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Cestoda, Bothriocephalidae, *Bothriocephalus acheilognathi* Yamaguti, 1934; Nematoda, Rhabdochonidae, *Rhabdochona canadensis* Moravec and Arai, 1971: New records for the state of Puebla, Mexico, and a new fish host

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ABSTRACT: In order to contribute to the knowledge on helminth parasites of freshwater fishes in Mexico, the helminth fauna of the cyprinid fish *Notropis moralesi* was studied. The helminth species *Bothriocephalus acheilognathi* and *Rhabdochona canadensis* were recovered from 20 examined hosts. Values of prevalence, abundance and mean intensity of each infection are provided. Present work represents the first helminthological study for *N. moralesi*. Therefore, both helminth species recorded are new host records. This is the second report of *B. acheilognathi* and the first of *R. canadensis* for the state of Puebla.

Freshwater fishes represent the host group with the largest study effort for helminth parasites among vertebrates in Mexico (Pérez-Ponce de León and Choudhury 2010). It has been argued that the inventory of the helminth fauna of these hosts is nearing completion and because of that it has been suggested that sampling effort must be focused to discover the missing component of the host spectrum (Pérez-Ponce de León and Choudhury 2010), and that included, particular regions in the country and certain hosts groups such as cyprinids. In this context, this note provide the first study on the helminth fauna of the freshwater fish *Notropis moralesi* De Buen, 1955 (Cyprinidae) in Puebla state, central Mexico, a region of the country that has been scarcely studied for helminth parasites.

During a prospective study addressed to establish the parasitological fauna of freshwater fishes occurring in river basins along central Mexico, twenty individuals of *N. moralesi* were examined for helminth parasites. Fishes (collected under the Cartilla Nacional de Colector Científico de Flora y Fauna Silvestre FAUT-0057 issued to G.P.P.L.) were captured on April 2009 in the Ahuehuello River at Santo Domingo Ayotlicha, an affluent of the Balsas River Basin (18°43'12.5" N, 98°34'43.4" W), using an electrofishing device. Individual fishes were kept alive and studied for helminths no more that 6 hours after capture. All internal organs were analyzed separately in Petri dishes with 0.65 % saline under the stereomicroscope. Parasites were removed to a Petri dish with saline 0.65 %, prior to fixation. Cestodes were fixed with hot (steaming) 4 % formalin, while nematodes were fixed with hot (steaming) 4 % formalin or 70 % ethanol. All helminths were processed following standard procedures. Identification was made using specialized literature, and representative specimens of the helminth species were deposited at the Colección Nacional de Helmintos, Instituto de Biología, Universidad Nacional Autónoma de México (UNAM), Mexico City (CNHE).

Two helminth species were found in the examined hosts: the anthropogenically introduced cestode *Bothriocephalus acheilognathi* Yamaguti, 1934 (47 individuals, prevalence 60 %, abundance 2.35 ± 2.74, mean intensity 3.9 ± 2.5 worms per infected host), and the nematode *Rhabdochona canadensis* Moravec and Arai, 1971 (Figure 1, 135 individuals, prevalence 90 %, abundance 6.75 ± 6.72, mean intensity 7.5 ± 6.7 worms per infected host). No larval stages of any helminth species were found. Only 1 host in the sample was free of infection.

The cestode *B. acheilognathi* is a generalist species commonly recorded in freshwater fishes in Mexico (Salgado-Maldonado and Pineda-López 2003; Okoldkov *et al*. 2007). This species was introduced into Mexico along with its hosts, common carps, from Asia. It possesses a large dispersal capability and it is now found not only in introduced hosts but also in the native freshwater fish fauna (Pérez-Ponce de León *et al*. 2009). Previous records of this cestode in fishes of the genus *Notropis* Rafinesque in Mexico includes its finding in the species *N. chihuahua* Woolman and *N. nazas* Meek from the Nazas River basin, Durango state, North of Mexico (Pérez-Ponce de León *et al*. 2010). The record of *B. acheilognathi* established herein represents the second for Puebla state, Mexico, where it was previously found in *Poecilia* sp. (Aguilar-Aguilar *et al*. 2004).

Nematodes of the species *R. canadensis* have frequently been reported for freshwater fish species, mainly belonging to the family Cyprinidae, in North America (Hoffman 1999; Caspeta-Mandujano 2005; Garrido-Olvera *et al*. 2006). Studies on the seasonal dynamics of this nematode conducted in central Mexico suggest that its prevalence and mean intensity in hosts of the genus *Notropis* fluctuate throughout the year, occurring an increase for these parameters in some seasons (Caspeta-Mandujano and Mejía-Mojica 2004). Previous records of this nematode in species of *Notropis* in Mexico includes *Notropis* sp., and *N. boucardi* (Günther) from Guerrero, Hidalgo, Estado de México, Michoacán, Morelos and Oaxaca states in central Mexico (Caspeta-Mandujano 2005; Garrido-Olvera *et al*. 2006), and *N. chihuahua* and *N. nazas* from the Nazas River basin, Durango state, North of Mexico (Pérez-Ponce de León *et al*. 2010). The present is the first record of this nematode in freshwater fishes of Puebla state in central Mexico.

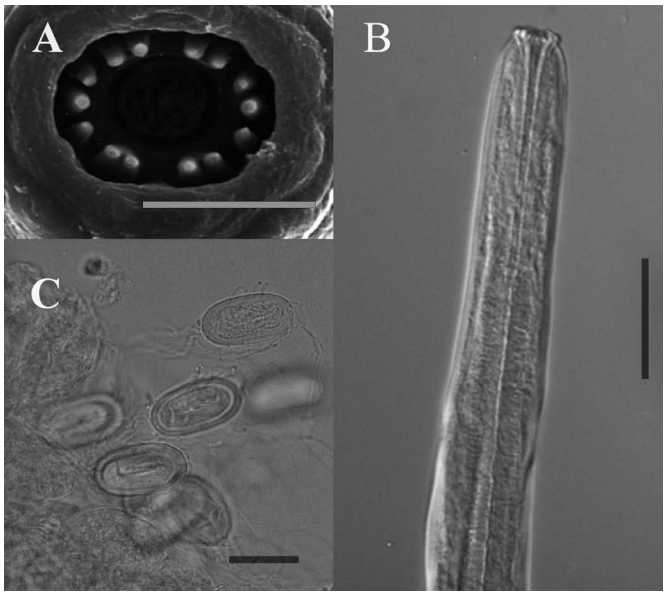

Figure 1. *Rhabdochona canadensis*. A, Anterior end of male, apical view (x 10k), scale bar 5 μm; B, Anterior end of female, scale bar 0.05 mm; C, Detail of mature, larvated and filamented eggs, scale bar 0.03 mm.

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