TWO NEW SPECIES OF NOTHOBOMOLOCHUS (COPEPODA : BOMOLOCHIDAE) FROM KERALA

M. SHAHUL HAMEED AND K. ASOK KUMAR

Department of Industrial Fisheries, Cochin University of Science and Technology, Fine Arts Avenue, Cochin - 682 016

ABSTRACT

Two new parastic copepods Nothobomolochus trichiuri from the gill arches of the ribbonfish Trichiurus savala and N. sigani from the branchial cavity of Siganus oramin are described with illustrations in this communication.

INTRODUCTION

DURING the course of a detailed survey of the copepods parasitic on the marine fishes of the Kerala Coast, one of the authors (M.S.H.) obtained two new species belonging to the genus Nothobomolochus Vervoort. Nothobomolochus trichiuri sp. nov. was collected from the gill arches of Trichiurus savala Cuvier and Nothobomolochus sigani sp. nov. was obtained from the branchial cavity of Siganus oramin (Bloch and Schneider) at Trivandrum. Detailed study of the species revealed that they are new and the two new species are described in this paper in detail with illustrations comparing with all the related species in this genus.

The authors are grateful to Dr. N. Krishna Pillai, former Professor, Department of Aquatic Biology and Fisheries, Trivandrum for his encouragement in this study and to Dr. C. T. Samuel, Professor and Head of the Department of Industrial Fisheries, Cochin for providing facilities to carry out the work.

DESCRIPTION

Vervoort (1962) revised the genera and species of Bomolochidae and gave a detailed description of known and new species. To accommodate ten known and new species of Bomolochidae created the genus Nothobomolochus. The present paper adds two more species N. trichiuri and N. sigani.

Nothobomolochus trichiuri sp. nov. (Fig. 1 and 2)

Material examined: Two females were collected from the gill arches of Trichiurus savala Cuvier at Trivandrum. The holotype female will be deposited in the Indian Museum, Calcutta, India.

Female: Carapace (Fig. 1 a) roughly semicircular, broader than long, its antero-median part deeply incised, with a shallow incision on either side. Second trunk segment narrower than carapace, its hind border concave and lateral borders rounded. Third segment transversely ovate, longer than second and almost completely hiding the fourth segment in dorsal view. Fourth segment very narrow, fifth segment broader than fourth. Genital segment swollen, broader than long. Abdomen three-segmented first segment longest, second and third segments subequal in length, latter narrowed distally. Anal laminae as long as second and third abdominal segments combined, with a long stout apical and three small setae.

First antenna (Fig. 1 b) with a chitinous plate on the basal segment carrying three stout spines, first spine (Fig. 1 c) comparatively slender and short, apically strongly curved, second and third spines chitinised, second with spines. Mandible (Fig. 1 e) with two unequal blades, distal blade comparatively long and winged beyond the middle. First maxilla (Fig. 1 f) with four plumose setae. Basal segment of second maxilla (Fig. 1 g) stout and long, second segment short, with two spiny blades and a spine. Second segment of maxilliped (Fig. 1 h) roughly rectangular



Fig. 1. Nothobomolochus trichiuri sp. nov. - female: a. dorsal view; b. First antenna;
c. First antenna base - dorsal view; d. Second antenna; e. Mandible; f. First maxilla; g. Second maxilla; h. Maxilliped and i. First leg.

longer than third, apically slightly curved outwards, third spine also apically pointed. There are three modified setae of which the middle one is longest. Basal segment of second antenna (Fig. 1 d) as long as distal, with a distal lower seta, second segment short. Terminal segment roughened, with longitudinal rows of denticles, distally carrying four long claws and one short claw and a fingershaped process in shape, with three setae, claw strongly curved and without accessory process.

Rami of first leg (Fig. 1 i) three-segmented, endopod highly flattened, exopod comparatively narrow. Basipod of legs two to four two segmented. Endopod of second leg (Fig. 2 a) broad and longer than exopod, with two short winged spines on the terminal segment, first and second exopod segments with one each and third with four outer spines one and six alike, with a distal spinule, others toothed externally and each with subapical spinule. instead of four in the second leg. Fourth leg (Fig. 2 c) smaller than third, endopod longer than exopod, first two segment with a very long middle pectinate spine and two short



Fig. 2. Nothobomolochus trichiuri sp. nov. - female: a. Second leg; b. Third leg; c. Fourth leg and d. Fifth and sixth leg.

Rami of third leg (Fig. 2 b) equal in length, armature of spines similar to that of second leg except for the distal segment of the exopod which carries only three toothed spines blunt spines. Spines on exopod similar to those on third leg. Basal segment of fifth leg (Fig. 2 d) short, with a seta, distal segment with three apical spines of which one is long, an

ć

outer spine and two patches of spinules. Sixth leg represented by a group of three very small setae. Total length 2.0 mm.

Remarks: Of all the species of Nothobomolochus hitherto recorded N. cypseluri (Yamaguti, 1953) is closest to the present species. This resemblance is particularly evident in the structure of the first antenna. In both species as the cephalothorax, while it is only slightly narrower than the cephalothorax in N. trichiuri. In N. trichiuri the fourth segment is partially visible in the dorsal view while it is completely hidden in N. cypseluri. The fifth segment of N. trichiuri is comparatively broader than in N. cypseluri. The two species can further be distinguished by the armature of the legs. In N. cypseluri the spines arming the



Fig. 3. Nothobomolochus sigani sp. nov. - female: a. dorosal view; b. First antenna; c. First antenna spinous process; d. Second antenna; e. Mandible; f. First maxilla; g. Second maxilla; h. Maxilliped and i. First leg.

the chitinised plate of the basal segment of the first antenna carries three spines of which the first is comparatively very small and the other two are long and subsimilar. Just outside this chitinous plate there are three long sensory seate of which the middle seta is the longest. But judging from the figure published by Yamaguti the second trunk segment of N. *cypseluri* is very narrow, about half as broad exopod of legs two to four smooth, but prominently denticulated in *N. trichluri*.

Nothobomolochus sigani sp. nov. (Fig. 3 and 4)

Material examined: Two females were collected from the branchial cavity of Siganus oramin (Bloch and Schneider) at Trivandrum. The holotype female will be deposited in the Indian Museum, Calcutta, India.

Female: Carapace (Fig. 3 a) nearly twice as broad as long, its antero-median part deeply ment. Fifth segment much broader than long. Genital segment enlarged, equal in length and width, much longer than the fifth segment. Abdomen short, three-segmented, segments subequal in length. Anal laminae twice as



Fig. 4. Nothobomolochus sigani sp. nov. - female: a. Second leg; b. Third leg; c. Fourth leg and d. Fifth leg.

incised, with a shallow incision on either side. Second trunk segment much narrower than carapace, its hind border concave. Third segment transversely ovate, longer than second and completely overlapping the fourth seg-

long as broad, with a long stout apical seta.

First antenna (Fig. 3 b) with a very prominent chitinous plate on the basal segment carrying three stout processes, middle process (Fig. 3 c) strong and curved at the tip, others pointed and rugose, there are two modified setae. Basal segment of second antenna (Fig. 3 d) long, second segment short, with a seta, terminal segment fairly stout, with tubercles, and produced into a linguiform process, its distal border bearing five claws and a toothed blunt process. Mandible (Fig. 3 e) with a fairly long base, blades unequal, apical blade stout, accessory blade small and curved distally. First maxilla (Fig. 3 f) with four plumose setae, two of them long. Basal segment of second maxilla(Fig. 3 g)stout and long, second segment small, with two barbed blades. Second segment of maxilliped (Fig. 3 h) rather massive, with two distal plumose setae, claw strongly curved and carrying an accessory process.

Rami of first leg (Fig. 3 i) three-segmented, endopod very much flattened, exopod narrow. Basipods of legs two to four two segmented Rami of second leg (Fig. 4 a) nearly equal in length, endopod with two short winged spines, on the terminal segment, exopod with six spines, first five spines winged, each bearing a subapical spinule, sixth spine short, curved and blunt, with a flange and an apical spinule. Rami of third leg (Fig. 4 b) like those of second, spines on third segment of endopod pointed; exopod with five subequal spines similar to those on second leg. Endopod of fourth leg (Fig. 4 c) slender, first two segments with an outer long pectinate seta, terminal segment with one very long and two short winged spines. Basal segment of fifth leg (Fig. 4 d) short, with a seta, distal segment with a long spine - seta and three pectinate spines and patches of spinules. Sixth leg represented by a group of three very small setae. Total length 1.5 mm.

Remarks: This species closely resembles N. denticulatus (Basset-Smith, 1898) as redescribed by Pillai (1965). The similarity is particularly evident in the presence of a large third thoracic segment which completely overlaps the fourth segment and in the presence of a stout chitinous plate on the first antenna carrying three characteristic processes of which the middle one is apically curved Nevertheless N. sigani differs backwards. from N. denticulatus in the armature of the spines arming the exopod of legs two and three. In N. denticulatus the endopod of leg two is broader than in N. sigani. Further the maxilliped of N. sigani carries an accessory claw which is lacking in N. denticulatus.

REFERENCES

BASSET - SMITH, P. W. 1898. Further new parasitic. copepods found on fish in the Indo-tropical region-Ann. Mag. Nat. Hist., 2 (7): 77 - 98.

PILLAI, N. K. 1965. Copepods parasitic on South Indian fishes. Family Bomolochidae. J. Bombay Nat. Hist. Soc., 62: 38-55. VERVOORT, W. 1962. A review of the genera and species of the Bomolochidae (Crustacea, Copepoda) including the description of some old and new speices. Zool. Verhand., 56: 1-111.

YAMAGUTI, S. 1963. Parasitic Copepoda and Branchiura of fishes. Interscience Publishers, New York, 390 pp.