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Fish parasitology

A NEW SPECIES OF *MUGILICOLA* TRIPATHI, 1960 (CRUSTACEA)
COPEPODA, THERODAMASIDAE) PARASITIC ON IRAQI FISH

NOWY GATUNEK *MUGILICOLA* TRIPATHI, 1960 (CRUSTACEA, COPEPODA)
THERODAMASIDAE) PASOŻYTUJĄCY NA IRACKIEJ RYBIE

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&

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Female of parasitic copepod *Mugilicola kabatai* sp. nov. is described in detail, based on the material collected from Iraqi mugilid fish *Liza abu*. The new species differs from the other three, known species of *Mugilicola* mainly in the shape of the "trunk" and also in the proportions of the body as well as in the armature of legs and first antenna.

In a course of study on parasite fauna of a common Iraqi mugilid fish *Liza abu* (Heckel, 1843) carried out by two of the present authors (NRK & FTM), a very interesting and unusual copepod was found. Detailed examinations conducted in the Museum für Naturkunde in Berlin by one of the present authors (WP) revealed that the parasite should be accommodated in the family *Therodamasidae* Tripathi, 1960. The family contains three genera: *Therodamas* Kroyer, 1963, *Paëonodes* Wilson, 1944 and the most recent: *Mugilicola* Tripathi, 1960. There have been three species of the latter genus described so far.: *M. bulbosa* Tripathi, 1960; *M. smithae* Jones & Hine, 1978, and *M. australiensis* Boxshall, 1986. General and detailed differences between the newly found copepod and already known ones empowered the present authors to describe it as a new species.

The specimens were cleared with lactic acid, stained with lignin pink (Deets, G. - pers. comm.) and examined, whole and dissected using the method of the "wooden slide" (Humes & Gooding, 1964). Drawings were made using Zeiss-Jena microscopes with drawing tubes. The terminology follows that proposed by Kabata (1979). To facilitate description, however, some practical terms are used.

Mugilicola kabatai sp. nov.

(Figs. 1–25)

Material examined:

Nine female individuals. In this number 6 ovigerous females, 1 non ovigerous female and 2 anterior parts ("head" & "neck") of other specimens. Out of the total number, 3 ovigerous females were without "heads". Cephalothoraces of the parasites were embedded in host tissue. Around them a tight connective tissue capsule developed as a defense response of the host (Figs. 11, 12). In addition to the above – mentioned individuals studied microscopically, the head of an infested fish with intact other specimens of this species was examined macroscopically. Types were deposited in the Museum für Naturkunde in Berlin, Germany (Holotype: ZMB Crust. 26 934; paratypes: ZMB Crust. 26 935 and ZMB Crust. 26 936).

Host:

"Khishni" – *Liza abu* (Heckel, 1843) (Pisces, *Mugilidae*) syn. *Mugil abu* Heckel, 1843; *Mugil hishni* Misra in Hora & Misra, 1943 and (?) *Mugil pseudotelestes* Pietschmann, 1912 (Coad 1991).

1 female, total length 13.5 cm.

Habitat:

Gill arches and the upper roof of the buccal and pharyngeal cavities

Locality:

Abu-Ai-Khaseb Creek, one of the western side branches of Shatt-Al-Arab River, about 20 km south of Basrah City, Southern part of Iraq. The exact date of the collection unknown.

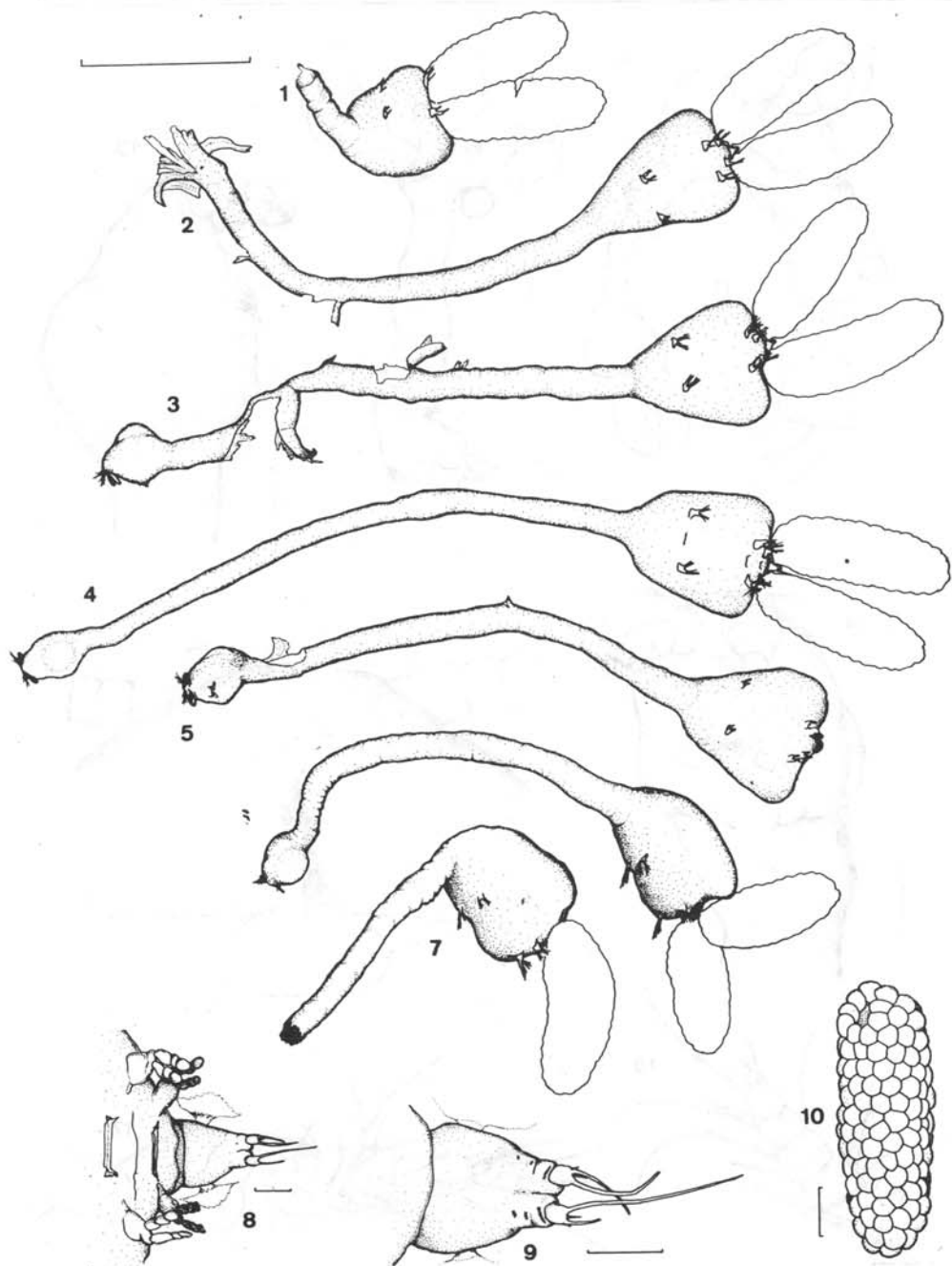
Etymology:

The specific name of the copepod is intended to honour Dr. Z. Kabata.

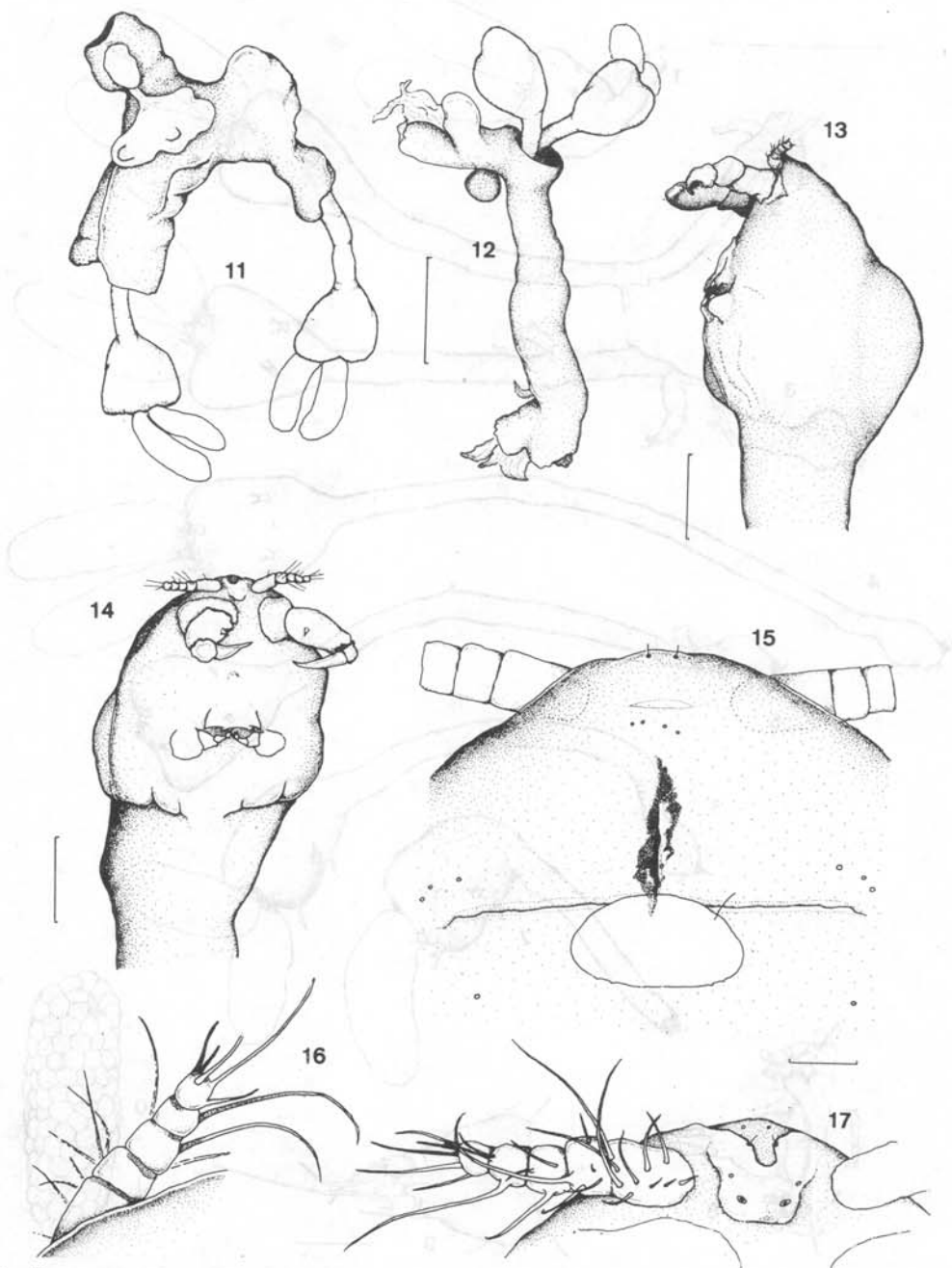
Description:

Female (Figs. 1–25):

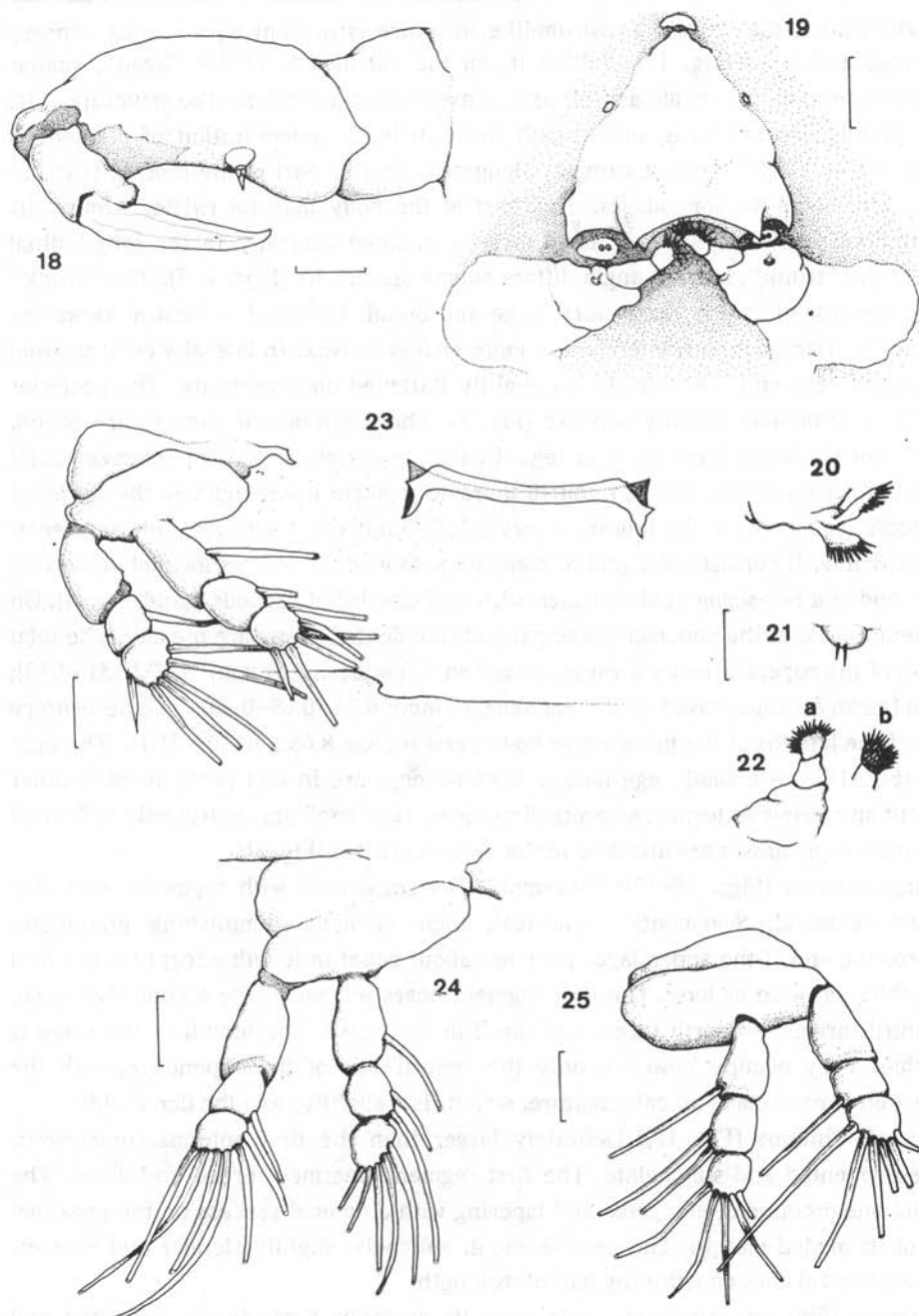
The body consists of three strictly delimited major parts: "head", "neck", and "trunk". Segmentation is almost completely lost. The "head" comprising segments of cephalothorac is irregularly ovoid in its shape (Fig. 14) with prominent swelling on its dorsal side (Fig. 13), but this element cannot be considered as a holdfast. On the



Figs. 1-10. *Muglicola kabatai*, females: 1-7, general view; 8. posterior end of the body, ventral (setae of thoracopods omitted); 9. genital complex and abdomen with uropods, ventral; 10. egg sac (4, 8-10, holotype).
Scale bars: 1 mm in 1-7; 0.1 mm in 8; 0.2 mm in 10; 0.05 mm in 9.



Figs. 11–17. *Mugilicola kabatai*, female: 11–12, females with their anterior parts covered with connective tissue capsules of host's body; 13, cephalothorax, lateral; 14 cephalothorax, ventral; 15, anterior part of cephalothorax, dorsal; 16, first antenna dorsal; 17, first antenna and frontal area of cephalothorax, ventral (13–17, holotype). Scale bars: 1 mm in 11, 12; 0.1 mm in 13, 14; 0.02 mm in 15, 16, 17.



Figs. 18–25. *Mugilicola kabatai*, female: 18, second antenna medial; 19, oral area ventral, with labrum, first maxillae and second maxillae visible; 20, mandible; 21, first, maxilla anterior; 22, second maxilla a – three distal segments, ventral, b – terminal segment, dorsal; 23, first leg, with interpodal bar, ventral; 24, second leg ventral; 25, third leg ventral (19–holotype). Scale bar: 0.02 mm.

anterior end of the "head" a rostrum-like structure is present with minute sensory openings and hairs (Fig. 17). Behind it, on the dorsal side of the "head", similar sensory openings are visible as well as a convex transparent lens-like structure (Fig. 15). Slightly forward to it, underneath the cuticle, a concentration of pigment is located. The "neck" being a strongly elongated anterior part of the thorax, is cylindrical and bears no appendages. This part of the body may be twisted around its longitudinal axis (Figs. 4-6). It may also be inclined ventrally to the longitudinal axis of the "trunk", but the angle differs among specimens (Figs. 1-7). The "trunk" being the rest of the thorax is very large and broad. In dorsal or ventral views the "trunk" is triangular with lateral sides more or less convex. In lateral view it is ovoid with blunt rear end. The "trunk" is slightly flattened dorsoventrally. The posterior margin is sometimes slightly concave (Fig. 1). The postrolateral corners are round. The "trunk" bears three pairs of legs. In their proximity traces of intersegmental boundaries are present. The last, fourth thoracic segment has no legs. In the center of the posterior margin of the thorax, a very small "hindbody" with retained segmentation is visible. It consists of a genital complex with oviduct orifices located dorsoventrally and of a two-segmented abdomen with well developed uropods (caudal rami). On the ventral side of the abdomen three pairs of fine denticle rows are present. The total length of the copepod (mean & range, based on 4 specimens, in mm): 4.17 (3.51-4.83); width (mean & range, based on 5 specimens, in mm): 0.74 (0.69-0.80). The percentage ratio of the lengths of the three major body parts is like: 8.65 : 70.20 : 21.15. The egg sacs (Fig. 10) are actually egg masses because eggs are in fact glued to each other without any visible external sac protecting them. The "sac" part exists only in limited area where egg masses are attached to the oviduct orifices (Fig. 8).

First antenna (Figs. 16-17): Uniramous, five-segmented with segments very distinctly delimited. Segments cylindrical, their diameter diminishing gradually towards the end of the appendage. They are about equal in length except for the first one which is twice as long. The first segment bears ten setae, the second five setae, the third three, the fourth three, and the fifth five setae. The length of the setae is variable. They occupy however, only the ventral side of the appendage, with the exception of one seta of apical armature, which rises slightly from the dorsal side.

Second antenna (Fig. 18): Definitely larger than the first antenna, uniramous, three-segmented and subchelate. The first segment unarmed, broad and short. The second one prominent, elongated and tapering with a conical process on the proximal half of its medial margin. The next segment, subchela, slightly slender and shorter, with a powerful claw constituting half of its length.

Labrum (Fig. 19): Triangular, with only its posterior part clearly delimited and armed with four sharply pointed teeth. Labrum veils the mouth opening and the mandibles.

Mandible (Fig. 20): Minute with two spatulate blades (rami ?) with their margins armed with spines.

First maxilla (Fig. 21): Very small, round, inflated swelling with two apical setae. Tightly inserted between the edge of the labrum and the second maxilla.

Second maxilla (Figs. 19, 22): Uniramous, obscurely four-segmented, with a robust first segment not clearly delimited from the basic surface. The second segment smaller, sharply tapering towards the next, round segment. This terminal segment has its anterior margin and dorsal side covered with spines (Fig. 22b).

Maxilliped: absent.

First leg (Fig. 23): Situated in the center of the "trunk" much more in its anterior half. Between the legs of this pair a well developed interpodal bar. Sympod two segmented without armament. Two rami, equal in length distinctly three segmented. The first segment of both exo- and endopod nearly two times longer than the subsequent ones.

Second leg (Fig. 24): Very similar to the first one. Situated in the posterior part of the "trunk" (Fig. 8). Interpodal bar well developed.

Third leg (Fig. 25): Very similar to the second and the first ones. Situated close to the posterior margin of the "trunk". Interpodal bar well developed.

Armature of the leg's rami (most of the elements were broken):

	Endopod			Exopod		
	1	2	3	1	2	3
Leg 1	1-0	1-0	5-I	0-0	1-0	5-I
Leg 2	1-0	2-0	4-I	0-0	1-0	6-0
Leg 3	1-0	2-0	4-I	0-0	1-0	5-I

No traces of legs posterior to the third pair were found.

Uropods (caudal rami) (Fig. 9): Each armed with two longer terminal setae and one short between them. Additionally a small seta is visible near the base of the lateral seta.

Male: Unknown.

DISCUSSION

Muglicola bulbosa Tripathi, the type species of the genus, was collected from *Mugil tade* Forsk, and *Mugil parsia* Ham. caught in a fish farm near Canning and in the Matla River (India). *Muglicola smithae* Jones & Hine parasitized elvers of *Anguilla mossambica* Peters from the Keiskamma River. South Africa, while *Muglicola australiensis* Boxshall inhabited gills of *Silago ciliata* Cuv. & Val. caught off Arrawarra Beach, New South Wales, Australia. The geographic separation of the *Muglicola* species as well as the diversity of their host's preferences is obvious. *Muglicola bulbosa* Tripathi appears

to be closest to *Muglicola kabatai* sp. nov. in this respect, since it has a related host and a relatively less remote geographic locality.

Muglicola kabatai differs from its congeners in the proportions of the body, in the shape of the "trunk" and in the armature of its legs. *Muglicola kabatai* differs from *Muglicola smithae* in the shape of its "head", the latter species having developed posterolateral trilobate processes, and in the setation of the first antenna. The new species differs from *M. bulbosa* in having a relatively longer and narrower "neck" and better separated "head" and "trunk". A definitely more distant separation of the "neck" from the "trunk" is a feature which differentiates *M. kabatai* from *M. australiensis*. It is worth to mention that the overall appearance of the new species resembles to a great extent *Paeonodes nemaformis* Hewitt, 1969, which is a representative of the same family. The resemblance is however only superficial, since *Paeonodes* has one more pair of biramous legs than *Muglicola*.

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STRESZCZENIE

Przedstawiono szczegółowy opis *Mugilicola kabatai*, nowego gatunku widłonoga, pasożytującego w jamie gębowej i skrzelowej irackiej ryby *Liza abu* (Heckel, 1843). Osobnik żywicielski pochodził z Abu-Al-Khaseb Creek, będącego jedną z gałęzi rzeki Shatt-Al-Arab w południowym Iraku. Opis nowego gatunku oparto na szczegółowych badaniach dziewięciu samic widłonoga. Cechy morfologiczne *M. kabatai* sp. nov. pozwalają na łatwe i przekonujące odróżnienie go od trzech innych znanych przedstawicieli rodzaju *Mugilicola*.

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