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STUDIES ON THE PARASITE FAUNA
OF INSECTIVORA I
PARACRENOSOMA TAKIKAWAI N. SP. FROM
SOREX UNGUICULATUS DOBSON
IN HOKKAIDO, JAPAN

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A new metastrongylid nematode of Japanese insectivore was described. Paracrenosoma takikawai n. sp. was found in the lungs of 17 out of 63 big-clawed shrews, Sorex unguiculatus Dobson, captured in Hokkaido, Japan. This species is the largest among the known species of genus Paracrenosoma and is easily differentiated by the size and morphology of its spicules, gubernaculum and bursal rays. This is the first recording of genus Paracrenosoma Yun & Kontrimavic, 1963, in Japan.

INTRODUCTION

The insectivores, which are primitive mammals, exist throughout the world, with the exception of Australia, most of South America, Greenland and Antarctica. They are known to be terrestrial, fossorial, or semi-aquatic, and their food habitats are generally insectivorous, although some have been found to be carnivorous. Up to now, there has been little information on the ecology of the insectivores of Japan, with the exception of some studies by Abe (1967, 1968). Recently, however, some insectivores, especially the musk shrew, Suncus murinus murinus (Linnæus), is going to be developed as laboratory animals.

Since a few studies about the parasite of insectivores were carried out in Japan, the author has initiated investigations to clarify the phylogenetic nature and geographical background of the parasite fauna of Japanese insectivores.

Herein a new metastrongylid nematode of genus Paracrenosoma which is parasitic in the lungs of big-clawed shrews, Sorex unguiculatus, is described.

MATERIALS AND METHODS

From 1971 to 1975, 3 kinds of Sorex spp., 63 Sorex unguiculatus, 15 S. minutus gracillimus Thomas and 4 S. caecutiens saevus Thomas, were trapped in Teshio District (northern Hokkaido), Nemuro District (eastern Hokkaido), and the suburbs of
Sapporo, and routine measurements of the shrews were taken. The skulls were pre­
served for taxonomical identification and age estimation. The nematodes in the lungs
were collected using the dissection microscope, and then preserved in 5% formalin
solution. The specimens were treated with lacto-phenol solution for microscopy. The
paraffin sections of the lesional lung tissues were stained with hematoxylin-eosin.

The specimens are deposited in the helminthological collection of the Department
of Parasitology, Faculty of Veterinary Medicine, Hokkaido University, Sapporo, Japan.

RESULTS

Paracrenosoma takikawai n. sp. (Nematoda: Crenosomatidae)

Among the three species of Sorex, nematodes were found in only 17 out of 63 S.
unguiculatus. All of the infected shrews were old, according to age criteria by Abe
(1958). The conglomeration of nematodes was observed under the pleura of the lungs
(fig. 12).

Host: Sorex unguiculatus Dobson
Habitat: Bronchiole and alveolus
Locality: Teshio District and the Sapporo suburbs

Description: Filiform, fragile, slightly yellowish nematode, attenuated toward the
extremities. Cuticula inflated with fine, longitudinal striations. Cuticular transverse
striations distinct at extremities. Mouth surrounded by 6 small papillae. Buccal cavity
indistinct. Esophagus cylindrical, slightly dilated posteriorly. Excretory pore at nerve
ring. Excretory vesicle well-developed.

Male: Body length 7.30–9.85 mm. Maximum width 0.208–0.288 mm. Caudal end
bent ventrally. Esophagus 0.275–0.310 mm in length. Nerve ring, 0.102–0.160 mm from
anterior extremity. Bursa almost round, 0.11–0.12 mm in diameter. Ventral surface
of bursa rough. Bursal rays, except externo-dorsal ray and antero-lateral ray, touching
the bursal edge. Ventro-ventral and latero-ventral rays differentiable by shallow incision
near bursal edge, ending with a small protuberance. Lateral rays with a common trunk.
Antero-lateral ray rising separately from lateral rays at approximately middle of trunk,
not touching the bursal edge. Other lateral rays the same as ventral rays. Dorsal
ray 0.038–0.045 mm in length, split into four at proximal end. Externo-dorsal ray long,
rising proximally at one fourth of trunk. Spicules equal, filiform, proximally chitinized,
yellowish, hollowed in appearance, 0.128–0.150 mm in length with rounded distal end.
Small outgrowth on dorsal side of each spicule. Gubernaculum chitinous, bowed in shape,
0.026–0.032 mm in length. Excretory pore near nerve ring, 0.099–0.121 mm from ante­
rior extremity.

Female: Viviparous. Body length 9.79–14.78 mm. Width 0.325–0.390 mm at vul­
val region. Nerve ring and excretory pore, 0.090–0.125 mm and 0.093–0.138 mm from
cephalic end, respectively. Vulva, 5.94–8.67 mm from cephalic end. Orifice of vulva
split transversely. Vagina muscular and short. Muscular “trichostrongyloid” ovijector well-developed, with prominent sphincter. Two-layer ovijector wall consisting of muscular inner and outer layers with hexagonal pattern, resembling the basal membrane. Uterus reversed at the end of excretory vesicle. Short tail, 0.112–0.173 mm in length. Larvae with pointed tail, 0.230–0.240 mm in length. Elliptical eggs with larvae, 0.070–0.074 × 0.042–0.045 mm in size.

Pathological observations: The conglomeration of nematodes was observed under the pleura of the lungs (fig. 12); the lung tissues were occupied by the nematodes (fig. 13). Neither the larvae or eggs, however, were scattered in the terminal bronchioles or alveoli; and there were rarely found in the lymphatic vessel (fig. 14). Although the terminal bronchioles or alveoli parasitized by the nematodes were extremely dilated, the adjacent alveoli were atrophied. There was no observable inflammatory reaction, however, and the involved tissues were not surrounded by a fibrous wall or capsule. The only noteworthy changes were the compensatory dilation of the tributary alveolar sac and the alveoli and pulmonary emphysema.

DISCUSSION

The present species represents the first recording of genus Paracrenosoma in Japan, which includes 6 previously described species:

1. Paracrenosoma skrjabini (Pologentsev, 1935) Yun & Kontrimovichus, 1963:
   Host: Sorex araneus Linnaeus; Locality: Middle-Volga region, U. S. S. R.

2. P. yuni Chabaud, 1973 (P. skrjabini sensu Yun & Kontrimovichus, 1963);
   S. araneus, S. caecutiens Linnaeus, Sorex sp.; Altai, U. S. S. R.

3. P. abei Chabaud, 1973: Soriculus leucops Horsfield, S. nigrescens Gray,
   Chimarrogale platycephala himalayaica Gary; Nepal

4. P. ohbayashii Chabaud, 1973: S. nigrescens; Nepal

5. P. combesi Mas–Coma, 1977: Crocidura russula Hermann; Spain

6. P. kontrimovichusi Guenov, 1978: Crocidura leucodon Hermann, C. suaveolens Pallas; Bulgaria

P. takikawai differs considerably from the six, above-mentioned species of Paracrenosoma. In P. skrjabini, P. abei, P. ohbayashii, P. combesi and P. kontrimovichusi, the body, spicule, and gubernaculum are much shorter, and the morphology of the spicule and bursal rays differ. Morphologically, P. takikawai resembles P. yuni; however, in P. yuni the antero-lateral ray does not rise from the common trunk of the medio-lateral and postero-lateral ray, and the gubernaculum is much shorter. P. takikawai n. sp. is the largest species in the genus Paracrenosoma.

Although Soltyś (1953) reported on P. skrjabini in the S. minutus of Poland, the lungworm was not recognized in the S. minutus gracillimus and S. caecutiens saevus of Hokkaido; therefore, further investigations must be carried out to determine
whether or not *P. takikawai* is the specific species of *S. unguiculatus*.

The specific name is dedicated to Prof. S. TAKIKAWA, Teshio District Experimental Forests of Hokkaido University.

**Acknowledgements**

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**References**

EXPLANATION OF PLATES

PLATE I

Figs. 1–11 *Paracrenosoma takikawai* n. sp.

Fig. 1 Posterior end of male, ventral view
Fig. 2 Posterior end of male, lateral view
Fig. 3 Spicule
Fig. 4 Distal end of spicules
Fig. 5 Gubernaculum
Fig. 6 Anterior extremity of female, end-on view
Fig. 7 Anterior end of female
Fig. 8 Ovijector
Fig. 9 Posterior end of female
Fig. 10 Egg
Fig. 11 Larva
1, 2, 11: 0.1 mm
3, 10: 0.05
4, 5, 6: 0.03
7, 9: 0.3
8: 0.2
Plate II

Fig. 12 The conglomeration of *P. takikawai* n. sp. in lungs (♀)

Fig. 13 Lung section showing bronchioles and alveoli occupied by nematodes

Fig. 14 Lung section showing atrophied alveoli adjacent to the female nematodes, and the larvae in the lymphatic vessel (♀)