caring species of *Leptodactylus* (Anura: Leptodactylidae) with a report on alloparental care in frogs. *Journal of Natural History* 45 (33-34):2037-2047.
- ROY, P.; DASGUPTA, B. 1977. *Sarcophaga ruficornis* Fabr. (Sarcophagidae: Diptera) as a parasite of the common Indian toad. *Proceedings of the Indian Academy of Sciences* 86B (3):207-209.
- STUART, S.M.; CHANSON, J.S.; COX, N.A.; YOUNG, B.E.; RODRIGUES, A.S.L.; FISCHMAN, D.L.; WALLER, R.W. 2004. Status and Trends of Amphibian Declines and Extinctions Worldwide. *Science* 306 (5702):1783-1786.