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A NEW HELIGMOSOMID NEMATODE, *HELIGMOSOMOIDES PROTOBULLOSUS* N. SP.  
(HELIGMOSOMIDAE : NEMATODA),  
FROM THE JAPANESE GRASS VOLE,  
*MICROTUS MONTEBELLI* MILNE-EDWARDS

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A new heligmosomid nematode, *Heligmosomoides protobullosus* n. sp., from the small intestine of the Japanese grass vole, *Microtus montebelli* MILNE-EDWARDS collected at several sites in Japan, was described. This new species is distinguished from *H. bullosus* by the absence of a bubble-like membrane in the bursa. This is the first record of the genus *Heligmosomoides* from the Japanese *Microtus*.

Key words : *Heligmosomoides protobullosus* n. sp., *Microtus montebelli*, Japan

The phylogenetic system of nematode parasites, which occur specifically in the Japanese rodents, has been studied with regard to the host phylogenetic system.<sup>1,2)</sup> In this paper, the authors described a new heligmosomid nematode, *Heligmosomoides protobullosus* n. sp. (Heligmosomidae : Nematoda), from the small intestine of the Japanese grass vole, *Microtus montebelli* MILNE-EDWARDS. This is the first record of the genus *Heligmosomoides* from the Japanese *Microtus*.

MATERIALS AND METHODS

From 1983 to 1985, 24 Japanese grass voles, *Microtus montebelli* MILNE-EDWARDS, were collected at several sites in Japan (the sites, date and number of the hosts collected are shown in Table 1), and heligmosomid nematodes from the small intestine of the voles were obtained.

The nematodes were fixed in 5% formalin solution and cleared in lacto-phenol

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TABLE 1 Number, localities and collected date of hosts, *Microtus montebelli*, and occurrence of *Heligmosomoides protobullosus* n. sp.

Localities	Date	Occurrence
		Number of hosts : positive/collected
Ouma, Aomori Pref.	Jun. , 1985	3 / 3
Towada, Aomori Pref.	Aug. , 1984	2 / 11
Utsukushi-ga-mori, Yamanashi Pref.	Dec. , 1983	1 / 1
Oku-Tateshina, Nagano Pref.	Apr. , 1984	2 / 9
Total		8 / 24

solution for microscopic examination. Some of the specimens were embedded in paraffin, and the cross sections made were stained with hematoxylin-eosin to observe the ridges of synlophe.

#### RESULTS

*Heligmosomoides protobullosus* n. sp. (Figs. 1-9)

Host : Japanese grass vole, *Microtus montebelli* MILNE-EDWARDS

Habitat : Small intestine

Localities : Towada, Ouma, Oku-Tateshina (type locality) and Utsukushi-ga-mori, Japan

Description (all measurements in mm) :

Body length about 4.0 mm in male and about 7.0 mm in female. Body coiled and reddish when alive. Cuticle with continuous and longitudinal ridges (Fig. 1). Number of ridges 15 in mid-body of two males. Axis inclination of the orientation of ridges to the sagittal axis is almost frontal as shown in Figs. 2-4. Gradient in size of ridges from dorsal side to ventral side on the bilateral sides (the ventral ridges are highly developed). Cervical papillae not obvious. The main measurements are shown in Table 2. Genital organs are shown in Figs. 5-9. Male : Formula of bursal rays type 2-3 (DURETTE-DESSET & CHABAUD, 1981). Bursa asymmetrical, right lobe larger than left; bursal lobes large, about 0.46 in width and about 0.26 in length. Prebursal papillae present. Antero-ventral rays shorter than postero-ventral rays and medio-lateral rays longest of three laterals; externo-dorsal rays long and straight; dorsal ray reduced and bifurcated twice distally (Fig. 7). Spicules equal in length and brown in color, long (1.6-2.2 in length) and length ratio of spicules and body about 0.5; spicule tips fused and spinous shaped (Fig. 8); gubernaculum absent. Female : Monodelphic.

TABLE 2 Measurements of *Heligmosomoides protobullosus* n. sp. from *Microtus montebelli* collected at Oku-Tateshina (in mm)

	Male (N = 10)	Female (N = 2)
Cephalic vesicle		
length	0.053 – 0.061	0.056
width	0.031 – 0.041	0.049
Body		
length	3.6 – 5.2	7.3 – 7.5
width (mid-body)	0.08 – 0.17	0.12
Esophagus		
length	0.42 – 0.60	0.53
Excretory pore		
from head end	0.46	—
Nerve ring		
from head end	0.27	0.21

N : Number of specimens examined

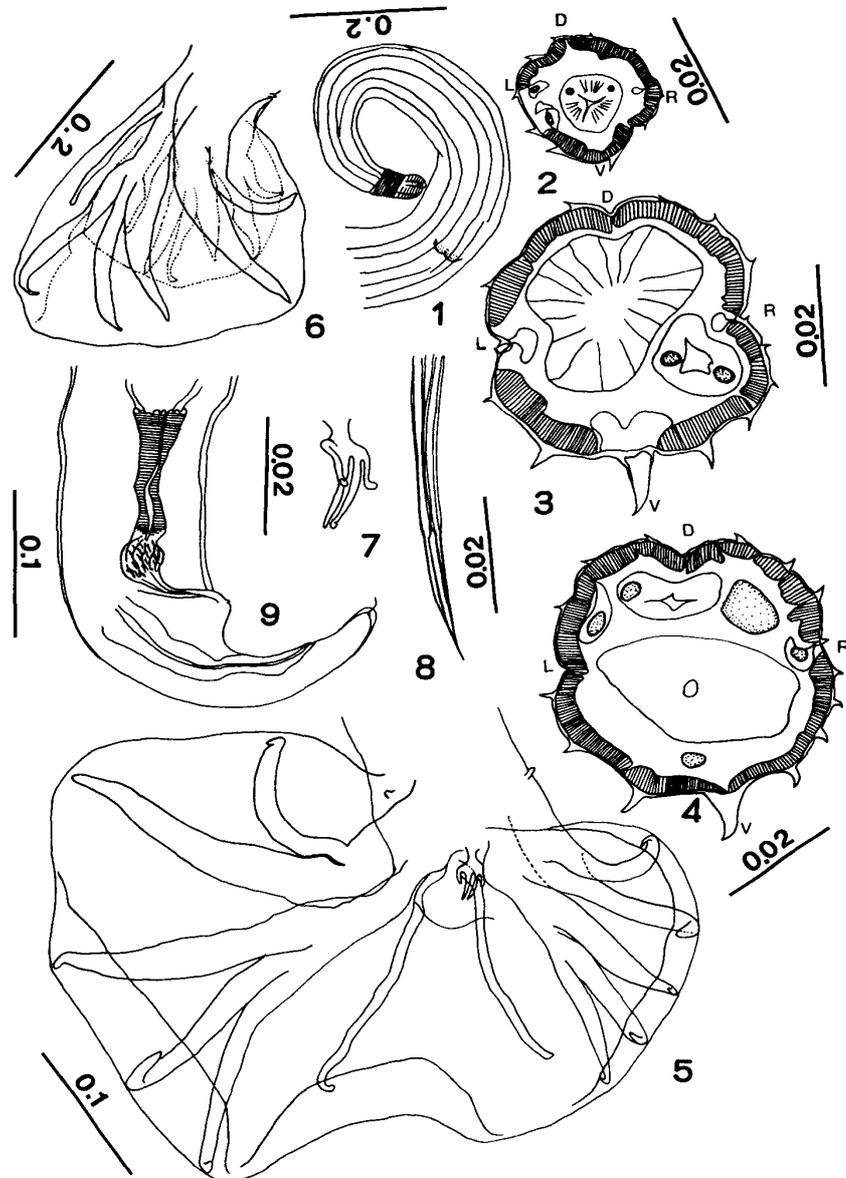
Vestibule about 0.05, sphincter 0.03 and infundibulum 0.10 in length, respectively; uterine eggs not observed; vulva at 0.14–0.15 from tail end, a papilla at vagina vera (Fig. 9); anus at 0.05 from tail end. Tail curving ventrally, with a spine at end.

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

#### DISCUSSION

The present species accords with the two subspecies of *H. bullosus* DURETTE-DESSET (1968) because of the general aspect of the bursa and the female tail end, and the host (genus *Microtus*). However, it was possible to distinguish the present species from *bullosus* by the lack of a bubble-like bursal membrane. From the morphological and zoogeographical view points, *H. protobullosus* in Japan and *H. bullosus* at Chaunsk Gulf in Northeastern Siberia<sup>5)</sup> and at St. Lawrence Island and St. Matthew Island in Alaska<sup>3)</sup> are closely related phylogenetically, and the former is considered as a progenitor of the latter.

The trichostrongylids except for the genus *Heligmosomoides*, i.e., *Carolinensis minutus*<sup>7)</sup> and *Heligmosomum halli*,<sup>6)</sup> have previously been recorded from the Japanese *Microtus*, but this is the first record of *Heligmosomoides* from the Japanese *Microtus*.



FIGURES 1-9 *Heligmosomoides protobullosus* n. sp. from *Microtus montebelli* collected at Oku-Tateshina, Japan (in mm)

- Fig. 1 Anterior extremity of male, left-lateral view
- Fig. 2 Cross-section of anterior extremity of male, D : dorsal, V : ventral, R : right, L : left
- Fig. 3 Cross-section of mid-body of male
- Fig. 4 Cross-section of mid-body of male
- Fig. 5 Bursa, ventral view
- Fig. 6 Bursa, right-lateral view
- Fig. 7 Dorsal ray
- Fig. 8 Spicule tips
- Fig. 9 Posterior extremity of female

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