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[原著]Two nematode species belonging to the genus Heligmosomum recovered from rodents in Niigata Prefecture, Japan :(Trichostrongyloidea: Heligmosomidae)

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# Two nematode species belonging to the genus *Heligmosomum* recovered from rodents in Niigata Prefecture, Japan (Trichostrongyloidea: Heligmosomidae)

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On the occasions of the epidemiological surveys on zoonotic parasitic diseases, the authors and co-workers examined various animals collected in Niigata Prefecture, Japan, and obtained two species of nematodes belonging to the genus *Heligmosomum* (Trichostrongyloidea: Heligmosomidae) from rodents. Since these two species have not been recorded from Japan, the authors would like to describe their morphological characteristics and to make some discussion on the taxonomy.

## MATERIALS AND METHODS

Most of nematodes were collected from mammals killed with ether, but some of worms were recovered from the viscera preserved in 10% formalin solution. Living nematodes were fixed in hot 70% ethanol. For microscopic observation, worms were cleared in glycerin alcohol solution and mounted with 50% glycerin jelly.

## DESCRIPTION AND DISCUSSION

### 1. *Heligmosomum halli* (Schulz, 1926)

Host: *Microtus montebelli montebelli* (Milne-Edwards)

Habitat: Small intestine.

Locality: Maki Town and Muikamachi Town, Niigata Prefecture, Japan.

Date: April, 1976 and August, 1980, respectively.

Two gravid females were obtained from a vole of Maki Town and two males from two voles of Muikamachi Town.

The body is slender. The mouth is triangular and encircled by six papillae. The cephalic vesicle is asymmetrical, with transverse striations and irregularly stippled in the anteriormost part. The cuticle is provided with oblique transverse ridges of 'crête' type (Durette-Desset, 1971). They arise from right lateral line and run antieriad obliquely to left lateral line across dorsal or ventral field.

Male: The body is 10.5-11.8mm long and 174-204 $\mu$ m wide in midbody. The cephalic vesicle is 104 $\mu$ m long and 93-104 $\mu$ m wide. Distance from the cephalic apex to the nerve ring and the excretory pore are 207-259 $\mu$ m and 0.49-0.57mm, respectively. The esophagus is 0.51-0.55mm long. The prebursal papillae are present at base of the ventro-ventral rays. The bursa copulatrix is almost symmetrical. The ventro-ventral ray is slightly curved anteriorly. The latero-ventral ray is thickest and runs straight. The antero-lateral ray is thickest but shortest among lateral ones, runs together with the medio-lateral. The postero-lateral ray is slightly curved internally. The extero-

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dorsal ray is slender, arises from base of lateral rays. In one male, the right externo-dorsal ray is lacked. The dorsal ray is very reduced, and positioned behind the genital cone. The spicules are almost equal and 0.87–0.94mm long. Each spicule is divided into two branches: one is shorter, provided with pointed tip and longer one is curved at distal end. Both spicules are fused at distal end and enclosed in a membrane. The gubernaculum is not found.

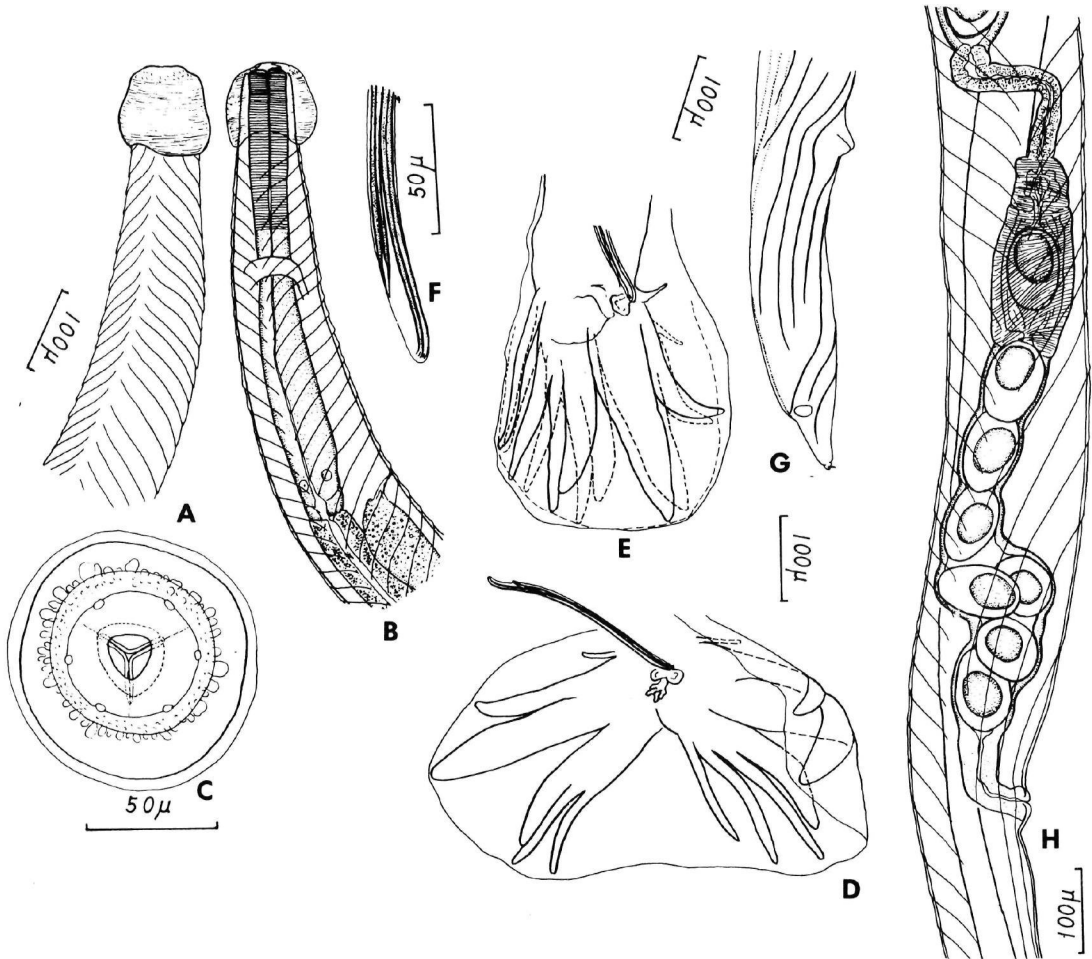


Fig. 1. *Heligmosomum halli* (Schulz, 1926).

A, B. Anterior extremity, left-lateral (A) and right-lateral (B) views. C. Cephalic apex, apical view. D. Posterior extremity of one male showing absence of right externo-dorsal ray, ventral view. E. Posterior extremity of the other male, lateral view. F. Distal part of spicules. G. Posterior extremity of one female showing torsion of body behind vulva. H. Vulval region of the other female, lateral view.

Female: The body is 14.5–16.8mm long and 215–222 $\mu$ m wide in midbody. The cephalic vesicle is 107–118 $\mu$ m long and 96–122 $\mu$ m wide. Distance from cephalic apex to the nerve ring and the excretory pore are 211–270 $\mu$ m and 0.55–0.56mm, respectively. The cuticular ridges in the ventral field of the posterior part are longitudinal, while oblique transverse ridges persists in the dorsal

field. Torsion of the body in posterior portion is seen in one female. Distance from the caudal apex to the vulva and the anus are 0.39–0.49mm and 63–78 $\mu$ m, respectively. The tail is conical and provided with a fine spine at tip. This spine was broken off in one worm. The eggs are elliptical, thin-shelled and 89–107 x 57–78 $\mu$ m.

Durette-Desset (1971)<sup>1)</sup> reviewed the classification of the heligmosomids and listed 7 species as *Heligmosomum*, i. e. *H. borealis* (Schulz, 1930),<sup>2)</sup> *H. costellatum* (Dujardin, 1845),<sup>3)</sup> *H. halli* (Schulz, 1926),<sup>4)</sup> *H. mixtum* Schulz, 1954,<sup>5)</sup> *H. nearcticum* Durette-Desset, 1967,<sup>6)</sup> *H. petrovi* (Krotov, 1957)<sup>7)</sup> and *H. yamagutii* Chabaud et al., 1963<sup>8)</sup>. In USSR, Nadochii (1970)<sup>9)</sup> described 4 new species, *H. asiaticum*, *H. myospalaxi*, *H. rutili* and *H. victori*.

The present worms differ from the species with longitudinal ridges in the ventral field, i. e. *H. mixtum*, *H. yamagutii*, *H. asiaticum*, *H. rutili* and *H. victori*. The present ones also differ from *H. myospalaxi* in having symmetrical bursa, and from *H. costellatum* and *H. borealis* in lacking small branch on externo-dorsal ray. The present specimens closely resemble *H. halli* especially in the structure of bursa and measurements. The authors consider that the present worms are *H. halli* although the egg size is somewhat smaller than that (85–88 x 50–55 $\mu$ m) originally described by Schulz (1926<sup>4)</sup>). To the authors' knowledge, there has no report on *H. halli* from Japan.

## 2. *Heligmosomum* sp.

Host: *Eothenomys* sp.

Habitat: Small intestine.

Locality: Kamikawa Village, Niigata Prefecture, Japan.

Date: May, 1974.

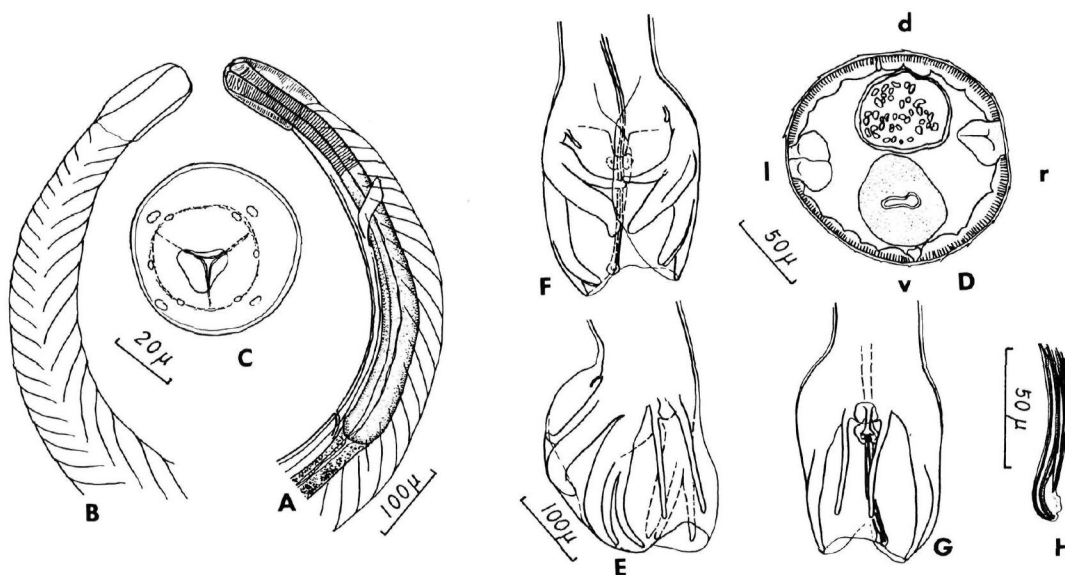


Fig. 2. *Heligmosomum* sp.

A, B. Anterior extremity, left-lateral (A) and right-lateral (B) views. C. Cephalic apex, apical view. D. Cross section of mid-body; d, dorsal, l, left-lateral, r, right-lateral, v, ventral. E–G. Posterior extremity of male, subdorsal (E), ventral (F) and dorsal (G) views. H. Distal part of spicules.

Five males and one gravid females were collected from a vole. The host species was not identified strictly although it was strongly supposed to be *E. smithi* (Thomas).

The body is slender. The mouth is triangular and encircled by inner circle of 6 papillae and outer circle of 4 papillae. The cephalic vesicle is asymmetrical and striated transversely. The cuticle is provided with ridges of 'crête' type in following arrangements: Those on dorsal area arise from right lateral line, run antieriad obliquely and end on left lateral line. Those on right-ventral ones arise from right lateral line, run antieriad obliquely and end on ventral midline. Those on left-ventral field are almost longitudinal. The number of ridges in a cross section is 17-18 and 5-6 of them are on left ventral-field.

Male: The body is 8.9-9.8mm long and 126-170 $\mu$ m wide in midbody. The cephalic vesicle is 111-112 $\mu$ m long and 56-70 $\mu$ m wide. Distance from the cephalic apex to the nerve ring and the excretory pore are 196-260 $\mu$ m and 0.43-0.50mm, respectively. The esophagus is 0.51-0.54mm long. The prebursal papillae are present. The bursa copulatrix is almost symmetrical but the right lobe is slightly larger. The ventro-ventral ray is curved anteriorly. The latero-ventral ray is thickest among rays. The antero-lateral ray is thickest among lateral rays, runs together with the medio-lateral ray, and the latter is somewhat shorter. The postero-lateral ray is curved posteriorly. The externo-dorsal ray arises separately from lateral ones, runs almost straight. Basal part of the externo-dorsal ray is slightly inflated and a small branch directing internally present on it. Dorsal ray is reduced, distally divided into 4 small branches: two inner long and two outer short. The genital cone is prominent. The spicules are equal, filiform and 1.04-1.29mm long. They are fused distally and encircled in a membrane. Each of the spicules is divided into two branches: one is shorter and ends sharply and the other longer, curved distally. Cuticular ridge is absent on posterior extremity.

Female: The condition of female specimen is poor, especially in internal organs. The body is 11.9mm long and 115 $\mu$ m wide in midbody. The cephalic vesicle is 111 $\mu$ m long and 67 $\mu$ m wide. The esophagus is 0.49mm long. Distance from the caudal apex to the vulva and anus are 0.27mm and 63 $\mu$ m, respectively. The tail is conical and provided with a fine process at apex. The cuticular ridges on the posterior body are inconspicuous and almost longitudinal. The eggs are elliptical, thin-shelled and 74-80 x 42-48 $\mu$ m.

The present species resembles *H. yamagutii*, *H. mixtum*, *H. asiaticum*, *H. rutili* and *H. victori* in having two patterns in the arrangement of cuticular ridges, oblique and longitudinal. *H. yamagutii*, *H. mixtum* and *H. asiaticum* differ from the present ones in lacking branch on the externo-dorsal ray, and *H. victori* is also distinguishable in having two branches on each externo-dorsal ray<sup>8)9)10)11)</sup>. The present specimens differ from *H. rutili* in having larger body and longer spicules<sup>9)</sup>.

The authors suppose that the species under discussion is a new one. However, strict identification or naming should be withheld until recovery of more specimens, especially complete females.

### SUMMARY

Two species of nematodes belonging to the genus *Heligmosomum* (Trichostrongyloidea: Heligmosomidae), namely, *H. halli* (Schulz, 1926) from *Microtus montebelli montebelli* and *H. sp.* from *Eothenomys* sp., were recovered first in Japan. Their morphological characteristics were described and figured.

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