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HELMINTH PARASITES OF *APODEMUS SPECIOSUS* AND *A. ARGENTEUS* FROM THE KOSHIKI ISLANDS, JAPAN, WITH A DESCRIPTION OF *SUBULURA SUZUKII* SP. N.

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Helminths of *Apodemus speciosus* and *A. argenteus* from Shimo-koshiki Island of the Koshiki Islands group, Kagoshima Prefecture, Japan were studied. Eight helminth species were collected: *Protospirura muris*, *Rictularia cristata*, *Tenorastrongylus speciosus*, *Capillaria* sp., *Syphacia emileromani*, *Syphacia* sp., *Subulura* (*Murisubulura*) *suzukii* sp. n. and *Cladothyridium* sp.. The genus *Subulura* was the first recorded in mammals of Japan. *Subulura suzukii* was differentiable from *S. ortleppi* and *S. williaminglisi* by the structure of the labial lobe, lateral alae and the spicules.

INTRODUCTION

The genus *Apodemus* represents an Old World rodent. In Japan there are three species, namely *Apodemus speciosus* TEMMINCK, *A. argenteus* TEMMINCK and *A. giliacus* THOMAS. Among these, *A. speciosus* and *A. argenteus* are distributed widely from Hokkaido in northern Japan to Yakushima Island in southern Japan. *A. giliacus* can be found only in Hokkaido.

Although ecological studies of these host animals have been advanced, reports concerning the helminth fauna have been limited to those based on materials from the mainland. In this paper we report helminths of *A. speciosus* and *A. argenteus* from Koshiki Islands.

MATERIALS AND METHODS

Twenty-four *Apodemus speciosus* and two *A. argenteus* were examined.

The animals were captured in December 1978 in a crop field and in a mountainous area of Shimo-koshiki Island of the Koshiki Islands group, which is located about 50 km west of Kushikino City, Kagoshima Prefectre, in southern Japan.

With the exception of the head, all of the organs were examined for helminth parasites. The skulls were used for the identification of the host animals.

The parasites were preserved in 10% formalin, and the nematodes were treated with lacto-phenol solution for microscopic examination. Scanning electron microscopy

was also carried out to elucidate the detailed surface structure of the specimens.

All of the specimens described in this paper are preserved in the Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University.

Results and discussion

The following 8 species belonging to 7 genera were collected. *Protospirura muris* (Gmelin, 1890); *Rictularia cristata* Froelich, 1802; *Tenorastrongylus speciosus* (Konno, 1958); *Capillaria sp.*; *Syphacia emileromani* Chabaud, Rausch et Desset, 1963; *Syphacia* sp.; *Subulura* (*Murisubulura*) *suzukii* sp. n. and *Cladothyridium* sp..

Among these, *Capillaria* sp., *Syphacia* sp. and *Cladothyridium* sp. could not be identified in detail because of insufficient materials. The incidence of these helminths is shown in table 1. A remarkable high infection rate of *Tenorastrongylus speciosus* was observed. i. e., 100 % in both *A. speciosus* and *A. argenteus*.

TABLE 1 *Helminths of Apodemus speciosus and A. argenteus from Koshiki Islands, Kagoshima Prefecture, Japan*

HELMINTH	HABITAT	HOST SPECIES	
		A. speciosus 24 cases	*A. argenteus* 2 cases
Nematoda			
Protospirura muris	stomach	2*	0
Rictularia cristata	small intestine	5	0
Tenorastrongylus speciosus	"	24	2
Capillaria sp.	"	0	1
Syphacia emileromani	large intestine	0	1
Syphacia sp.	"	1	0
Subulura suzukii	"	6	0
Cestoda			
Cladothyridium sp.	liver	8	0

* Number of cases infected

Concerning the helminth fauna of voles of the genus *Apodemus*, several reports have been published (Yamaguti, 1943, 1954; Konno, 1958; Chabaud et al., 1963; Ishimoto, 1974; Hasegawa, 1976). The high infection rate of *Tenorastrongylus speciosus* in Hokkaido was reported by Ishimoto (1974) (95 % of 183 *A. speciosus* and 94 % of 67 *A. argenteus*). We also obtained high rates in other places in Japan: in Unzen, Nagasaki Prefecture, 100 % of 11 *A. speciosus* and 67 % of 3 *A. argenteus*; in Ikeda, Osaka Prefecture, 100 % of 9 *A. speciosus* (data unpublished). The genus *Subulura* is the first recorded in mammals of Japan.

Subulura (*Murisubulura*) *suzukii* sp. n.

Host: *Apodemus speciosus* TEMMINCK

Habitat: Large intestine

Locality: Shimo-koshiki Island, Koshiki Islands group. Kagoshima Prefecture, Japan

Date: December 1978

Frequency: 6 out of 24 hosts were infected. In one heavily infected case, 37 parasites were found.

Description: Body slender, white in color when alive. Cervical alae and esophageal bulb present (pl. I, fig. 2). Cervical alae stretching to the anterior of the esophageal bulb. Oral opening with six labial lobes, each of which consists of an outer blunt bifurcate projection and an inner pointed projection (pl. I, fig. 4, pl. II, figs. 1 & 2). Wall of buccal cavity well cuticularized and pharyngeal portion twisted (pl. I, figs. 3 & 5).

Male: Body length 9.6–13.2 mm, width 0.43–0.54 mm. Esophagus including bulb 1.35–1.66 mm in length. Nerve ring and excretory pore 0.259–0.366 mm and 0.406–0.496 mm, respectively, from anterior end. Pre-anal sucker present but without cuticular elaboration, 0.634–1.050 mm from posterior end (pl. I, fig. 7). Caudal alae absent. Ten pairs of caudal papillae present. Spicules blunt without marked barbs (pl. I fig. 6). Gubernaculum tongue-like shape, 0.132–0.180 mm in length.

Female: Body length 16.7–29.9 mm, width 0.433–0.974 mm. Esophagus including bulb 1.60–2.00 mm in length. Nerve ring and excretory pore 0.272–0.390 mm and 0.466–0.575 mm, respectively, from anterior end. Vulva situated 6.80–11.64 mm from anterior end. Tail 0.964–1.640 mm in length. Egg oval, embryonated in uterus 0.080–0.094 by 0.058–0.067 mm.

INGLIS (1958, 1960) revised Subuluroidea after a detailed study of its buccal structure, and described *Subulura ortleppi* sp. n. from *Rhabdomys pumilio* and *Rattus* (*Praomys*) *namaquensis* found in Cape Province, Union of South Africa. He distinguished *S. ortleppi* from other species of genus *Subulura* by the head structure, which bears six labial lobes at the oral opening. QUENTIN (1965) described *S. williaminglisi* sp. n. from *Hybomys univittatus*, *Cricetomys gambianus* and *Thamnomys rutilans* found in the Central African Republic as having six labial lobes. Furthermore, QUENTIN (1969) slightly modified and completed INGLIS' classification by suggesting that all *Subulura* species which have six labial lobes be classified under a new subgenus *Murisubulura*. Employing this criteria, he placed the above two *Subulura* spp. under the new subgenus *Murisubulura*. CHABAUD (1978) stated that *Kaszabospirura* MÉSZÁROS, 1975 is synonymous to *Subulura* (*Murisubulura*).

Our specimen has six labial lobes, thus it belongs to *Subulura* (*Murisubulura*). We could compare our specimen with *S. ortleppi* and *S. williaminglisi* but not with *Kaszabospirura steinmanni* described by MÉSZÁROS (1975), because his description lacks detailed information on the oral opening and the male worm. *S. ortleppi* has cervical

alae stretched to the posterior end of the esophagus and an equal length of spicules with marked barbs on their posterior ends. The species also has outer labial projections without bifurcation, and the caudal alae is poorly developed in the male. *S. williaminglisi* was distinguished from *S. ortleppi* by the absence of lateral alae and the sharply pointed spicules. Our specimens can be differentiated from the above two species by the structure of the labial lobe, lateral alae and the spicules.

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EXPLANATION OF PLATES

PLATE I

Figs. 1–7 *Subulura* (*Murisubulura*) *suzukii* sp. n.

Fig. 1 Lateral view of male

Fig. 2 Ventral view of the anterior end

Fig. 3 Ventral view of the anterior end showing details of the head

Fig. 4 *En face* view of whole head

Fig. 5 *En face* view of the pharyngeal portion showing its helical arrangement

Fig. 6 Details of the posterior ends of two spicules

Fig. 7 Ventral view of the male tail

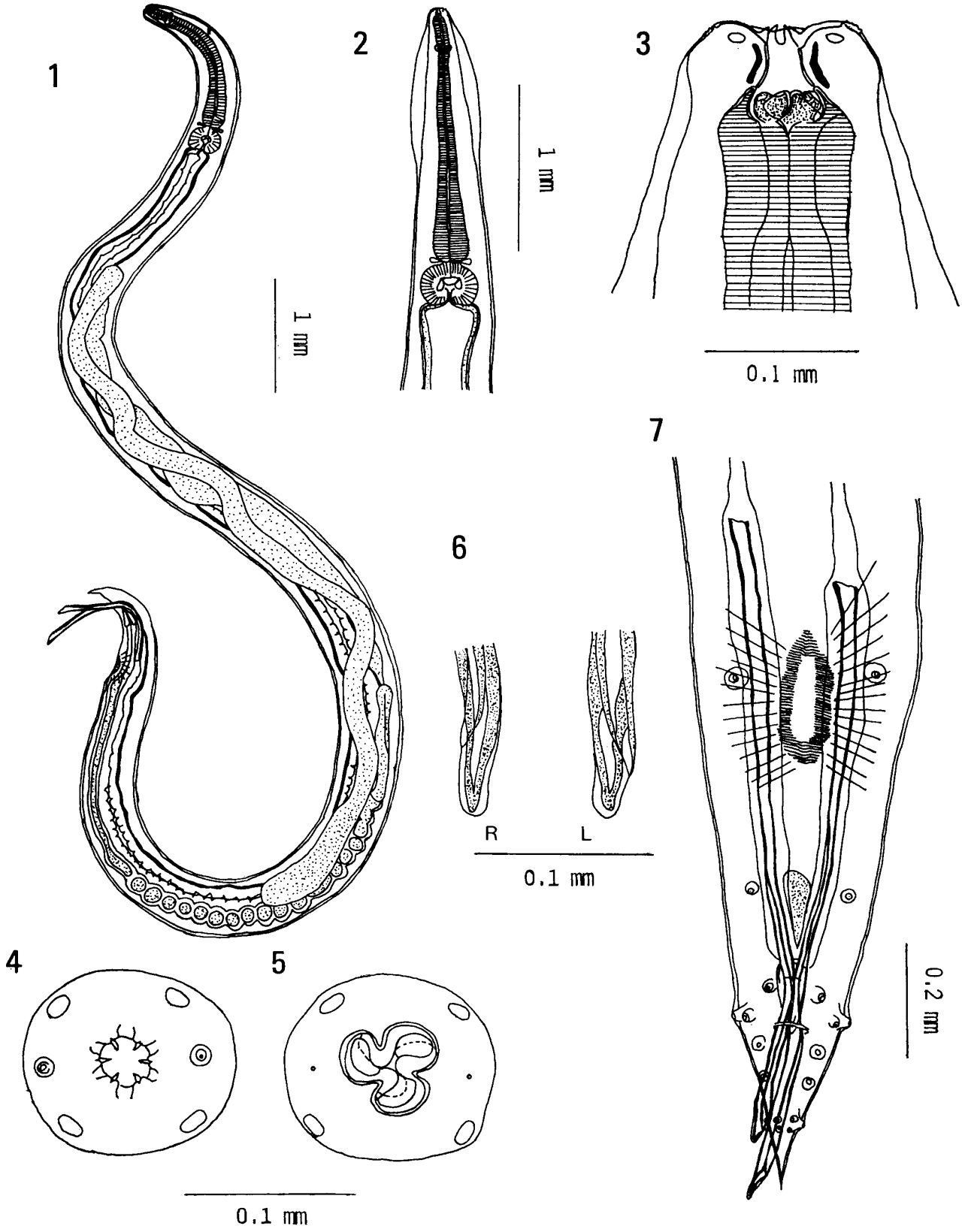
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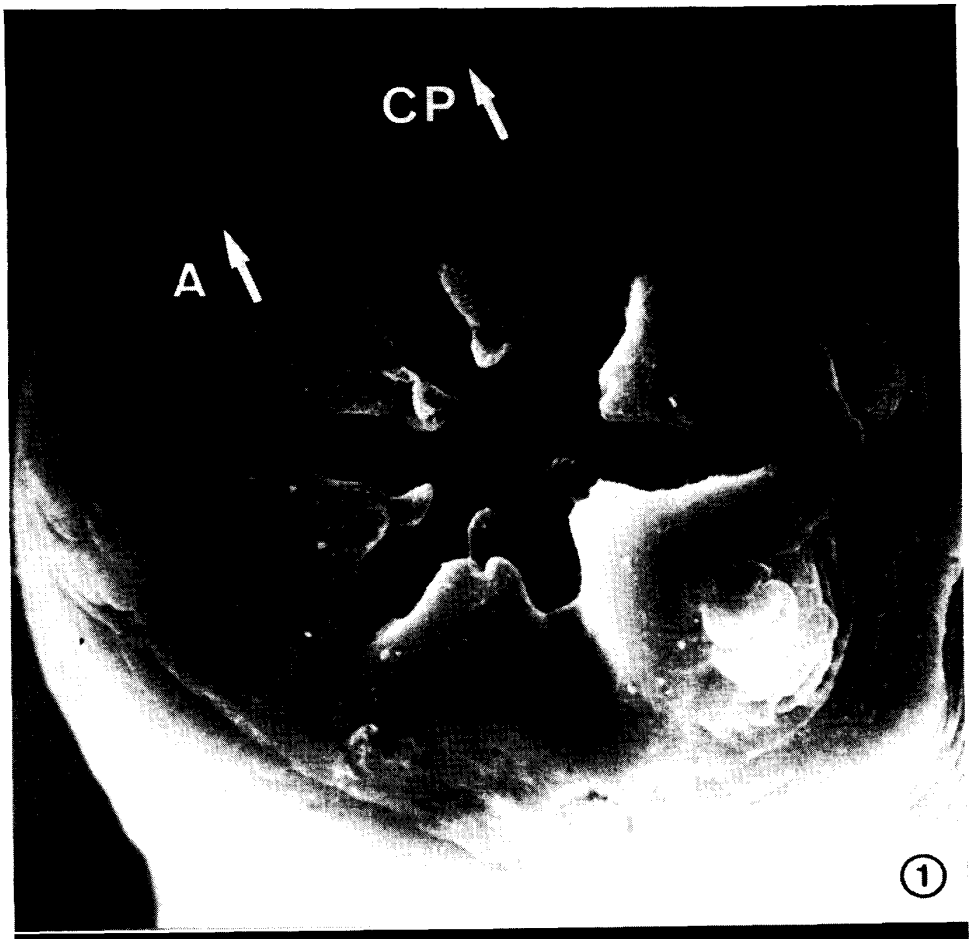
PLATE II

Fig. 1 *En face* view of whole head ×1265
CP: cephalic papilla A: amphid

Fig. 2 *En face* view of labial lobes showing details of the structure ×6333
OP: outer blunt bifurcate projection
IP: inner pointed projection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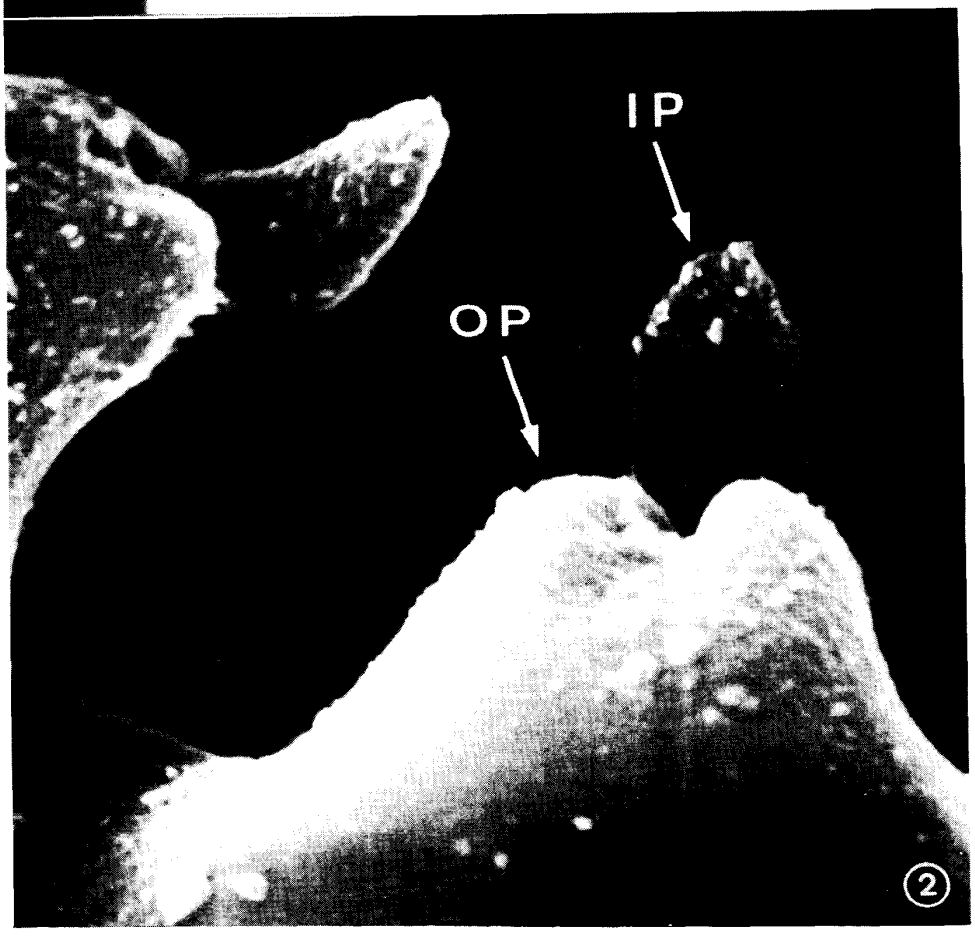
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