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NEW RECORDS OF NEMATODE PARASITES FROM *Euryzygomatomys spinosus* (RODENTIA, ECHIMYIDAE) IN MISIONES PROVINCE, ARGENTINA

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ABSTRACT: Although three species of nematodes have been recorded from the spiny rat *Euryzygomatomys spinosus* in Brazil, no helminthes have been recorded from this host in Argentina. Three taxa of nematodes from *E. spinosus* from Misiones province, Argentina, were identified from the helminthological collection of Museo de La Plata. Host voucher specimens refered to this material were found in the Colección Elio Massoia. The present survey contributes to the knowledge of nematode species from Echimyidae and illustrates the importance of integrating data from helminth and mammal collections.

RESUMEN: Nuevos registros de nematodes parásitos de *Euryzygomatomys spinosus* (Rodentia, Echimyidae) en la provincia de Misiones, Argentina. La rata espinosa *Euryzygomatomys spinosus* ha sido registrada como hospedador de tres especies de nematodes en Brasil. Hasta el momento, ningún helminto ha sido registrado parasitando a *E. spinosus* de Argentina. Nematodes no estudiados procedentes de la Provincia de Misiones, Argentina fueron hallados en la colección helmintológica del Museo de La Plata. En esta nota, esos nematodes fueron identificados y tres taxa fueron registrados. Los voucher de los hospedadores fueron encontrados en la Colección Elio Massoia. Este estudio contribuye al conocimiento sobre los nematodes de Echimyidae e invita a estudiar e integrar los datos registrados en las colecciones de helmintos y mamíferos.

Key words. Colección Helmintológica del Museo de La Plata. Colección Massoia. Echimyidae. Heligmosomoidea. *Paraspidodera*. *Trichuris*.

Palabras clave. Colección Helmintológica del Museo de La Plata. Colección Massoia. Echimyidae. Heligmosomoidea. *Paraspidodera*. *Trichuris*.

Euryzygomatomys spinosus (G. Fischer, 1814) (Syn. *E. brachyuran* [Rengger, 1830]*; E. catellus Thomas, 1916; E. guiara* [Brandt, 1835]; *E. rufa* Litchtensein, 1820) (Echimyidae: Rodentia) is distributed in southern and eastern Brazil, northeastern Argentina, and Paraguay (Woods and Kilpatrick, 2005; Álvarez and Martínez, 2006). This species occurs in moist grasslands of the southern cerrado and pampas habitats of Minas Gerais state, Brazil. It is also found in forests, at forest edges and in introduced grasslands in the Atlantic Forest from Espiritu Santo south to northeastern Argentina and Paraguay (Lacher and Alho, 2001; Woods and Kilpatrick 2005; Catzeflis et al., 2008).

This spiny rat, with a complex taxonomic history revised by Tate (1935), has been recorded as a host (cited as *Mesomys guiara* [Brandt, 1835]) of three species of nematodes

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from Brazil: *Pudica gamma* (Travassos, 1918) (Syn. *Heligmosomum gamma* Travassos, 1918) (Heligmonellidae: Strongylida), *Monodontus rarus* Travassos, 1929 (Ancylostomatidae: Strongylida) and *Filaria diacantha* Molin, 1858 (Onchocercidae: Spirurida) (Stossich, 1897; Hall, 1916; Travassos, 1918, 1929; Durette-Desset and Justine, 1991; Guerrero and Bain, 2001; Durette-Desset, 2009).

The last species requires a particular analysis. In this way, although *F. diacantha* was cited by Stossich (1897) and Hall (1916) as parasite from *E. spinosus*, the specimens studied by Molin (1858) came from the Matto Grosso, area that is not included in the known distribution of this rodent. In addition, later studies confirm that no filaroid nematodes have been found in this host (Vicente et al., 1997; Guerreiro and Bain, 2001).

To date, no helminths have been reported from *E. spinosus* in Argentina. It is common to find parasites not studied previously in taxonomic collections. Three vials with unidentified nematodes from *E. spinosus* were deposited about 30 years ago in the helminthological collection of Museo de La Plata (CHMLP; La Plata, Buenos Aires, Argentina) under the numbers MLP 159, 216, 250. The purpose of this note is to identify these parasites.

The studied specimens, preserved in 70% ethanol, were cleared in temporary mounts of lactophenol for study, and keys and specific bibliography were used for their identification. The classification follows Anderson (2000). Data about hosts, collection localities and collectors were obtained from the curatorial book of CHMLP. The complete data and identification of hosts were corroborated by finding the corresponding voucher specimens which belong to the Colección Elio Massoia (acquired by the Fundación de Historia Natural Félix de Azara, Buenos Aires, Argentina). The hosts were captured in Cuartel Río Victoria, Ruta Nacional 14 km 273 INTA, Guaraní Departament, Misiones Province, between 1976-1978 by E. Massoia and collaborators. Skins belonging to three host specimens were deposited (CFA05302, CFA05802, CFA06065; see **Table 1**).

Phylum NEMATODA Rudolphi, 1808
Class ADENOPHOREA Chitwood, 1958
Order ENOPLIDA Baird, 1853
Superfamily TRICHINELLOIDEA Hall, 1916
Family TRICHURIDAE Raillet, 1915
TRICHURIS Roederer, 1761
Trichuris sp.

Studied specimens.—Two complete males and one incomplete female (MLP 159/D), and one incomplete female (MLP 250).

Site of infection.—Large intestine.

Comments.—These specimens have been assigned to the genus *Trichuris* Roederer, 1761 by the general diagnostic characteristics such as anterior part of body long, narrow, tapered, and whip-like; and the posterior part of body broad, and handle-like; bacillary band located in anterior portion of body; eggs oval, flat, with bipolar plugs. The study of specific characteristics such as the presence of spicular tube, spicular sheath spinose (spines very small, densely arranged), nonprotusive vulva; along with morphometric characters (e.g., length of the body, spicule, cloacal tube, esophagus and egg) allows the separation of this species within this genus.

To date, six species of *Trichuris* have been reported from Argentina, one of these in Caviidae (*Trichuris dolichotis* Morini, Boero and Rodriguez, 1955), two in Ctenomyidae (*T. bursacaudata* Suriano and Navone, 1994, *T. pampeana* Suriano and Navone, 1994), and the others in Cricetidae (*T. laevitestis* Suriano and Navone, 1994, *T. pardinasi* Robles, Navone and Notarnicola, 2006 and *T. navonae* Robles, 2011) (Morini et al., 1955; Suriano and Navone, 1994; Robles and Navone, 2006; Robles et al., 2006; Robles, 2011). The specimens found in *E. spinosus* can be differentiated from *T. dolichotis* by the body length of female and egg size (male unknown), and from the rest of the mentioned species, except *T. laevitestis,* by the presence of spicular tube. The main difference between the specimenes recorded in this note and *T. laevitestis* is the nonprotusive vulve.

Trichuris thrichomysi Lopes Torres et al., 2011 described from *Thrichomys apereoides* (Lund, 1839) (Rodentia, Echimyidae) in Brazil, shares some diagnostic morphological

Table 1

Combined data from host vouchers and helminthes recorded for the spiny rat *Euryzygomatomys spinosus* in Misiones, Argentina

Hosts collection number	Host collector	Date	Locality	Helminthes collection number	Site of infection	Parasite collector
CFA05302	Massoia, De Simone, López, Temchuck	Jul. 1976	Cuartel Río Victoria, Ruta 14 km 273, INTA, Guaraní	0159/B	stomach*	Massoia, De Simone, López, Temchuck
				0159/D	large intestine	Massoia, De Simone, López, Temchuck
CFA05802	Massoia	Not recorded	Cuartel Río Victoria, Ruta 14 km 273, INTA, Guaraní	0250/D	large intestine	Massoia
CFA06065	Massoia	Jul. 1978	Cuartel Río Victoria, Ruta 14 km 273, INTA, Guaraní	0216/C	small intestine	Massoia

* See the main text.

and morphometric characters with the specimens recorded in this note (e.g., in males, presence of the spicular tube, and lengths of the spicule, cloacal tube and esophagus). However, the specimens studied here show differences with those of *T. apereoides* in general proportions of males (e.g. total body length/ posterior body length 2.04-2.15 vs. 1.66-1.91, posterior body length/ spicular length 2.27-2.54 vs. 3.5-5.2) and posterior body length in female (9.8-9.9 vs. 15.7-17.3) (Lopes Torres et al., 2011).

According to the data at hand the studied ~~specimense~~ are refered as *Trichuris* sp. It would be useful to obtain new samples from *E. spinosus* to confirm the species and carry out a complete and detailed description. This finding constitutes the first record of the genus *Trichuris* in Echimyidae from Argentina.

Class SECERNENTEA Von Linstow, 1905
Order ASCARIDIDA Yamaguti, 1961
Superfamily HETERAKOIDEA Chabaud, 1957
Family ASPIDODERIDAE Skrjabin and Schikhobalova, 1947
Paraspidodera uncinata (Rudolphi, 1819) Travassos, 1914

Syn. *Ascaris uncinata* Rudolphi, 1819; *Heterakis uncinata* Schneider, 1866; *P. americana* Khalil and Vogelsang, 1931; *P. uruguaya* Khalil and Vogelsang, 1931.

Studied specimens.—12 complete males, 11 complete females and three anterior parts (MLP 159/D).

Site of infection.—Large intestine.

Comments.—These specimens have been assigned to Aspidoderidae by diagnostic characteristics such as square lips connected by lateral lobes and esophagus long and narrow with small posterior esophageal bulb. Moreover, the cephalic cap not

being modified into plates, absence of cephalic cordons, lateral alae present, deirids located near of excretory pore, pre-anal sucker well developed, number of caudal papillae (about 14-21; although in Rossin, 2007, the maximum number is 40), gubernaculum present, vulvar morphology and localization in females; along with morphometric characters (e.g., length of the spicule, gubernaculum, ventral sucker), allows the assignment of the specimens to *P. uncinata* (Travassos, 1914; Sutton, 1976; Pinto et al., 2002; Rossin, 2007).

Despite the extensive synonymy, available descriptions of this species are scarce and incomplete (Rudolphi, 1819; Travassos, 1914; Pereira and Vaz, 1933; Sutton, 1976). Gardner (1991), in a study of coevolution between *Paraspidodera* species and *Ctenomys* species from Bolivia, suggests a specific parasite-host relationship. However, this hypothesis was not supported by descriptions or discriminatory morphologic characters. In addition, other studies indicated that the number and distribution of caudal papillae (within a restricted range) are intra-specific variable characters, supporting the synonymy of species suggested previously, and recognizing this species as monotypic (Rudolphi, 1819; Schneider, 1866; Travassos, 1914; Khalil and Vogelsang, 1931a, b; Lent and Freitas, 1939; Pinto et al., 2002; Rossin, 2007).

P. uncinata has been recorded in Argentina by Sutton (1976) from *Cavia aperea* (Caviidae) and by Rossin (2007) from *Ctenomys talarum* (Ctenomyidae) in Buenos Aires province. This is the first record of an aspidoderid species in Echimyidae, and in Misiones province, enlarging the distribution range of the species in Argentina.

Order STRONGYLIDA Diesing, 1851
Superfamily HELIGMOSOMOIDEA Travassos, 1914
Family, gen. et sp. indet.

Studied specimens.—One male and one female (MLP 216) and one posterior part of male (MLP 159/B).

Site of infection.—Small intestine (specimen MLP 159/B was recorded from stomach, but this is likely an error and the true habitat is the small intestine).

Comments.—These specimens have been assigned to the superfamily Heligmosomoidea by the absence of a buccal cavity, the presence of a caudal bursa in males and an ovijector in female. Other characteristics were observed in the specimens, such as a cephalic vesicle, symmetrical caudal bursa with pattern of type 2-2-1 and monodelphic uterus and localization of the vulva near the anus.

Travassos (1918) described *Pudica gamma* (Pudicinae: Heligmonellidae: Heligmosomoidea) from *E. spinosus* in Angra dos Reis, Brazil (Travassos, 1918; Durette-Desset and Justine, 1991). Although some characteristics are shared with the specimens studied here—and it is probable that these correspond to *Pudica* sp.—a precise assignment has not been possible. This is mainly due to the fact that important diagnostic characters, among these, the morphology of the synlophe could not be observed, since there were only two complete specimens and their preservation was not satisfactory. This is the first record of a strongylid species in Echimyidae from Argentina.

The Echimyidae includes some rare species, difficult to capture and distributed in little studied microhabitats. Among these, *E. spinosus* has a wide distribution, presumably representing large populations (Catzeflis et al., 2008). Nevertheless, the parasite species reported from this host consist of a few isolated records from Brazil. It suggests that current number of parasites registered represents but a small fraction of those that probably occur in this rodent, and that additional surveys should yield additional species.

This study represents additional progress in the research on nematode species from rodents in Argentina. *Trichuris* sp., *P. uncinata* and a heligmosomoid undetermined species are recorded for the first time from Echimyidae from Argentina. In addition, this survey illustrates the value of examining "hidden taxa" in taxonomic collections and integrating data from both helminth and mammal collections to increase our knowledge of biodiversity.

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