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 VERILL, 1879, N.
melanocephalum NIERS1ASZ, 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>
<thead>
<tr>
<th>SPECIES</th>
<th>BODY LENGTH (cm)</th>
<th>BODY WIDTH (mm)</th>
<th>AUTHORS</th>
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<tbody>
<tr>
<td></td>
<td>male</td>
<td>female</td>
<td></td>
</tr>
<tr>
<td><em>Nectonema</em> sp.</td>
<td>27*</td>
<td>49**</td>
<td>OKU et al. (present paper)</td>
</tr>
<tr>
<td><em>N. agile</em></td>
<td>4.5–20.0</td>
<td>3.4–12.0</td>
<td>WARD (1892), FEYEL (1969)</td>
</tr>
<tr>
<td><em>N. munidae</em></td>
<td>9.0–15.5</td>
<td>17.0–96.0</td>
<td>BRINKMANN (1930), NIELSEN (1969)</td>
</tr>
<tr>
<td><em>N. melanocephalum</em></td>
<td>1.0–4.7</td>
<td>—</td>
<td>NIERSTRASZ (1907)</td>
</tr>
<tr>
<td><em>N. svensksundi</em></td>
<td>—</td>
<td>19.0</td>
<td>BOCK (1913)</td>
</tr>
</tbody>
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* average length estimated from 2 fragmented specimens
** average length estimated from 4 fragmented specimens
Nectonema sp. from crab

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 synonymity 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 PEREZ (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 tenuiman. 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 tenuiman 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.

REFERENCES

and new host species *Sarsia*, 38, 91–110


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