

## ***Hedruris* sp. (Nematoda: Hedruridae) parasitizing *Leptodactylus latrans* (Anura: Leptodactylidae): first record of this nematode in Brazil**

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*Leptodactylus latrans* is a large, nocturnal frog with a generalist diet. It occurs in tropical South America east of the Andes (Maneyro et al., 2004) and can be found in lentic and lotic environments, in both natural and anthropomorphically impacted areas (Solé et al., 2009). Little is known about the helminth parasites of *L. latrans*, for which only some isolated studies in Atlantic rainforest have been published featuring its digenean trematodes and nematodes (Vicente and Santos, 1976; Stumpf, 1982; Rodrigues et al., 1990). Nematodes of the genus *Hedruris* (Nitzsch, 1821) are unique members of the family Hedruridae, which parasitize the digestive tract of fishes, frogs, salamanders, lizards, and turtles (Burse and Goldberg, 2000). Females of this genus have a peculiar, specialized attachment structure placed at the anterior end of their bodies, a chitin-containing retractable hook that becomes fixed to the host's stomach wall (Baker, 1986). Males are usually found coiled around the female (Baker, 1986). The genus is characterized by the presence of four complex lips, an oesophagus not clearly divided into muscular and glandular portions, as well as a terminal portion of the female's body that is modified into a ligation or fixation organ (Petter, 1971; Hasegawa and Otsuru, 1979; Anderson, 2000). Species of *Hedruris* are distinguished on the basis of the number and disposition of caudal

papillae in males, the appearance of eggs in females, and the morphology of cephalic structures, spicules, and the caudal hook (Baker, 1986; Hasegawa, 1989; Bursey and Goldberg, 2000, 2007).

At least two species of *Hedruris* are known to parasitize frogs of the genus *Lithobates*. *Hedruris heyeri* was found parasitizing *L. warszewitschii* in Costa Rica (Burse and Goldberg, 2007), and *H. siredonis* parasitizes *L. clamitans* and *L. catesbeianus* in North America (Muzzall and Baker, 1987). In South America, there are four records of the genus parasitizing anurans. In Uruguay, *H. scabra* (Freitas and Lent, 1941) was found parasitizing *Leptodactylus latrans* (Yamaguti, 1961); in Peru *H. juninensis* (Bendezu, 1976) was recorded in *Lysapsus limellum* (Baker, 1987); and *H. moneiezi* (Ibanez and Cordova, 1976) was listed for *Telmatobius peruvianus* and *Telmatobius* sp. (Baker, 1987). In Argentina, *H. mucronifer* (Schurmans-Stekhoven, 1951) was recorded in *Telmatobius schreiteri* (Yamaguti, 1961). Here we report for the first time a record of *Hedruris* in Brazil.

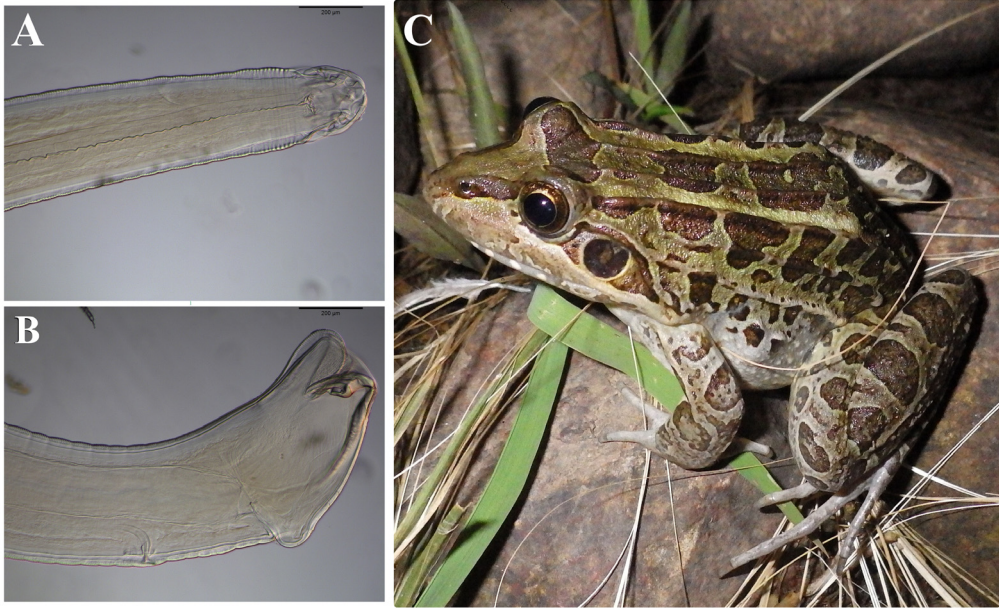
On 24 January 2016, we collected three adult females of *Hedruris* sp. (Fig. 1) from the stomach of a male *Leptodactylus latrans*. The anuran host was collected in a highly anthropogenic pond located in an agricultural landscape of Cerro Negro Municipality (27.7774°S, 50.8594°W, elevation 1014 m), Santa Catarina State, southern Brazil (Fig. 2). The nematodes were killed in hot 70% ethanol (~60°C) and afterwards fixed in the same ethanol concentration. The specimens were clarified with Aman's lactophenol (Andrade, 2000), mounted on temporary slides, and examined under an optical microscope. Photomicrographs were obtained using a computerized LAZ V4 (Leica Application Suite) image analysis system, adapted to a DM 2500-Leica® microscope, with interferential phase contrast system. The host *L. latrans* (SISBIO license # 49876-1) and the *Hedruris* specimens were deposited in the Zoological

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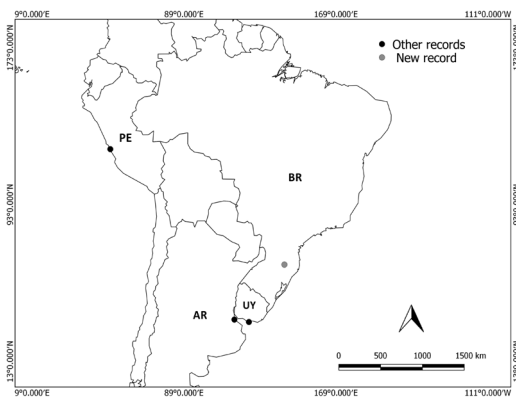
**Figure 1.** Female of *Hedruris* sp. from the host species *Leptodactylus latrans* in Santa Catarina State, southern Brazil. (A) Anterior view showing the head. (B) Posterior view showing the tail. Photomicrographs by Aline Aparecida Bastos Portela.

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The parasite specimens were identified based on common characters of the genus; however, due to lack of males in the sample, the species could not be

determined. Thus, we compared the photomicrographs of our specimens with photomicrographs and the description of species available in Baker (1986), Chero *et al.* (2014), and Rossin and Timi (2016). All specimens possessed the diagnostic characteristics of the genus according to the identification key (Hoffman, 1999), including the four complex lips and the retractable chitinized hook.

This record is the first for the nematode genus *Hedruris* in Brazil and it significantly increases the geographical range of the genus, by approximately 900 km in a northeastern direction from the closest record in Montevideo, Uruguay. Interestingly, the host anuran was collected in a pond overpopulated by the North American bullfrog *Lithobates catesbeianus* (an invasive frog species in Brazil). Thus, the present record may indicate the occurrence of cross-infection between these two species of anurans since *Hedruris* has been described from *Lithobates*. However, this hypothesis can only be effectively tested through a helminthological study of *Lithobates catesbeianus* from that locality.



**Figure 2.** Distribution map for the genus *Hedruris* (Nematoda) in South America, including historical records (black circles) in Peru (PE), Argentina (AR), and Uruguay (UY), as well as the first record (gray circle) for Brazil (BR).

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