

## Two Species of Parasitic Copepods (*Neobrachiella incurva* and *Peniculus ostraciontis*) from the Marine Fishes, *Halichoeres poecilopterus* and *Sebastes schlegeli*, of the South Coast of Korea

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### 남해안 어류(용치놀래기, 조피볼락)에 기생하는 요각류 2종

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Two species of the copepod parasite were observed from two marine fishes in Korea. A siphonostomatoid copepod *Neobrachiella incurva* (Shiino, 1956) (Lernaeopodidae) and a cyclopoid copepod *Peniculus ostraciontis* Yamaguti 1939 (Lernaeidae) were found on the gills of *Halichoeres poecilopterus* and the fins of *Sebastes schlegeli*, respectively.

The most distinct features of *N. incurva* are bipartite of maxillule, 2 ventro-posterior processes and conical genital process. *P. ostraciontis* is very distinguishable in the body shape, antenna, and fused trunk. Both species of copepods are newly observed from the Korean waters.

Key words : Marine fish parasites, *Neobrachiella incurva*, *Peniculus ostraciontis*

### Introduction

Because of serious economic damage, copepod parasites have been considered as enemies of marine fishes (Kabata, 1979 ; Suh *et al.*, 1992, 1993 ; Choi *et al.*, 1994a, 1994b), marine shellfishes (Wilson, 1938 ; Davey *et al.*, 1978 ; Paul, 1983 ; Pregonzer, 1983 ; Suh and Choi, 1990, 1991 ; Choi and

Suh, 1991), and ascidians (Choi and Hong, 1994).

The family Lernaeopodidae is widely distributed among fishes in both sea and fresh water. It is remarkable not only for the peculiar mode of its life, but also for striking degeneration in the structures of the body. A decisive influence on the morphology of Lernaeopodidae has been exerted by the adaption

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of their second maxillae to fulfil the function of an "anchor chain" connecting the body of the parasite with the bulla, the anchor-like organ of attachment.

The body of a lernaeopodid female consists of three major parts: the cephalothorax, the second maxillae and the trunk. These parts are concerned with nutrition, prehension and reproduction, respectively. The family contains presently more than 260 species, ground in 42 genera, parasitic on both elasmobranch and teleost fishes in the sea and in freshwater habitats (Kabata, 1992). The genus *Neobrachiella* was established to accommodate species previously placed in *Brachiella* (Kabata, 1979). *Neobrachiella* received also species of *Parabrachiella*, *Probrachiella*, *Epibrachiella* and *Brachiellinae*.

On the other hand, most genera of Lernaeidae resembled siphonostomatoid Pennellidae, with which they were confused for a large part of their history. Each has an anterior extremity typically provided with a well-developed holdfast, often deeply embedded in the tissues of the host. Their bodies are more or less elongated, trunk-like, and have lost external segmentation and all resemblance to the crustacean habitus.

In order to add our knowledge of the parasitic copepod fauna of Korean marine animals, this survey has been carried out since 1990. In the course of the study we had an opportunity to examine two species of marine fish, *Halichoeres poecilopterus* and *Sebastes schlegeli*, in Korea. Having studied this material, we recovered two species of the copepod parasites: *Neobrachiella incurva* (Shiino 1956) (Siphonostomatoida, Lernaeopodidae) and *Peniculus ostraciontis* Yamaguti 1939 (Cyclopoida, Lernaeidae). Both species were described for the first time in Korea.

## Materials and Methods

The fishes (*Sebastes schlegeli* and *Halichoeres poecilopterus*) examined for the copepod parasites were taken from Kamak Bay and Haklim finfish farming areas, the south coast

of Korea. The copepod parasites, *Neobrachiella incurva* and *Peniculus ostraciontis*, were removed from the gill of *Halichoeres poecilopterus* and fin of *Sebastes schlegeli*, respectively. All the parasites were fixed in 5% buffered formalin-seawater. For morphological observation the copepods were cleared in lactic acid and dissected on wooden slides as used by Humes and Gooding (1964). Drawings were made with the aid of a drawing tube. Body structures are described according to the terminology of Kabata (1979).

## Results and Discussion

The classification of these two species of copepods is listed as follows:

Suborder Siphonostomatoida Latreille, 1829

Family Lernaeopodidae Edward, 1840

*Neobrachiella incurva* (Shiino, 1956)

Suborder Cyclopoida Sars, 1886

Family Lernaeidae Cobbold, 1879

*Peniculus ostraciontis* Yamaguti, 1939

### 1. *Neobrachiella incurva* (Shiino, 1956)

#### Material examined.

Two females from the gills of 4 fishes, *Halichoeres poecilopterus* (Temminck and Schlegel) were taken from Kamak Bay, by J.I. Choi of South Sea Fisheries Research Institute, 11 July 1994.

#### Description.

Female: Body (Fig. 1A) consisting of a long, cylindrical cephalothorax, subcylindrical trunk. Cephalothorax separated from trunk by a distinct groove with carapace. Trunk slightly depressed, with a pair of posterior processes and a minute genital process; no abdomen or caudal ramus. Egg sacs cylindrical, about as long as trunk.

Antennule (Fig. 1B) 3-segmented, composed of swollen basal and cylindrical succeeding joints; first segment with a single subterminal spine and third segment tipped by 4 spines, of which the one spine lengthened. Antenna (Fig. 1C) turned inward, with apices meeting on mid line, biramous; endopod 2-segmented with 3 spines, of which the two

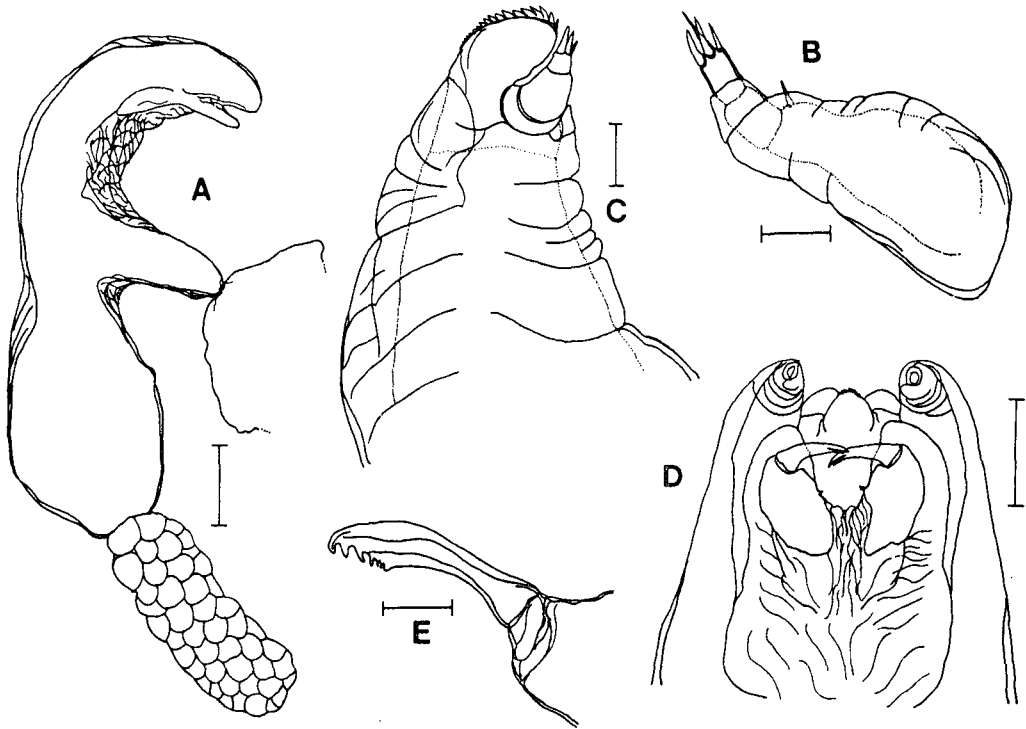


Fig. 1. *Neobrachiella incurva* (Shiino, 1956), female : A, habitus ; B, first antenna ; C, second antenna ; D, first and second maxilliped ; E, mandible. Scale bars : A=0.5 mm ; B-C, E=0.025 mm ; D=0.2 mm.

spines thick, conical ; exopod triangular, with dorsal margin covered by rows of pointed papillae. Labrum (Fig. 2B) triangular, labium (Fig. 2A) semicylindrical, both fringed with hairy marginal lamella.

Mandible (Fig. 1E) with 2 primary, 1 secondary, and 4 basal teeth. Maxillule (Fig. 2A) deeply bifurcate ending in acuminate spines, and with a rudimentary outer spine ; palp rod-shaped, with 2 short spines. Maxilla (Figs. 1D, 2D) fused with an anchoring device, known as the bulla ; the bulla, produced in the frontal region of the cephalothorax, has as its precursor the frontal filament ; inserted into the tissues of the host. First maxilliped (Fig. 1D) long, united only at their tips, and without bulla ; displaced toward posterior end of cephalothorax to which they stand at right angles ; completely separated from each other. Second maxilli-

ped (Figs. 1D, 2C) usual form, close to mouth ; terminal claw with two accessory spines on inner margin and with short blunt spine at base. Conical genital process (Fig. 2E) present, flanked by prominent posterior process, ventral to egg sacs.

#### Remarks.

Original description (Shiino, 1956) lacked sufficient details and no redescription followed. It was necessary, therefore, to redescribe this species in detail. The most distinct feature of *Neobrachiella incurva* are bipartite of maxillule, 2 ventro-posterior processes and conical genital process.

The genus *Neobrachiella* was established to accommodate species previously placed in *Brachiella*. *Neobrachiella* received also species of *Parabrachiella*, *Probrachiella*, *Epibrachiella* and *Brachiellina* (Kabata, 1979). The taxonomic history of *Neobrachiella* (Pa-

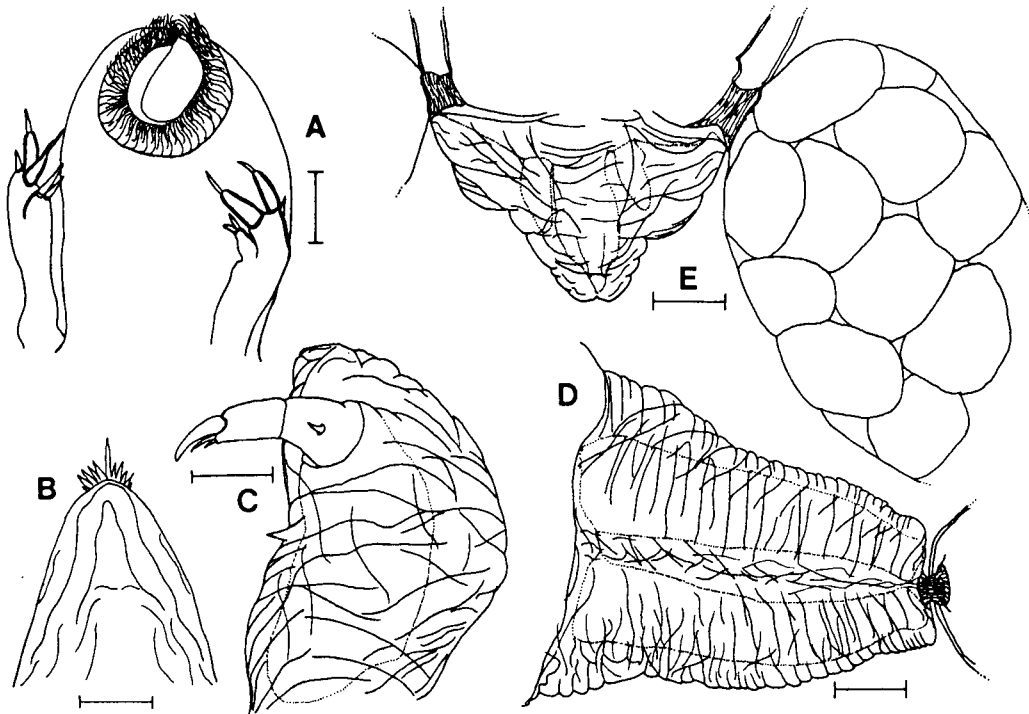


Fig. 2. *Neobrachiella incurva* (Shiino, 1956), female : A, labium and first maxilla ; B, labrum ; C, second maxilliped ; D, second maxilla ; E, genital process. Scale bars : A–B=0.025 mm ; C=0.05 mm ; D–E=0.2 mm.

*rabrachiella*) *incurva* involved only one change of the generic status.

The present species was first reported from *Kyphosus lembus* at the Inland Sea of Japan. This is the new host record of *Halichoeres poecilopterus*. Resembling in many respects of original species, the present species differs from it in having a rudimentary outer spine of the maxillule.

2. *Peniculus ostraciontis* Yamaguti, 1939

Material examined.

Four females from the pectoral fins of 3 fishes, *Sebastes schlegeli* were taken from Haklim finfish farming area, by H.S. Choi of Chungmu Laboratory, 14 July 1993. Five females from the same host fish from Kamak Bay, 26 October 1993.

Description.

Female : The body (Fig. 3A) cylindrical, but not segmented : first thoracic segment fused with head, more or less distinctly separated from head ; second and third thoracic segments narrowed, forming a short of neck. Fourth segment swollen, fused with genital segment, forming a trunk. Egg strings (Fig. 3A, 3B) much longer than the trunk, containing uniserial flattened eggs. Abdomen (Fig. 4G) inserted between the caudal rami a little. Tiny caudal rami (Fig. 4G) present just inside the projections terminate in six non-plumose setae. Antennule located just outside the second antenna, reduced to a mere knob. Antenna (Fig. 3C) placed at the fore end of the head, composed of columnar peduncle and internally curled apex which wrapped by chitinous tubercle secreted from fin ray bone. Oral tube (Figs. 3D, E) arises

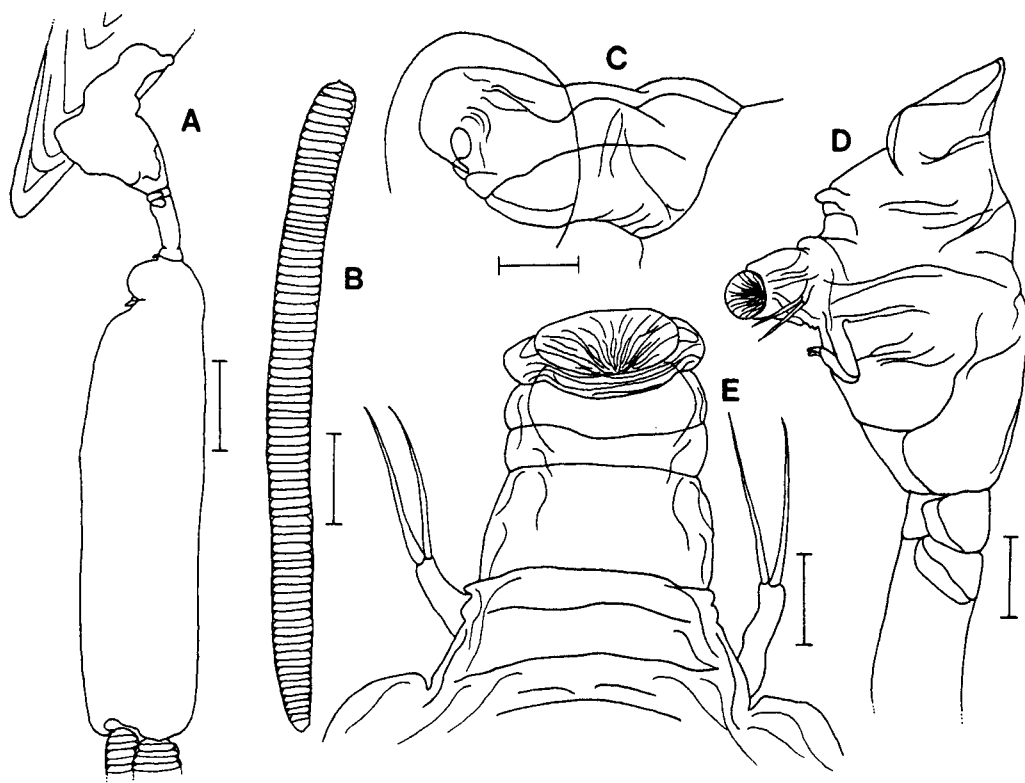


Fig. 3. *Peniculus ostraciontis* Yamaguti, 1939, female : A, habitus ; B, egg strings ; C, second antenna ; D, anterior part ; E, oral appendages. Scale bars : A-B=0.5 mm ; C, E=0.03 mm ; D=0.1 mm.

from the ventral face of the head close to the fore end and directed forward. Mandible (Fig. 4A) toothed at tip. Maxillule (Figs. 3E, 4B) represented by two setae lie just outside the base of oral tube. Maxilla (Figs. 3D, 4C) unciniate, terminating in 2 blunt recurved claws. All pairs of legs (Figs. 4D, E, F) retain protopodite, having rami entirely lost. The protopodite carries an unguiform process at outer angle, and indistinct fissures on both dorsal and ventral faces, extending from outer angle inwards. First two pairs of legs overlapping upon one another, whereas the rests isolated from the others, and the fourth placed some distance behind the fore end of the trunk. First two legs more or less rhombic in shape, of which the second somewhat larger. Last two legs fusiform. All of them spin-  
 eless.

**Remarks.**

*Peniculus ostraciontis* was first reported from *Ostracion gibbosum* at the Pacific coast of Japan (Yamaguti, 1939). It was found again from *Rhinesomus concatenatus*, Sagami Bay (Shiino, 1959). This is the third report of this species from *Sebastes schlegeli* in the Korean waters. *P. ostraciontis* is easily identified by the body shape, antenna, and fused trunk. The Korean fish, *S. schlegeli* should be considered as an additional host of this species because *P. ostraciontis* were recovered from Kamak Bay and Haklim finfish farming area. Resembling in many respects of original species, the present species differs from it in having 2 blunt recurved claw.

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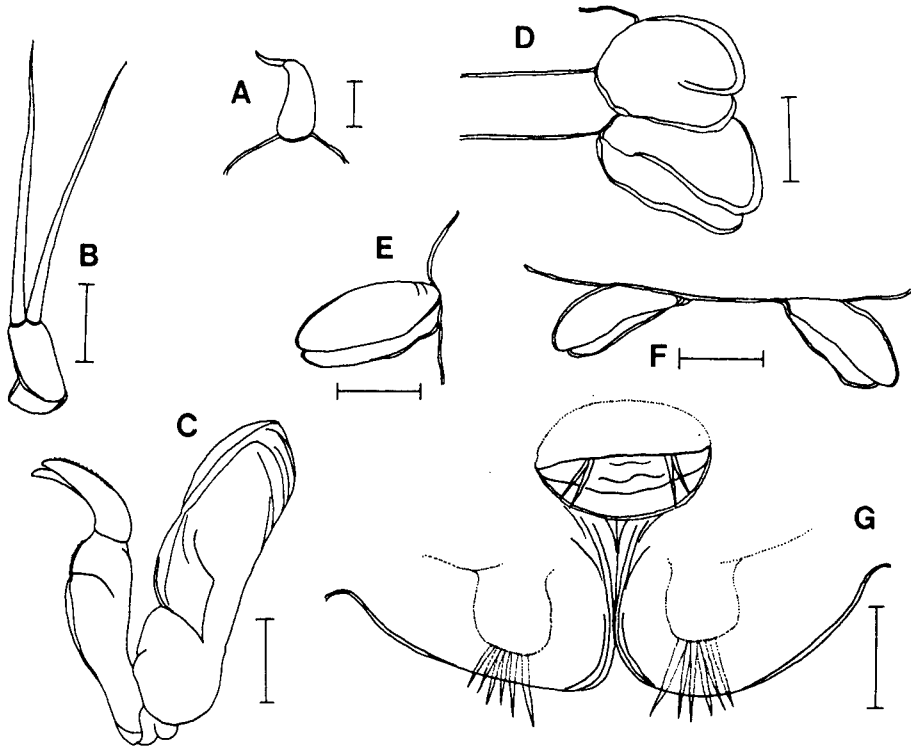


Fig. 4. *Peniculus ostraciontis* Yamaguti, 1939, female : A, mandible ; B, first maxilla ; C, second maxilla ; D, first and second legs ; E, third leg ; F, fourth leg ; G, posterior median part. Scale bars : A=0.01 mm ; B-C=0.02 mm ; D-F=0.05 mm ; G=0.025 mm.

ction of *Peniculus ostraciontis* from the fins of *Sebastes schlegeli*, and J. I. Choi of South Sea Fisheries Research Institute for providing us with collection of *Neobrachiella incurva* from the gills of *Halichoeres poecilopterus*. Thanks are also given to Y. G. Noh and Y. C. Park, South Sea Fisheries Research Institute, for various levels of support in laboratory

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