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Description of a new *Nipergasilus* species (Family: Ergasilidae) from the gills of grey mullet

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Abstract

A new *Nipergasilus* species is described from the gills of the grey mullet *Valamugil cunnesius* from several localities in India and Pakistan. The new species is closely related to *Nipergasilus bora* (Yamaguti, 1939) which is also recorded here on three species of grey mullet. The genus *Nipergasilus* is redefined in order to accommodate the second species.

Introduction

Nipergasilus bora was first described by Yamaguti (1939) from *M. cephalus* Linnaeus collected in Japan. Since that time, it has been recorded on the same host from Japan (Yin, 1956; Ho & Do, 1982) and on this, plus four other species of grey mullet (*Liza aurata* (Risso), *Liza ramada* (Risso), *Liza saliens* (Risso) and *Chelon labrosus* (Risso)) from many localities around the Mediterranean (Paperna & Lahav, 1971; Ben Hassine & Raibaut, 1979; Braun, 1981; Radujkovic, 1982; Ben Hassine, 1983). Here we report *N. bora* from three grey mullet species at localities from Egypt to Japan. In addition, a second species of *Nipergasilus* was found on *Valamugil cunnesius* (Valenciennes) from India. The discovery of this species necessitates considerable revision of the generic diagnosis of *Nipergasilus*, which was formerly based largely on the modification and enlargement of the fifth pedigerous somite.

Materials and methods

The material was collected from the gills of grey mullet deposited in the fish collections of the NHM, London. The copepods were removed from the gills and examined as temporary preparations in lactophenol on an Olympus BH2 equipped with Differential Interference Contrast. Measurments were made with an ocular micrometer and drawings were made with the aid of camera lucida.

Nipergasilus Yamaguti 1939
Nipergasilus bora (Yamaguti, 1939)

Synonyms
Ergasiloides bora Yamaguti, 1939
Yamagutia bora (Yamaguti, 1939): Fryer, 1956.

Present Records
Two females recorded on *Valamugil cunnesius* from Mangalore, India; one female on *Mugil cephalus* from Tsu Shima, Japan; 15 females on *Liza saliens* from Lake Burullus, Egypt.

Remarks

This species was well described previously by Yamaguti (1939), Ben Hassine (1983) and, especially, Ho & Do (1982). No supplementary description is required.

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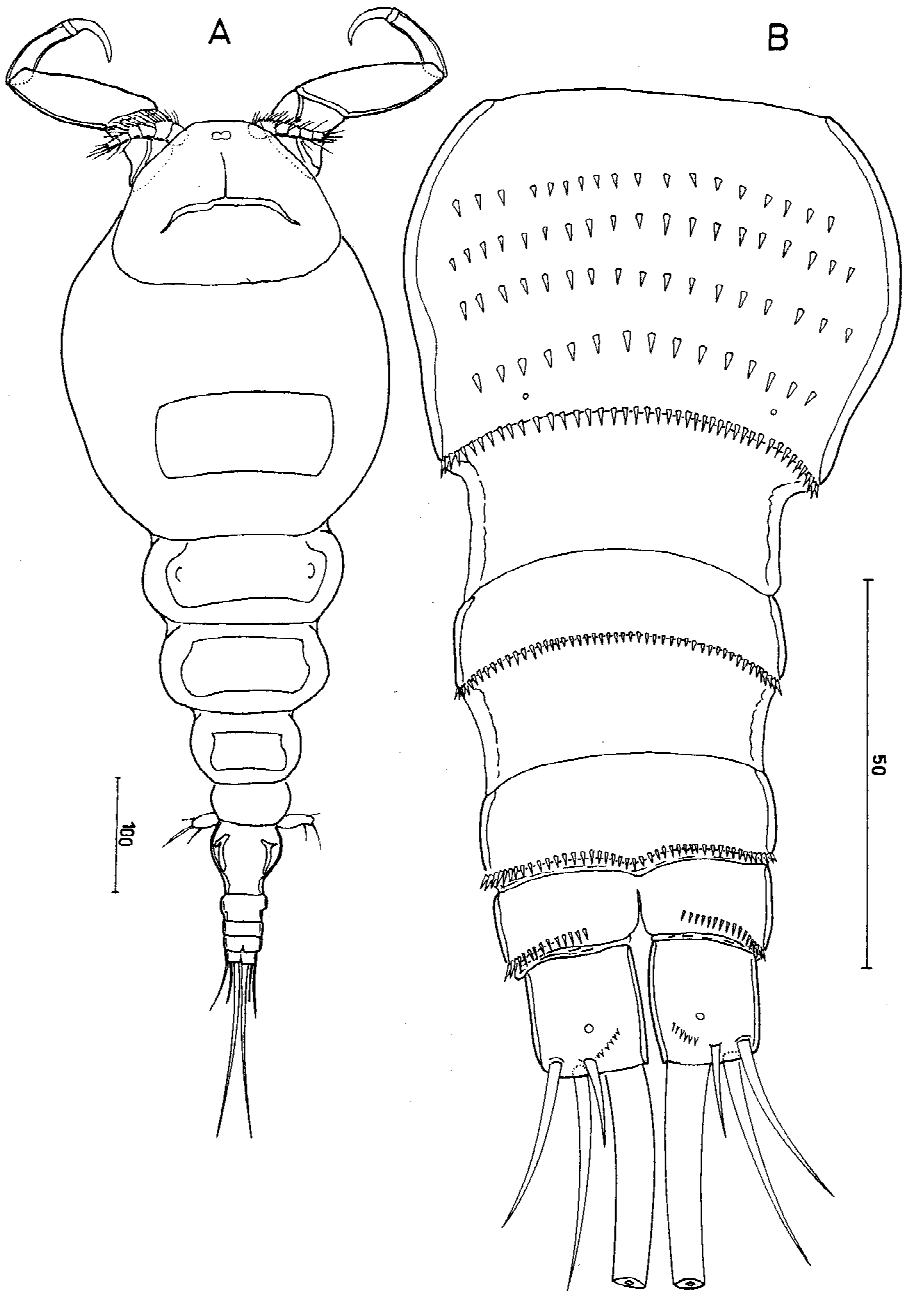

Figure 1. N. parabora n. sp. Adult female. (A) dorsal view; (B) urosome. Scale bars in μm.

Nipergasilus parabora n. sp. (Figures 1–4)

Material examined:

Holotype, BMNH Reg. No. 1999. 1443; paratypes, BMNH Reg. Nos. 1999. 1444–1451, eight females. Collected from *Valamugil cunnesius* caught at Orissa in India and at Sind (Karachi) in Pakistan.

Etymology

The specific name refers to the similarity to *Nipergasilus bora* in the form of the swimming legs.

Description

Adult female, Cephalothorax oval-shaped and slightly produced anteriorly (Figure 1A). Rostrum small, triangular and ornamented with four sensillae and central

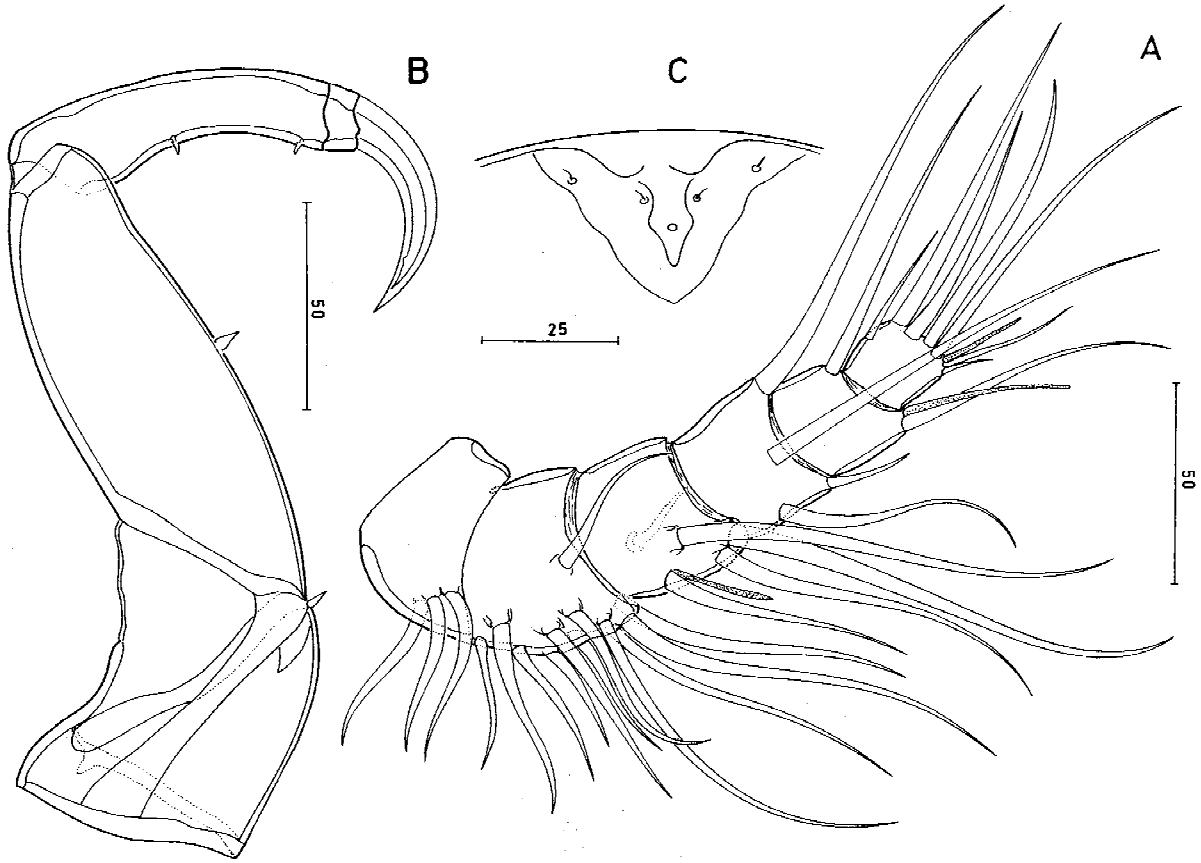

Figure 2. N. parabora n. sp. Adult female. (A) antennule; (B) antenna; (C) rostrum. Scale bars in μm.

integumental pore (Figure 2C). Mean body length 0.65 $\pm$ 0.05 mm, mean body width 0.25 $\pm$ 0.03 mm (n = 7). Dorsal surface of cephalic shield ornamented with inverted T-shaped marking. First pedigerous somite incorporated into cephalothorax and indicated by dorsal tergite. Free second to fourth pedigerous somites narrowing posteriorly. Fifth pedigerous somite (Figures 1A and 3E) smaller than fourth, but not as reduced as typical for *Ergasilus* species.

Urosome modified by extension and thickening of cuticle between genital double-somite and first free abdominal somite, and between first and second free abdominal somites. Genital double-somite (Figure 1B) barrel-shaped, wider than long; ornamented with four rows of spinules on ventral surface. First and second free abdominal somites broad, each ornamented with row of spinules posteriorly marking original somite boundary. Anal somite slightly smaller than preceding somite, deeply incised and armed with paired spinule rows. Caudal rami 1.4 times longer than anal somite, ornamented with row of minute spinules ventrally.

Antennule (Figure 2A) six-segmented; setal formula 3, 12, 5+aesthetasc, 4, 2+ae, 7+aesthetasc. Antenna four-segmented (Figure 2B) with short coxobasis bearing small seta; first endopodal segment robust, nearly 1.5 times longer than coxobasis, armed with peg seta midway along inner margin. Second endopodal segment short, with minute setal elements proximally and distally on concave margin. Second plus third endopodal segments together comprising nearly three-quarters length of first endopodal segment. Curved terminal claw nearly three-quarters length of second and third segments.

Mouthparts (Figure 3A–C), mandible unsegmented, bearing anterior, mid and posterior blades: anterior blade small, with teeth on anterior margin; mid and posterior blades with teeth on posterior margin. Maxillule lobate bearing two outer setae and small process medially. Maxilla consisting of large syncoxa tapering distally and small spatulate basis, armed an-

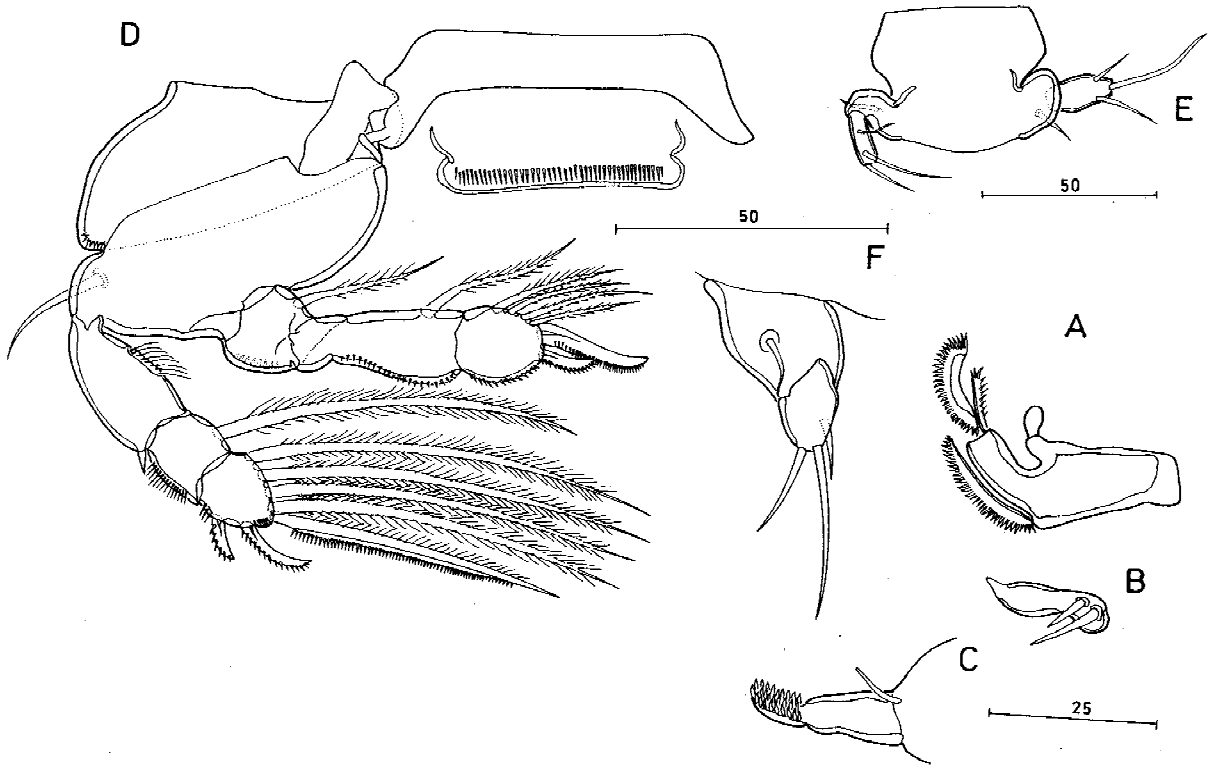

Figure 3. N. parabora n. sp. Adult female. (A) mandible; (B) maxillule; (C) maxilla; (D) first swimming leg with interpodal plate, anterior; (E) fifth pedigerous somite with the fifth swimming leg, anterior; (F) fifth swimming leg, posterior. Scale bars in μm.

teriorly with rows of sharp teeth; naked seta present near origin of basis.

Swimming legs 1–3 (Figures 3D and 4A) with all rami 3-segmented; leg 4 (Figure 4B) with both rami 2-segmented. Basis with row of spinules along inner margin in legs 2–4 and with outer seta on posterior surface in all legs. Lateral margins of both rami of leg 1 spinulate. Setules present on inner margin of first exopodal segment of all legs. Setules present on outer margin of endopodal segments of legs 2 to 4. First endopodal segment of leg 1 small and wide, second segment elongate. Posterior margin of interpodal plates of legs 1–3 ornamented with slender spinules (Figure 3D). Spine and seta formula as follows:

	Coxa	Basis	Exopod	Endopod
Leg 1	0–0	1–0	I-0; 0-1; II,5	0-1; 0-1; II,4
Leg 2	0–0	1–0	I-0; 0-1; 6	0-1; 0-1; I,4
Leg 3	0–0	1–0	I-0; 0-1; 6	0-1; 0-1; I,4
Leg 4	0–0	1–0	I-0; 5	0-1; I,4

Leg 5 two-segmented; protopodal segment well developed with outer seta; free exopodal segment small, armed with small lateral seta and two longer distal setae (Figure 3E, F).

Remarks

The new species is closely related to *Nipergasilus bora*. It shares with *N. bora* the following characteristics: a small antenna, the wide protopod and small free exopod of leg 5, the setation of legs 1 – 4, the two-segmented endopod of leg 4 and the unusual elongation of the second endopodal segment of leg 1. Until the discovery of this new species, all these characters were regarded as characteristic of the monotypic genus *Nipergasilus*, together with the strongly modified body segmentation around the fifth pedigerous somite. The occurrence of these characters in the new species, which has a relatively unmodified body, necessistates revision of the generic diagnosis of *Nipergasilus*.

Revised diagnosis of *Nipergasilus*

Cephalothorax with first pedigerous somite more or less defined. Antennal area set off from cephalothorax.

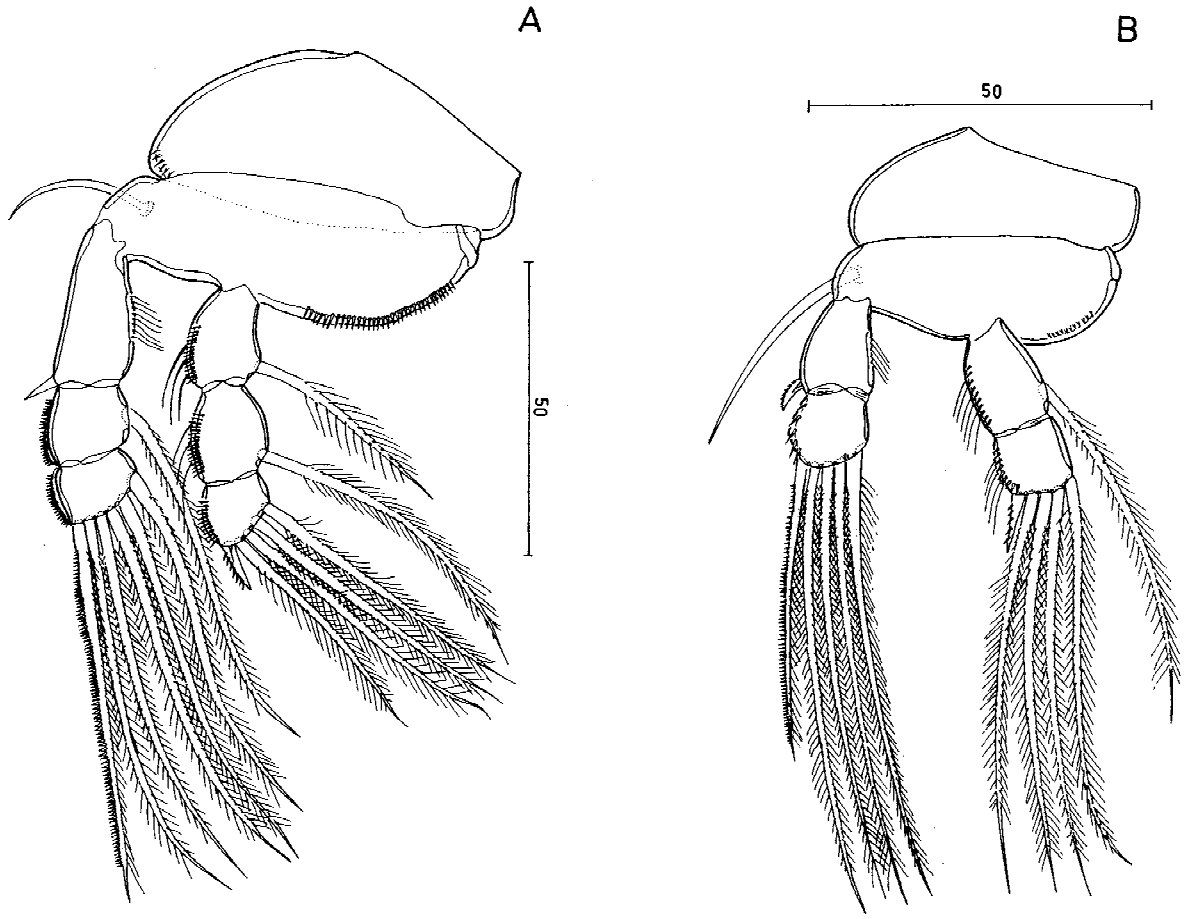

Figure 4. N. parabora n. sp. Adult female. (A) second swimming leg, anterior; (B) fourth swimming leg, anterior. Scale bars in μm.

Fourth and fifth pedigerous somites either completely fused to form large unit or separate. Antennule six-segmented, setal formula 3, 12, 5+ aesthetasc, 4 2+ aesthetasc, 7+ aesthetasc. Antenna composed of coxobasis and three-segmented endopod plus terminal claw. First endopodal segment of leg 1 broad and small, second segment elongate and narrowing proximally. Endopod of leg 4 two-segmented. Leg 5 with broad protopodal segment bearing posterior seta and small free exopod armed with small lateral and two distal setae.

Type Species: *Ergasiloides bora* Yamaguti, 1939.

Acknowledgements

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