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Arostrilepis horrida (Linstow, 1901) (Cestoda, Hymenolepididae) from *Eothenomys* spp. (Rodentia) in Japan

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Abstract. Four gravid specimens and several fragments of cestodes were found in the small intestine of *Eothenomys smithii* and *E. andersoni*, sampled in four different prefectures of Japan. All of the cestode specimens had a scolex without a rostellum and a cirrus armed with short spines, and the embryophore of the hexacanthe showed typical pointed ends. Therefore, the cestodes were identified as *Arostrilepis horrida*. But, because there is a complicated situation in the systematic position of *A. horrida*, a brief review of the taxa was presented.

Key words: Cestoda, *Arostrilepis horrida*, *Eothenomys* spp., Rodentia, Japan.

Introduction

The distribution of the species *Arostrilepis horrida* (Linstow, 1901) is Holarctic, and its host range is rodents although Ryzhikov *et al.* (1978) reported that *A. horrida* was obtained from *Lepus* sp. as well in the former USSR (*cf.* Mas-Coma, 1982). This species was redescribed by Spasskii *et al.* (1952), Spasskii (1956), Egorova and Nadtochily (1975) and Ryzhikov *et al.* (1978) from the former USSR, by Voge (1952) and Schiller (1952) from the USA, and by Lühe (1910), Baer (1932), Joyeux and Baer (1936), Erhardová (1958), Murai and Tenora (1973) and Mas-Coma and Tenora (1997) from European localities. However although the species has been recorded from Japan (Yamaguti, 1959; Asakawa and Harada, 1989; Asakawa, 1993; Tenora and Kamiya, 1999), there is no detailed description of this species. Hence the description of the Japanese specimens was presented.

Materials and Methods

Four gravid specimens and several fragments of *A. horrida* from the small intenstines of *Eothenomys smithii* and *E. andersoni* captured in four different prefectures of Japan were examined. They were fixed and preserved in 70% alcohol, stained with borax carmine, and mounted in Canada balsam. Voucher specimens are deposited in the Meguro Parasitological Museum, Tokyo, Japan, Nos 19770–19773. All measurements in the description are in mm.

Result

Species: *Arostrilepis horrida* (Linstow, 1901).

Host (localities): *Eothenomys smithii* (Daisen, Tottori Pref., March 1989; Tsurugi-san, Tokushima

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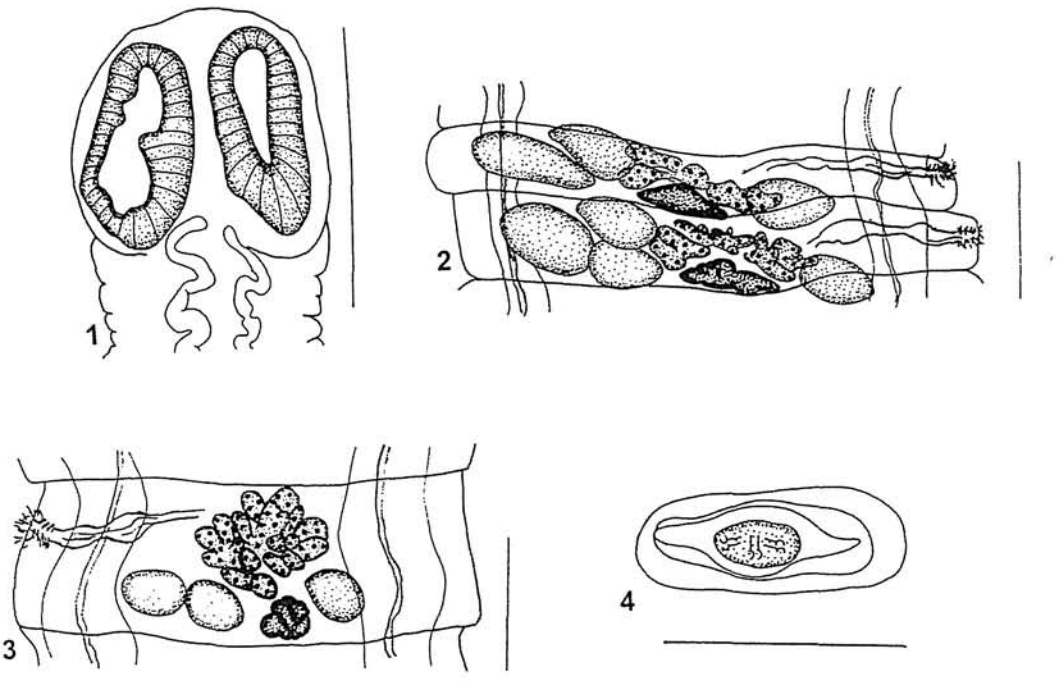

Figs 1–4. *Arostrilepis horrida*. 1. Scolex. Scale bar: 0.20 mm. 2, 3. Mature proglottids. Scale bars: 0.20 mm. 4. Hexacanth. Scale bar: 0.04 mm.

Pref., August 1986; Kami-kita-yama, Nara Pref., May 1989), *E. andersoni* (Tazawako-cho, Akita Pref., October 1985).

Microhabitat: small intenstine.

Description: Total length 30–40, maximum width 1.36. Strobila consists of 550–692 proglottids. Scolex (Fig. 1) 0.160–0.196×0.138–0.161; 4 oval suckers, 0.178–0.181×0.091–0.093; rostellum or reminiscence of armature absent. Proglottids wider than long, sizes of mature ones 0.894–0.920× 0.142–0.153 and gravid ones 0.999–1.361× 0.350–0.410. Excretory system simple with dorsal and ventral canals bilaterally (Figs 2 and 3). Transversal canal not observed. Diameters of ventral excretory canals 0.033–0.084 and dorsal excretory canals 0.002–0.003. Genital pores in the first half of proglottids or near the middle of proglottids. Genital atrium small, 0.009–0.012 in size, without genital papilla. Genital ducts dorsal to poral excretory canals.

The species is characterized by typically presenting 3 testes per proglottid and occasionally 4 testes. Testes ellipsoid or irregular oval form, 0.112–0.174×0.069–0.089 in size. One testis rests in poral part of proglottid, near poral part of ovarium; two or three testes in aporal part of the proglottid. Testes are arranged in a triangle or in line (Figs 2 and 3). Arrangement in triangle is dominant. External seminal vesicle 0.120–0.140×0.026–0.033. Cirrus sac 0.136–0.152 in length and 0.025–0.033 in width. Internal seminal vesicle 0.091–0.110 in length, 0.015–0.019 in width. Cirrus 0.024–0.032 in length with maximum width of 0.003, densely armed with very short spines.

Female gonads anterior or median or slightly poral in proglottids. Vitelline gland massive and asymmetrical, 0.058–0.149×0.024–0.041 (maximum size in postmature proglottids 0.129–0.149× 0.030–0.035), medial and posterior to ovary. Ovary 0.141–0.396×0.042–0.096 (maximum size in

Table 1. Review of different systematic arrangements of *Arostrilepis horrida* and its allies (Linstow, 1901)—original name (*) and alternations.

(1)	*Taenia horrida* Linstow, 1901*	
	Hymenolepis horrida (Linstow, 1901)	*cf.* Janicki, 1906
	Arostrilepis horrida (Linstow, 1901)	*cf.* Mas-Coma, 1982
	Arostrilepis horrida (Linstow, 1901)	*cf.* Mas-Coma and Tenora, 1997
(2)	*Hymenolepis procera* Janicki, 1904*	
	Dicranotaenia procera (Linstow, 1901)	*cf.* Skryabin and Matevosyan, 1948
	Hymenolepis horrida (Janicki, 1904)	*cf.* Baer, 1932, Spasskii, 1956, Pojmańska, 1998
	Arostrilepis horrida (Linstow, 1901)	*cf.* Mas-Coma *et al.*, 1980
(3)	*Hymenolepis arvicolina* Cholodkowsky, 1912*	
	Hymenolepis horrida (Linstow, 1901)	*cf.* Baer, 1932; Spasskii, 1956; Pojmańska, 1998
	Hymenolepis arvicolina Cholodkowsky, 1912	*cf.* Skryabin and Matevosya, 1948
(4)	*Hymenolepis skrjabiniana* Achumjan, 1947*	
	Hymenolepis horrida (Linstow, 1901)	*cf.* Ryzhikov *et al.*, 1978; Mas-Coma *et al.*, 1980; Mas-Coma, 1982
	Paraoligorchis skrjabiniana (Akumyan, 1947)	*cf.* Gulyaev and Chechulin, 1996
(5)	*Hymenolepis mathevossianae* Akumyan, 1948*	
	Hymenolepis horrida (Linstow, 1901)	*cf.* Rybicka, 1959
	Arostrilepis horrida (Linstow, 1901)	*cf.* Gulyaev and Chechulin, 1997
(6)	*Hymenandrya thomomyis* Smith, 1954*	
	Hymenolepis horrida (Linstow, 1901)	*cf.* Spasskii, 1956, Pojmańska, 1998
	Hymenandrya thomomyis Smith, 1954	*cf.* Mas-Coma, 1982; Czaplinski and Vaucher, 1994
(7)	*Oligorchis nonarmatus* Neiland, 1952*	
	Hymenolepis horrida (Linstow, 1901)	*cf.* Spasskii, 1954; Schmidt, 1986; Pojmańska, 1998
	Vaucherolepis nonarmatus (Neiland, 1952)	*cf.* Mas-Coma, 1982

postmature segments 0.376–0.396×0.083–0.096), median or slightly poral, with ramifications. Mehlis gland not observed. Seminal receptacle elongated, anteriorly in proglottids, 0.126–0.141×0.054–0.063 in mature proglottids. Vagina opening ventral to orifice of male duct, enlarged, 0.092–0.110. Uterus at first cleary reticulate, enlarging gradually and becoming saccate, filling gravid proglottids. Uterus across osmoregulatory canals bilaterally. A saccate form of uterus, with rest of internal reticulum, filled with hexacanths. Hexacanth 0.045–0.050× 0.017–0.019 in size. The outer shell of the hexacanth is very thin without external ornamentation. The embryophore 0.030–0.035×0.013–0.015 in size, showing a typical pointed ends. The oncosphere presents 6 very small hooks, 0.003–0.004 in length.

Discussion

Although the name of *Arostrilepis* with the type *Taenia horrida* Linstow, 1901 was used preliminary as the genus name by Mas-Coma (1982) and Mas-Coma and Tenora (1997), but Czaplinski and Vaucher (1994) considered the name *Arostrilepis* as *nomen nudum*. However, Gulyaev and Chechulin (1997) confirmed the validity of the genus *Arostrilepis*.

The genus *Arostrilepis* contains the species *A. horrida* (Linstow, 1901), *A. beringiensis* (Kontrimavichus et Smimova, 1991), *A. microtis* Gulyaev et Chechulin, 1997 and *A. neurotrichi*

(Rausch, 1962). Furthermore, it is considered that *Oligorchis nonarmatus* Neiland, 1952 belongs to this genus (Tenora, unpublished) Mas-Coma and Tenora (1997) and Tenora and Kamiya (1999) considered that the cestodes named "*horrida*" may be divided into several different species. However, in general, the taxa have been treated as *Hymenolepis horrida* (*sensu lato*) (*cf.* Haukisalmi and Henttonen, 2001). The various reported systematic arrangements of *A. horrida* are shown in Table 1. Anyway there is a question that the present *A. horrida*, parasitizing *Eothenomys* spp. (or *Phaulomys* spp., see Musser and Carleton, 1993) is the endemic form to Japan or not. This question can not be answered unless sufficient materials are found and studied with both morphological and molecular biological methods.

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