



Title	OH BAYASHINEMA ABEI SP. N.(NEMATODA : HELIGMOSOMIDAE) FROM THE NORTHERN PIKA, OCHOTONA HYPERBOREA PALLAS, IN HOKKAIDO, JAPAN
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***OHBAYASHINEMA ABEI* SP. N.
(NEMATODA : HELIGMOSOMIDAE)
FROM THE NORTHERN PIKA,
OCHOTONA HYPERBOREA PALLAS, IN HOKKAIDO,
JAPAN**

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An intestinal nematode, *Ohbayashinema abei* sp. n., from the northern pika, *Ochotona hyperborea yesoensis*, in Hokkaido, Japan, was described and its morphological characteristics were compared with those of the previously known *O. ochotoni* DURETTE-DESSET, 1974 and *O. dubinini* (GVOZDEV, 1966) DURETTE-DESSET, 1974.

Key words: *Ohbayashinema abei* sp. n., *Ochotona hyperborea*, Japan

Only two species have been recognized in the genus *Ohbayashinema* DURETTE-DESSET, 1974 from pikas in Eurasia: *O. ochotoni* DURETTE-DESSET, 1974 from *Ochotona macrotis* in Nepal, and *O. dubinini* from *O. alpina* in the U. S. S. R. The geographically isolated populations of the northern pika on Hokkaido Island, northern Japan are interesting from the view point of phylogeny of related genera in the family Heligmosomidae (fig. 1).

MATERIALS AND METHODS

In May of 1978, 5 northern pikas, *Ochotona hyperborea yesoensis* KISHIDA, were collected at a rocky area near Shikaribetsu Lake, Hokkaido, Japan. Five species of endoparasites had been detected (tab. 1; OHBAYASHI et al., 1979).

Heligmosome nematodes were collected from the small intestine of the pikas. All the specimens were fixed with 10% formalin, preserved in 5% formalin and treated with lactophenol. Drawings and measurements were done with the aid of a camera lucida. The synlophe was examined on whole mounts and on cross sections of nematodes using a microscope. The cross sections at midbody were made by cutting with a blade using a dissection microscopy.

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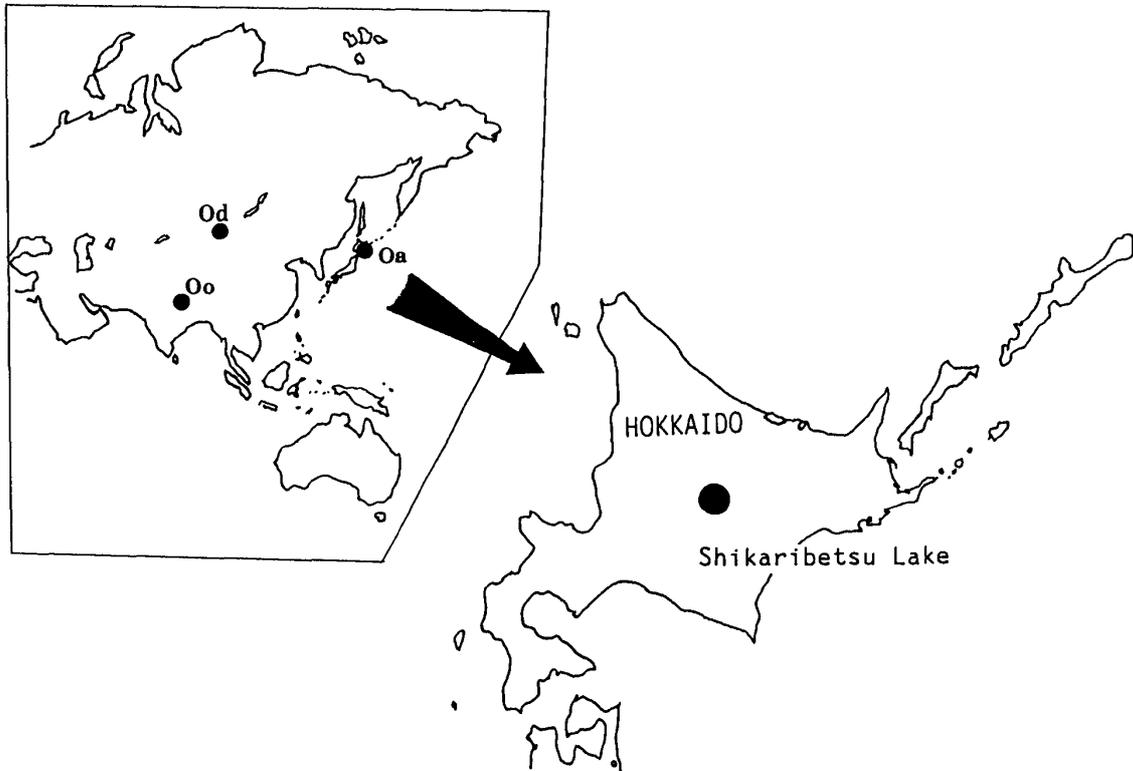


FIGURE 1 *Geographical distribution of the three species of the genus Ohbayashinema DURETTE-DESSET, 1974 from pikas, Ochotona spp. in Eurasia*

Oa: *O. abei* sp. n. (Hokkaido, Japan)

Od: *O. dubinini* (GVOZDEV, 1966) DURETTE-DESSET, 1974 (Altai, USSR)

Oo: *O. ochotoni* DURETTE-DESSET, 1974 (Nepal)

TABLE 1 *Endoparasites from the northern pika, Ochotona hyperborea yesoensis. in Hokkaido, Japan**

PARASITES	HABITAT	PREVALENCE
Nematoda		
<i>Ohbayashinema</i> sp.	Small intestine	4/5
<i>Labiostrongylus</i> sp.	Caecum	3/5
<i>Trichuris</i> sp.	Caecum	1/5
Cestoda		
<i>Schizorchis yamashitai</i> RAUSCH, 1963	Small intestine	2/5
Protozoa		
<i>Sarcocystis</i> sp.	Muscle	1/5

*After OHBAYASHI et al., 1979

RESULTS

Ohbayashinema abei sp. n.

Host: Northern pika, *Ochotona hyperborea yesoensis*

Habitat: Small intestine

Locality: Lakeside of Shikaribetsu Lake, Hokkaido, Japan
(43° 15' N, 143° 10' E)

Description (tab. 2 & fig. 2): Small nematode. Dark red in color and coiled tightly while alive and after fixation. Cephalic vesicle well developed with fine annulation. Cuticular ridges start from the margin of the cephalic vesicle, and continue the whole body length. The axis of orientation of ridges inclines 90° from the dorso-ventral axis. The size of ventral ridges greater than those in dorsal. Male (7 specimens): Number of ridges 12 or 13 at midbody, 6 or 7 in dorsal and 5 or 6 in ventral. The ridges terminate near bursa. Body 6.1–8.9 mm long and maximum width 129–174 μm . The distance from anterior end to nerve ring and excretory pore 185–207 μm and 217–304 μm , respectively. Esophagus 576–876 μm in length. Bursa well developed, asymmetrical, the right lateral lobe larger than the left one. Small prebursal papillae present on the base of antero-ventral rays. Ventral rays thick and long. Antero-ventral and postero-ventral rays divided at their base with short stem. Lateral rays with common stem, almost same size. Externo-dorsal rays thin and long, originated from the base of lateral rays. Dorsal ray small, and two branches originated at its stem and bifurcated twice at the distal end. Spicules slender and long, fused at the distal end, 944–1424 μm in length.

Female (13 specimens): Ridges decreased in number posteriorly. A few ridges posterior to the vulva, 13 or 14 ridges are observed at midbody, 7 or 8 in dorsal and 5–7 ventral. Body, 6.3–13.9 mm long, 141–207 μm wide. The distance from anterior end to nerve ring and excretory pore, 125–239 μm and 212–304 μm , respectively. Esophagus 543–720 μm in length. Monodelphic. Anus and vulva situated at 50–181 μm and 189–381 μm from the tail end, respectively. Ovejector long, 739–1282 μm in length. Vestibulum longer than infundibulum. The cuticle inflated around the vulval region and the vulva opened at the bottom of the concaved area. A small spine, 12–31 μm long, at the tail end. The eggs in uterus are rather large, 83–111 μm by 47–75 μm in size.

The species name of this nematode has been dedicated to Dr. Hisashi ABE, Institute of Applied Zoology, Faculty of Agriculture, Hokkaido University.

DISCUSSION

DURETTE-DESSET (1974) erected the genus *Ohbayashinema* in the subfamily Heligmosominae, family Heligmosomidae, superfamily Trichostrongyloidea. She separated this genus from other genera of the family Heligmosomidae by the following characteristics: 1) the synlophe is dorso-ventrally symmetrical, which means that the number

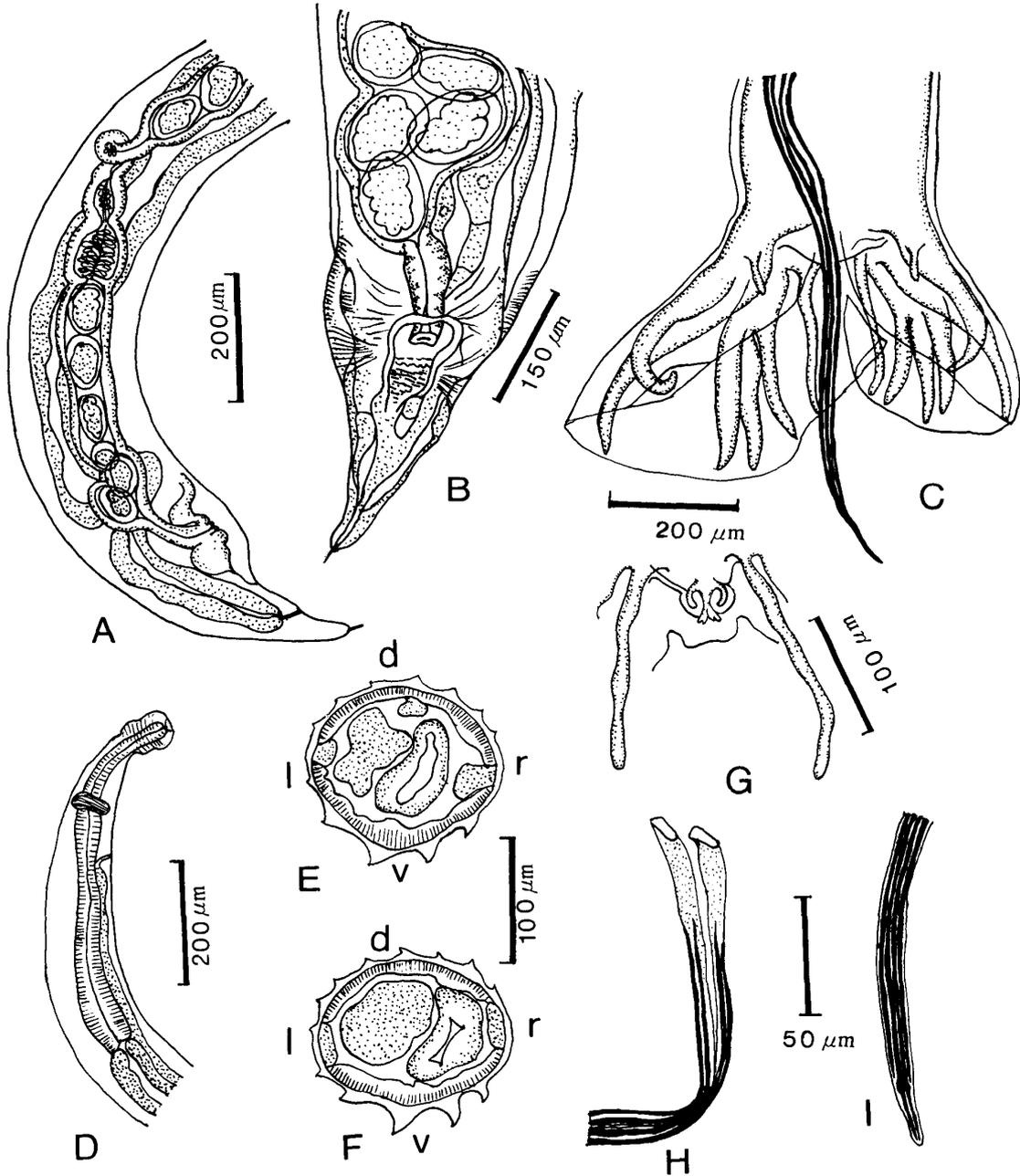


FIGURE 2 *Ohbayashinema abei* sp. n.

- | | |
|--|---|
| <p>A Posterior end of female, lateral view
 B Caudal end of female, ventral view
 C Prebursal and bursal regions of male, ventral view
 D Anterior end of female, lateral view
 E Cross section of male, midbody</p> | <p>F Cross section of female, midbody
 G Externo-dorsal and dorsal rays of male, ventral view
 H Proximal end of spicules
 I Distal extremity of spicules
 d: dorsal, l: left, r: right, v: ventral</p> |
|--|---|

TABLE 2 Comparison of three species of the genus *Ohbayashinema* DURETTE-DESSET, 1974¹⁾

SPECIES	<i>O. OCHOTONI</i>	<i>O. DUBININI</i>	<i>O. ABEI</i> N. SP.
Authors	DURETTE-DESSET 1974	GVOZDEV 1966	present authors
Host	<i>Ochotona macrotis</i>	<i>O. alpina</i>	<i>O. hyperborea yessoensis</i>
Locality	Nepal	Altai, USSR	Hokkaido, Japan
Male			
Number examined	NI ²⁾	NI	7
Body length (mm)	8.7	7–8.2	6.1–8.9
Body width	150	150	129–174
Length of			
esophagus	710	400–430	576–826
spicules	560	670–690	944–1424
Number of ridges	10	14	12–13
Female			
Number examined	NI	NI	13
Body length (mm)	NI	11.0–12.0	6.3–13.9
Body width	NI	220	141–207
Length of			
esophagus	NI	600–610	543–720
caudal spine	NI	11–12	12–31
Distance from			
caudal end			
anus	NI	25–30	50–181
vulva	NI	210–220	189–381
Number of ridges	NI	14	13–14
Size of eggs	NI	110–120 X 83–88	83–111 X 47–75

¹⁾ Measurements in μm unless otherwise indicated.

²⁾ NI: Not indicated

and size of ridges are the same on the dorsal and ventral sides of the body, and that the orientation of ridges inclines 90° to the dorso-ventral axis; 2) number of ridges is small compared to that of other species of *Heligmosomum* and *Heligmosomoides* (DURETTE-DESSET, 1974, 1983). She also moved *Heligmosomum dubinini* into the genus *Ohbayashinema*, because of its fewer number of ridges (14) and the phylogeny of the host. There is no detailed description of the morphology of synophe, especially in the cross section.

O. ochotoni is distinguished from *O. dubinini* by; 1) the length of spicule is shorter; 2) the antero-lateral and medio-lateral rays have a common stem and the postero-lateral ray originates from the stem of the lateral rays. In *O. dubinini*, the medio-lateral and postero-lateral rays have a common stem; 3) the morphology of dorsal ray and 4) the number of cuticular ridges is different from that of *O. ochotoni*.

O. abei differs from *O. ochotoni* in the following characteristics; 1) length of spicule is longer; 2) the number of ridges is larger and 3) the ventral ridges are larger and more protruded.

O. abei is also distinguishable from *O. dubinini* in the following characteristics: 1) arrangement of the lateral rays; 2) shape of dorsal ray and 3) length of spicules.

DURETTE-DESSET (1974, 1983) defined that the female of the genus *Ohbayashinema* is monodelphic depending on the description of *Heligmosomum dubinini*. The morphology of female *O. ochotoni*, however, was not described. The present paper describes for the first time the figures of the adult female. There are no figures or pictures of the female of the genus *Ohbayashinema*.

According to the definition by DURETTE-DESSET (1983), *O. abei* cannot be included in the genus *Ohbayashinema* because its synophe is not symmetrical with respect to the frontal axis. Moreover, the ventral ridges are larger and more protruded than those in the dorsal side.

DURETTE-DESSET (1974) discussed that the synophe characteristics of the genus *Ohbayashinema* might be an intermediate form between the genera *Molineus* and the *Citellinema*. The female is monodelphic. The origin of these genera was supposed to be a hypothetic didelphic genus related to the genus *Molineus*. This hypothetic ancestor 'Molineus' gave rise to two branches; 1) the genus *Ohbayashinema* in Lagomorpha and 2) the genus *Citellinema* in Sciuromorpha, and then to the genera *Heligmosomoides* and *Heligmosomum* in Microtidae (fig. 2).

The authors considered that *Ohbayashinema abei* might have intermediate characteristics between *Ohbayashinema ochotoni* and the genus *Heligmosomoides*. The authors also speculated that the genus *Ohbayashinema* is more closely related to the genus *Heligmosomoides* than the genus *Citellinema*. Thus, following DURETTE-DESSET's recent hypothesis (DURETTE-DESSET, 1985), the authors concluded that the genus *Ohbayashinema* might be the direct ancestor of the genus *Heligmosomoides* (fig. 3).

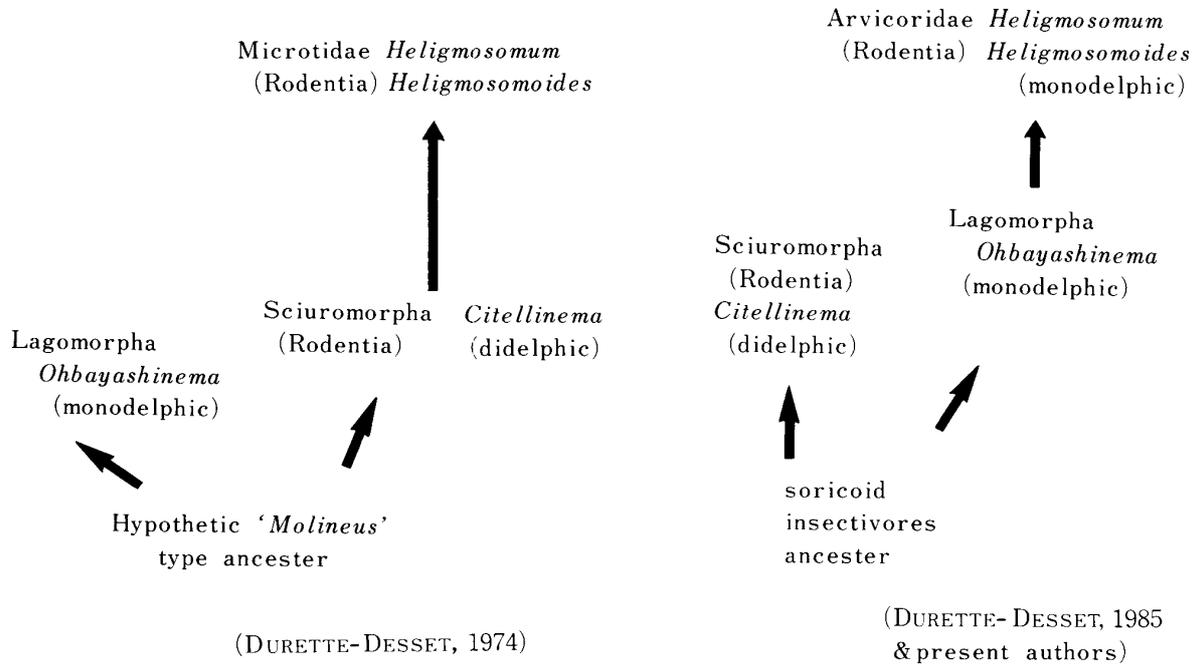


FIGURE 3 *Phylogeny of the genus Ohbayashinema and related genera* (DURETTE-DESSET, 1974 & 1985, modified)

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