SHORT COMMUNICATION

The first report of *Cosmocerca parva* (Nematoda: Cosmocercidae) from *Colostethus* *fraterdanieli* (Anura: Dendrobatidae) in Colombia

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Palavras-chave: Anura, Dendrobatidae, *Colostethus fraterdanieli*, Nematoda, Cosmocercidae, *Cosmocerca parva*, Colômbia, helmintos.

Research on the nematode parasites of anurans in Colombia is scarce, with only three species of nematodes having been recorded from two Colombian anurans. Goldberg and Bursey (2003) reported *Cosmocerca podicipinus*, *Physocephalus* sp., and *Porrocaecum* sp. in the intestines, digestive tract musculature, and coelom, respectively, of the bufonid *Atelopus spurrelli* and the dendrobatid, *Oophaga histrionica* (*Dendrobates histrionicus* auctorum). *Cosmocerca parva* Travassos, 1925 (Ascaridida: Cosmocercidae), originally was described from the leptodactylid frog, *Hylodes nasus* (*Elosia nasus* auctorum) from Angra dos Reis, State of Rio de Janeiro, Brazil. Since this description, *C. parva* has been reported in 44 anuran species from eight countries in Central and South America (Table 1). Despite the

diversity of anurans in Colombia (~750 species, Frost 2010), there are no reports of this nematode in an anuran in this country.

Colostethus fraterdanieli Silverstone, 1971 is endemic to Colombia. This species occurs at elevations between 1000 and 2500 m along the western flanks of the Cordillera Central, as well as on both the western and eastern sides of the Cordillera Occidental in the departments of Antioquia, Caldas, Risaralda, Quindío, Valle del Cauca, and Nariño (Grant and Castro-Herrera 1998). *Colostethus fraterdanieli* is diurnal and inhabits the leaf litter near streams (Grant and Castro-Herrera 1998, Ramírez *et al.* 2009). The males guard developing eggs and, at hatching, transport the tadpoles to small, still pools and shallow, slow-flowing streams (Grant and Castro-Herrera 1998). We discovered the nematode parasite, *Cosmocerca parva*, in *C. fraterdanieli*; this is the first record of this nematode species in Colombia and *C. fraterdanieli* is a novel host of *C. parva*.

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Table 1. Anuran species (names as in Frost 2010) reported as host of *Cosmocerca parva* in Central and South America.

Anuran host (= original name reported)	Country	Site of infection	Reference
BRACHYCEPHALIDAE:			
<i>Hylodes nasus</i> (= <i>Elosia nasus</i>)	Brazil	Intestines	Travassos 1925, Vicente <i>et al.</i> 1990
BUFONIDAE:			
<i>Rhaebo glaberrimus</i> (= <i>Bufo glaberrimus</i>)	Peru	Intestines	Burseý <i>et al.</i> 2001
<i>Rhinella bergi</i> (= <i>Chaunus bergi</i>)	Argentina	Small and large intestines	González and Hamann 2007a, González 2009
<i>R. crucifer</i>	Paraguay	No indicated	McAllister <i>et al.</i> 2010a
<i>R. fernandezae</i> (= <i>Chaunus fernandezae</i>)	Argentina	Large intestine	González and Hamann 2007b
<i>R. granulosa</i> (= <i>Bufo granulatus major</i> ; <i>Chaunus granulatus major</i>)	Argentina	Small and large intestine	Mordegliá and Digiani 1998, González and Hamann 2006b
<i>R. schneideri</i> (= <i>Bufo paracnemis</i>)	Argentina, Paraguay	Large intestine	Baker and Vaucher 1984, González and Hamann 2008
<i>R. margaritifera</i>	Peru	Intestines	Burseý <i>et al.</i> 2001
<i>R. marina</i> (= <i>Bufo marinus</i>)	Peru	Intestines	Burseý <i>et al.</i> 2001
CRAUGASTORIDAE:			
<i>Craugastor crassidigitus</i>	Costa Rica	Large intestine	Goldberg and Bursey 2008
<i>Craugastor gollmeri</i>	Costa Rica	Large intestine	Goldberg and Bursey 2008
CYCLORAMPHIDAE:			
<i>Odontophrynus americanus</i>	Argentina	Large intestine	González and Hamann 2009
DENDROBATIDAE:			
<i>Ameerega picta</i> (= <i>Epipedobates pictus</i>)	Peru	Intestines	Burseý <i>et al.</i> 2001
<i>A. trivittata</i>	Peru, Guyana	Not indicated	McAllister <i>et al.</i> 2010b, c
HYLIDAE:			
<i>Hypsiboas boans</i>	Guyana	Intestines	McAllister <i>et al.</i> 2010c
<i>H. fasciatus</i> (= <i>Hyla fasciata</i>)	Peru	Intestines	Burseý <i>et al.</i> 2001

Table 1. Continued.

Anuran host (= original name reported)	Country	Site of infection	Reference
<i>Phyllomedusa atelopoides</i>	Peru	Intestines	Burse et al. 2001
<i>P. hypochondrialis</i>	Guyana	Intestines	McAllister et al. 2010c
<i>Scarthyla goinorum</i>	Peru	Intestines	Burse et al. 2001
<i>Scinax acuminatus</i>	Argentina	Large intestine	González and Hamann 2008
<i>S. garbei</i>	Peru	Intestines	Burse et al. 2001
<i>S. ictericus</i>	Peru	Intestines	Burse et al. 2001
<i>S. nasicus</i>	Argentina	Large intestine	Hamann et al. 2009
LEIUPERIDAE:			
<i>Edalorhina perezi</i>	Peru	Intestines	Burse et al. 2001
<i>Physalaemus soaresi</i>	Brazil	Intestines	Vicente et al. 1990
LEPTODACTYLIDAE:			
<i>Leptodactylus bufonius</i>	Argentina	Small and large intestines	González and Hamann 2006a
<i>L. chaquensis</i>	Paraguay	Small and large intestines	Baker and Vaucher 1984, Hamann et al. 2006b
<i>L. fuscus</i>	Brazil	Intestines	Vicente et al. 1990
<i>L. elenae</i>	Argentina	Large intestine	Baker and Vaucher 1984
<i>L. latinasus</i>	Argentina	Large intestine	Hamann et al. 2006a
<i>L. leptodactyloides</i>	Peru	Intestines	Burse et al. 2001
<i>L. macrosternum</i>	Trinidad	Large intestine	Goldberg et al. 2002
<i>L. marmoratus</i> (= <i>Adenomera marmorata</i>)	Brazil	Intestines	Vicente et al. 1990
<i>L. mystaceus</i>	Brazil	Intestines	Vicente et al. 1990, Burse et al. 2001
<i>L. nesiotus</i>	Trinidad	Large intestine	Goldberg et al. 2002
<i>L. ocellatus</i>	Brazil	Intestines	Vicente et al. 1990
<i>L. podicipinus</i>	Brazil	Large intestine	Vicente et al. 1990, Trombeta 2008

Table 1. Continued.

Anuran host (= original name reported)	Country	Site of infection	Reference
MICROHYLIDAE:			
<i>Elachistocleis ovalis</i>	Peru	Intestines	Burse et al. 2001
<i>Hamptophryne boliviana</i>	Peru	Intestines	Burse et al. 2001
STRABOMANTIDAE:			
<i>Oreobates quixensis</i>	Ecuador, Peru	Large intestine	Dyer and Altig 1977, McAllister et al. 2010b
<i>Pristimantis fenestratus</i> (= <i>Eleutherodactylus fenestratus</i>)	Peru	Intestines	Burse et al. 2001
<i>P. peruvianus</i> (= <i>E. peruvianus</i>)	Peru	Intestines	Burse et al. 2001
<i>P. toftae</i> (= <i>E. toftae</i>)	Peru	Intestines	Burse et al. 2001
<i>P. turpinorum</i> (= <i>E. turpinorum</i>)	Tobago	Large intestine	Goldberg et al. 2002

We collected 37 *Colostethus fraterdanieli* (24 males, 13 females; SVL = 22.6 mm $\pm$ 3.0 SD) from Vereda La Paloma, Municipio Santa Rosa de Cabal, Departamento Risaralda (4°49' N, 75°33' W), in the western versant of the Cordillera Central (Colombia, South America). The frogs were collected by hand and euthanized with topical xylocaine (5%); they were fixed in 10% buffered formalin and preserved in 70% ethanol. The body cavity of each frog was accessed by a longitudinal incision from throat to the cloaca and the digestive tract was removed. The entire digestive tract (esophagus, stomach, and small and large intestines) was slit open and examined under a dissecting microscope. The isolated nematode parasites were washed with saline solution (Iannacone 2003a, b) and mounted on glass slides; the parasites were cleared with

Amann's lactophenol (González and Hamann 2004). We used the keys of Anderson et al. (1974) and Yamaguti (1961) to identify the species of nematode. Prevalence (number of infected frogs $\div$ number of frogs examined $\times$ 100, expressed as percentage), mean intensity (mean number of nematodes $\div$ infected host) and mean abundance (total number of nematodes $\div$ number of examined hosts) were calculated according to Bush et al. (1997). We deposited some of the frogs examined in the herpetological collection of the Museo de Herpetología, Universidad de Antioquia (MHUA, Medellín, Colombia; voucher numbers MHUA 6587–6589 and MHUA 6618–6622); the nematodes were deposited in the helminthological collection of the Colección Colombiana de Helmintos (CCH, Medellín, Colombia; voucher numbers CCH 140).

Of the 37 frogs examined, each of three males (MHUA 6587–6589) harbored one adult *Cosmocerca parva*. The parasitic prevalence, mean intensity and mean abundance in *C. fraterdanieli* was 8.1%, 1.0 ($\pm$ 0.0) and 0.09 ($\pm$ 0.0), respectively. All *C. parva* found in the intestines of *C. fraterdanieli* are male, based on the presence of spicules on the nematode. The males have four or five pairs of plectanes arranged in rows; contralateral plectanes are independent of one another. Each plectane has four or five pairs of ventral papillae that are rosette in form. *Cosmocerca parva* has a pharynx and a long, muscular esophagus, with a light pre-bulbar area and a posterior sub-spherical bulb bearing a tri-radiate, stagnant valvular apparatus.

Cosmocerca parva is common in the intestines of anurans (Travassos 1931, Baker 1987, González and Hamann 2007b, 2009, McAllister *et al.* 2010a; Table 1). Like other cosmoceroid species, this nematode is monoxenic and infects its hosts through larval integumentary penetration (Anderson 2000). Because of these characteristics, *C. parva* is a typical parasite of anuran species inhabiting terrestrial environments (McAlpine 1997, Bursey *et al.* 2001, Goldberg *et al.* 2002, Bolek and Coggins 2003, Luque *et al.* 2005, González and Hamann 2006b). Most anurans that are hosts of *C. parva* are denizens of the forest floor where they feed and reproduce, although some species, such as *C. fraterdanieli*, all *Leptodactylus*, the bufonid *Rhinella*, and many species of hylid frogs, use the lotic and lentic waters for egg and tadpole development.

The presence of *Cosmocerca parva* in only males of *Colostethus fraterdanieli* in this study may indicate that in this taxon, males are more prone to the infection by this parasite than the females. Because the larvae of *Cosmocerca* survive in thin films of water (Anderson 2000), male *C. fraterdanieli* may be infected in wet leaf litter as they attend their eggs or as they transport larvae on their backs to deposit them in creeks. However, this hypothesis must be investigated.

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