Anura is the most diverse amphibian order, with a recognized importance in biodiversity and conservation. However, we still lack information about its interaction with different trophic levels, such as parasitism. Although we have advanced significantly in the last years, we have studied host-parasite interactions for only 16.45% of the Brazilian anurans (Campião et al., 2014). Among helminth endoparasites, the filaroid nematodes are a very peculiar group, once they include a life stage in the blood of their hosts. Blood parasites also include protozoans such as Trypanosoma, Hepatozoon and Haemogregarina species (Souza, 1974; McKenzie and Starks, 2008).

The Hylodidae Günther, 1858 represents well the scarcity of studies, since it is composed by 26 species occurring in the southeast and south of Brazil (Frost, 2017) and none of these was studied for parasites. Here we report the association of a filarial nematode parasitizing Hylodes heyeri (Fig. 1). Our study was carried out in Parque Estadual do Marumbi (MSP, State Decree 7.300/90) (25°29’23” S; 48°58’37” W) in Piraquara, Paraná, southern Brazil. We conducted two field surveys during the breeding season, one in September 2017 and one in January 2018. We surveyed two streams using visual and auditory surveys (Scott and Woodward, 1994), license SISBIO 53210-2. For each anuran we collected blood samples and made blood smears, which were fixed with methanol, stained with Giemsa (16%), and screened for blood parasites with an optical microscope (Carl Zeiss). Then, specimens were killed with Lidocaine 5%, fixed in 10% formalin, preserved in 70% ethanol and deposited in the collection of the Museu de História Natural do Capão da Imbuia (MHNCI 10868-10872) in Curitiba, Paraná, Brazil.

We examined the blood smears of twenty specimens of H. heyeri (mean SVL = 40.91 mm ± 0.15 SD, mean body weight = 5.75 g ± 0.75 SD). Among those, one specimen (male, SVL = 40.29 mm, weight = 6.9 g) was infected by microfilariae (n = 13, average length = 100.14 µm, ± 25.36 SD, average width = 4.91 µm ± 1.19 SD; Fig. 2).

Infections by blood nematode parasites are reported among amphibians, reptiles, birds and mammals (McKenzie, 2007). In the most common form of infection, parasites in adult stage live within the host’s body cavity, where the female releases the larval microfilariae that reach the bloodstream of the host (McKenzie, 2007). Among amphibians, reports of microfilariae are scarce. Only Rhinella marina (Linnaeus, 1758), Boana lundii (Burmeister, 1856), Boana geographica (Spix, 1824), Bokermannohyla luctuosa (Pombal and Haddad, 1993), and Leptodactylus

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Figure 1. Adult male of Hylodes heyeri from Parque Estadual do Marumbi, in the municipality of Piraquara, State of Paraná, southern Brazil. Photo by Michelle M. Struett.
latrans (Steffen, 1815) have been reported as hosts of microfilariae in Brazil (Travassos and Freitas, 1964; Vicente and Santos, 1976; Vicente et al., 1991; Toledo et al., 2013). Therefore, this is the first record of microfilariae larvae in a hylodid species.

Hylodes heyeri is a rheophilic species (Haddad et al., 1996), and the aquatic environment that it inhabits may contribute to infections by hemoparasites. Nematodes of the Onchocercidae family are the main filarid parasites associated with amphibians, and are usually transmitted by hematophagous arthropods (Anderson, 2000). Species of Culex and Aedes (Culicidae) are vectors of microfilariae larvae infecting frogs (Causey, 1939; McKenzie, 2007). It is possible that Culex and Aedes are the main vectors of microfilariae for H. heyeri in our study area. Further studies should investigate how the microfilariae can affect H. heyeri, and how this hemoparasite is transmitted.

Acknowledgments. We thank Parque Estadual do Marumbi for the facilities and sampling license (No. 41.16); Dr. Mário Navarro for providing the microscope for the picture; Gabriel de La Torre for helping to stain the slides; André Bruinje, Fabrício H. Oda and Drausio H. Morais for reviewing this manuscript.

References


Figure 2. Filarial parasite of Hylodes heyeri from Parque Estadual do Marumbi, State of Paraná, southern Brazil. Photo by Elvira D’Bastiani.