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Citation	Japanese Journal of Veterinary Research, 31(2), 65-69
Issue Date	1983-05-13
DOI	<a href="https://doi.org/10.14943/jjvr.31.2.65">https://doi.org/10.14943/jjvr.31.2.65</a>
Doc URL	<a href="https://hdl.handle.net/2115/2275">https://hdl.handle.net/2115/2275</a>
Type	departmental bulletin paper
File Information	KJ00002374097.pdf



A MARINE HORSEHAIR WORM, *NECTONEMA* SP.,  
PARASITIZING ATELECYCLID CRAB, *ERIMACRUS*  
*ISENBECKII*, FROM HOKKAIDO, JAPAN

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(Received for publication February 22, 1983)

*Nectonema* sp. (Nematomorpha) was recovered from an atelecyclid crab, *Erimacrus isenbeckii*, collected at Kushiro, Hokkaido, Japan. The worm parasitized in the body cavity under the carapace of the crab. Body length was estimated as 27cm in the male and 49cm in the female. This is the first record of *Nectonema* found in the north Pacific Ocean.

Key words: *Nectonema* sp., *Erimacrus isenbeckii*

#### INTRODUCTION

*Nectonema* is filiform in shape, parasitic in the decapod crustacean as a juvenile and free-living in sea water as an adult. The genus *Nectonema* is the only genus which belongs to the marine nematomorph, the order Nectonematoidea. Up to this time, five species of *Nectonema* have been described: *N. agile* VERRILL, 1879, *N. melanocephalum* NIERSTRASZ, 1907, *N. svensksundi* BOCK, 1913, *N. munidae* BRINKMANN, 1930 and *Nectonema* sp. by BAKKE (1975). *N. agile* was recovered in north-eastern USA, Brazil, the Bay of Napoli and north-western Africa, *N. munidae* in Norway, *N. melanocephalum* in Indonesia, *N. svensksundi* in Spitzbergen and *Nectonema* sp. BAKKE in northern Norway (NIELSEN, 1969; BAKKE, 1975). Generally speaking, *Nectonema*-species have been reportedly found in the Atlantic Ocean but not in the north Pacific Ocean. This is the first report of the discovery of the marine horsehair worm, *Nectonema* sp., in the north Pacific Ocean.

#### MATERIALS

In the present investigation, 1 to 6 specimens of *Nectonema* sp. were found in 4 specimens of *Erimacrus isenbeckii* which had been collected in the vicinity of Kushiro, Hokkaido, Japan, during the period 1973 to 1979 (fig. 1). Formalin-fixed specimens were examined. No complete specimens of the worm were obtained; therefore, the present description was based on the fragmented worms. Some transverse section

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preparations were made and stained by hematoxylin-eosin.

#### DESCRIPTION AND DISCUSSION

The worm has dental projections in the buccal cavity leading to the oesophagus, which shows a slender, cuticularized tube-like shape and is followed by the midgut (figs. 2, 3). The digestive tract fades out posteriorly and does not reach the posterior end (fig. 4). *N. svensksundi*, or *N. melanocephalum*, has a prominent black head pigmented around the brain. Also, the lateral line of *N. agile* is laid out in squares marked in outline by the black pigment. The present specimens and *N. munidae* have no pigment. The morphological features of the cross section of the specimens are similar to those of *N. agile* (FEYEL, 1936). Under the thin cuticle layer the epidermis consists of syncytium. The ventral cord, which includes the nerve and dorsal cords, runs along the ventral and dorsal lines (fig. 5). In the female, oocytes with eosinophilic granules (vitellus) and myoblasts are attached to the epidermis by their strands (fig. 6). In the male, myoblasts are attached to the epidermis, and the testis is suspended from the dorsal cord (fig. 7). The midgut, which consists of two or four rows of cells, passes through the center. The present specimens have no bristles, while a double row of natatory bristles along the dorsal and ventral lines are reported in adults of *Nectonema* (HYMAN, 1951). From these findings, all the present specimens are considered to be immature juvenile.

Table 1 shows the body length and width of the specimens as compared with other *Nectonema*-species. HYMAN (1951) reported that juveniles of *Nectonema* closely resemble adults in size. The present male specimens are the longest of known species, and the female specimens are as long as *N. munidae*. Both parasitic juveniles and free-living adults of *N. munidae* and *N. agile* have been collected, while only 9, 1 and 1 degenerated adult specimens of *N. melanocephalum*, *Nectonema* sp. (BAKKE,

TABLE 1 *Body length and width of Nectonema-species*

SPECIES	BODY LENGTH (cm)		BODY WIDTH (mm)	AUTHORS
	male	female		
<i>Nectonema</i> sp.	27*	49**	0.7	OKU et al. (present paper)
<i>N. agile</i>	4.5—20.0	3.4—12.0	1.0	WARD(1892), FEYEL (1969)
<i>N. munidae</i>	9.0—15.5	17.0—96.0	1.7	BRINKMANN (1930), NIELSEN (1969)
<i>N. melanocephalum</i>	1.0— 4.7	—	0.3	NIERSTRASZ (1907)
<i>N. svensksundi</i>	—	19.0	0.3	BOCK (1913)

\* average length estimated from 2 fragmented specimens

\*\* average length estimated from 4 fragmented specimens

1975) and *N. svensksundi* have been collected, respectively. All the specimens collected in the present investigation are parasitic juveniles. FEYEL (1936), and NOUVEL and NOUVEL (1938) suggested the synonymy of *N. agile* and *N. munidae*, while NIELSEN (1969) believed the specific validity of these two species. The specific validity of *Nectonema*-species remains a subject of controversy. Examination of an adult specimen is needed for identification of *Nectonema*. Further investigation is necessary for the identification of the specimens. *N. munidae* shows an enormous range of variation in length. In addition, if *N. agile* and *N. munidae* are synonymous, the length of the parasite seems to be insignificant for the identification of *Nectonema*. According to PÉREZ (1935), the size difference of *N. agile* depends on the host, for example, the bigger *Pagurus bernhardus* is long, and *Anapagurus hyndmanni* is relatively short. Meanwhile, NIELSEN (1969) reported that the size of *N. munidae* is not correlated with the size of the host, *Munida tenuimana*. The present specimens were discovered from *Erimacrus isenbeckii* of which the carapace was 5 to 6cm width.

*N. agile* were recovered from crustaceans of Reptantia, Anomura, Brachyura and Natantia (Panaeidea and Eucyphidea), and *N. munidae* from Reptantia, Anomura and Natantia (Panaeidea and Eucyphidea). Therefore, it is supposed that the present *Nectonema* sp. may be recovered from decapod crustaceans other than *Erimacrus isenbeckii* in the north Pacific Ocean.

Parasitic castration of female hosts by *N. agile* was reported for *Palaemonetes vulgaris*, *Palaemon serratus* and *Anapagurus hyndmanni* (NIELSEN, 1969; BORN, 1967). In some instances of *Munida tenuimana* infected heavily with *N. munidae*, the hepatopancreas was smaller than in uninfected hosts of the same size class (NIELSEN, 1969). In the present investigation, the pathogenic effect of the parasite on the host was not recognized.

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#### EXPLANATION OF PLATE

##### PLATE I

- Fig. 1 *Nectonema* sp. (↑) in the body cavity of *Erimacrus isenbeckii*
- Fig. 2 Anterior end of *Nectonema* sp. O: oesophagus, I: intestine
- Fig. 3 Buccal cavity of *Nectonema* sp. DP: dental projection, O: oesophagus
- Fig. 4 Posterior end of *Nectonema* sp.
- Fig. 5 Transverse section of the female *Nectonema* sp. I: intestine, VC: ventral cord, DC: dorsal cord
- Fig. 6 Transverse section of the female *Nectonema* sp. VC: ventral cord, V: vitelli, M: myoblasts
- Fig. 7 Transverse section of the male *Nectonema* sp. T: testis, I: intestine

