



**Occurrence of *Catoessa gruneri* (Crustacea: Isopoda), Parasitic on
Photopectoralis bindus from the Arabian Gulf with the First Description
of its Male and Manca**

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Abstract: 170 specimen of Orangefin ponyfishfish *Photopectoralis bindus* were collected during the period from January 2011 till June 2012 from the northwest of Arabian Gulf (29° 44' to 29° 49' N and 48° 35' to 48° 51' E). Fish samples were examined for parasitic infections. The isopod *Catoessa gruneri* Bowman and Tareen, 1983 was recorded from the gill pouch. Descriptions and some ecological aspects of females, males and manca larvae of the isopod were reported. The highest percentage of infection of manca was 98.8%, while the highest levels of prevalence of infection was 1.8 in male. The present descriptions of the male and manca represent the first reports around the world.

Key words: Marine fish, Parasitic Isopod, Cymothoidae, Iraq.

Introduction

Orangefin ponyfish *Photopectoralis bindus* (Valenciennes, 1835), belongs to the family Leiognathidae. Its distribution being in Indo-west Pacific, i.e from Port Sudan in the Red Sea and the Arabian Gulf to Japan, the Arafura Sea, and Australia. They live on muddy-sand bottoms of coastal waters, often enters estuaries. According to Froese and Pauly (2019) there are four valid species in the genus *Photopectoralis*.

The Isopods are a group of crustaceans belong to the class Malacostraca (Kabata, 1996). Some isopods are terrestrial, while many are aquatic, and some of them being parasites of fish. They are eumalacostracans

including 119 different families (Martin and Davis, 2001). Cymothoidae is the only family that its adults seen on teleost fishes of marine and freshwaters in tropicals and sub-tropicals (Lester, 2005). Some of the young cymothoids burrow under the scales of their hosts while members of *Lironeca* are usually found beneath the operculum, it cause a marked pressure and atrophy of the adjacent gills (Kabata, 1996). Williams and Bunkley-Williams (1996) stated that the game fish chub mackerel along the Peruvian coast are parasitized by isopods, causing 15% loss of body weight and costing fishermen approximately 1.3 billion kilograms of fish

annually. Lester (2005) mentioned that isopods harm the fish in several ways; mancae feed voraciously and easily kill fry and fingerlings; adult isopods stunt the growth of fish and inhibit reproduction. Farmed fish in many countries have been attacked by isopods, and plagued by tongue bites especially in Mediterranean mariculture and cages of sea bass in Chile and Australia (Lester 2005). The studies in Iraq dealing with parasitic isopods including: Ahmed (1970 a, b), Al-Daraji and Naama (1989) and Al-Daraji (1995). Nevertheless, these studies are still poor and limited, so the present study focus on the new occurrence of harmful isopod *Catoessa gruneri* Bowman and Tareen, 1983, which may turn to be a serious threat to the future mariculture and the adjacent inland aquaculture in Iraq.

Materials & Methods

Fish collections were carried out during the period from January 2011 till June 2012 (Latitudes 29° 44' to 29° 49' N and longitudes 48° 35' to 48° 51' E). Fishing gears were trawl nets with dimension of 75 x 4 m, drift gill nets with dimensions of 180 x 4 m. Fishes were removed from the fishing gears immediately on board of the fishing vessels separated individually in a sealed plastic sacs with amount of water and ice, then kept on ice in icebox (54 x33 x30 cm) (Plumb and Bowser, 1983). Fish total lengths were measured up to the near cm on 58 cm fish measuring board and weighted to the nearest gm on balances

model, sartorius 1.5 Kg and mettler PE 3600 4.5 Kg. Fishes were identified, based on Carpenter *et al.* (1997).

Fish examination started by checking the external surface to detect any parasitic crustaceans. Gills and mouth cavities were also detected. Isopods were removed using fine pointed forceps and kept in 80% alcohol (Yamauchi, 2009). Glass slides were prepared instead of the wooden slides which were conducted by Humes and Gooding (1964). The parasites were washed in 5% sodium hypochlorite to remove host tissue, and cleared in 85% lactic acid for 1 to 2 h Khamees & Adday (2013), the isopods were kept overnight on this slide. They were dissected, their appendages were removed, kept in 85% lactic acid on normal slide for overnight (Dr. N. Bruce, pers. comm., 30. 3. 2013). Body of the isopods were moisted, fixed on vaseline and examined under dissecting microscope and measured with the aid of digital vernair, while the appendages were measured using ocular micrometer. All measurement were in mm. Illustratiuons were prepared with the aid of camera lucida fixed on dissecting microscope model Wild M 8, 2566575 (Switzerland).

Results

One hundred seventy specimens of *Photoptoralis bindus* (Valenciennes, 1835), were collected during the period from January 2011 till June 2012 from the northern west of the Arabian Gulf (Table 1).

Table (1): Mean prevalence, mean intensity of infection of *P. bindus* with *C. gruneri*.

Isopod gender	No. fish Inf.	Fish length cm	Fish weight gm	fish No. uninf.	Fish length cm	Fish weight gm	Per. Inf. %	Prv. Inf.
Female	54	5.7-.9	11-11.1	116	6.9-10.2	8.3-18.2	31.8	0.7
Male	10	8.5-11.0	8.1-20.3	160	8.5-11.0	10-20	5.9	1.8
Manca	2	9.6,10.2	8.3,18.2	168	5.7-11	8.1-20.3	98.8	1

Description *Catoessa gruneri* Bowman and Tareen, 1983 (Female):

Fourty parasitic females were found attached in the branchial cavity and inner side of operculum of *Photopectoralis bindus* (Valenciennes, 1835). Two specimens of this parasite were deposited in the British Natural History Museum (NHMUK 2013.49-50). The description and measurements based on 11 specimens. Body (Figs. 1 A, B, C) 2.4 times as long as wide, being 10.6-16.6 mm (13.7 mm) long and 5.2-6.1mm (5.7 mm) wide. It is widest at pereonites 4-5, twisted to the left side (55%), and (45%) to the right side (Fig. 1 A, C), dorsum convex (Fig. 1 B, D). Cephalon pyriform, not deeply immersed with pereonites, narrowed anteriorly, and reflexed down into ventral lobe, narrowing frontwards. Eyes small about 0.30 width of cephalon and elongate about 0.26 of lateral margin of cephalon. Pereonites being 1<2<3<4>5>6>7. Pereonite 6 being about 1.5 Pereonite 7. Posterior margin of pereonite 7 is slightly indented. Coxae 2-6 are much shorter than their pereonites (Fig. 1 D), while only coxa 7 is being slightly longer than its pereonite. Pereonite 7 overlaps pleonite 1 (Fig. 1 A, C). Pleonites 2-5 being as wide as pereonite 7, all about of the same length. Epimeria directed laterally, narrower than central parts of pleonites, and with gaps in between. Pleotelson small, semicircle in shape gradually narrowing distally. Antennule (Fig. 1 I) eight articulated, long reaching anterior margin of pereonite 1 (Fig. 1 F), peduncle with three segments wider and longer apart, five distal flagellum segments short, small and being row of distal aesthetes. Antenna (Fig.1 J) was slightly shorter more slender than antennule, 10 articulated, gradually

narrowing distally. Segments 3-10 bear one aesthetasc each, while there are three on distal article. Mandible (Fig. 1 K, L) with outer three segmented palp and broad incisor, distal segment of palp bears distal serrated spines. Maxillule (Fig.1 N, O) long, slender tipped with four apical spines. Maxilla (Fig. 1 M) robust tipped with two spines on outer lobe and one spine on inner lobe. Maxilliped (Fig.1 P, Q) three articulated, proximal segment long and robust, second small, and distal segment smallest bearing three recurved spines. Pereopods (Figs. 1 R-U) all with broad bases excluding basis of pereopod 1. First pereopod being smallest, while pereopod 4 being the largest. Ischium and merus being slightly broader than carpus and propodus. All pereopod tipped with strong, pointed and curved dactylus. Pleopods (Figs. 1 V-X) each consist of broad, semicircular branches, bearing gills or surface folds in addition to retinacula on pleopods 1-4. Uropods (Fig. 1 G) slightly extended beyond the telson, rami sublinear, narrowing distally, exopod slightly lower than endopod.

***C. gruneri* Male:**

18 parasitic crustaceans were found attached to the branchial cavity of *P. bindus*, The description and measurements based on 10 specimens. Body being smaller than body of female (Fig. 2 A) about 6.6-8.8 mm (8.1 mm) long and 2.7-3.1 mm (2.9 mm) wide. It is about 2.7 times as long as wide, widest at pereonite 4. Body untwisted, dorsum straight. Cephalon was as in female (Fig. 2 A, B), Eyes slightly larger than in female (Fig. 2 B), about 0.55 times width of cephalon, elongate about 0.33 times of lateral margin of cephalon. Pereonites being 1>2=3<4>5>6>7.

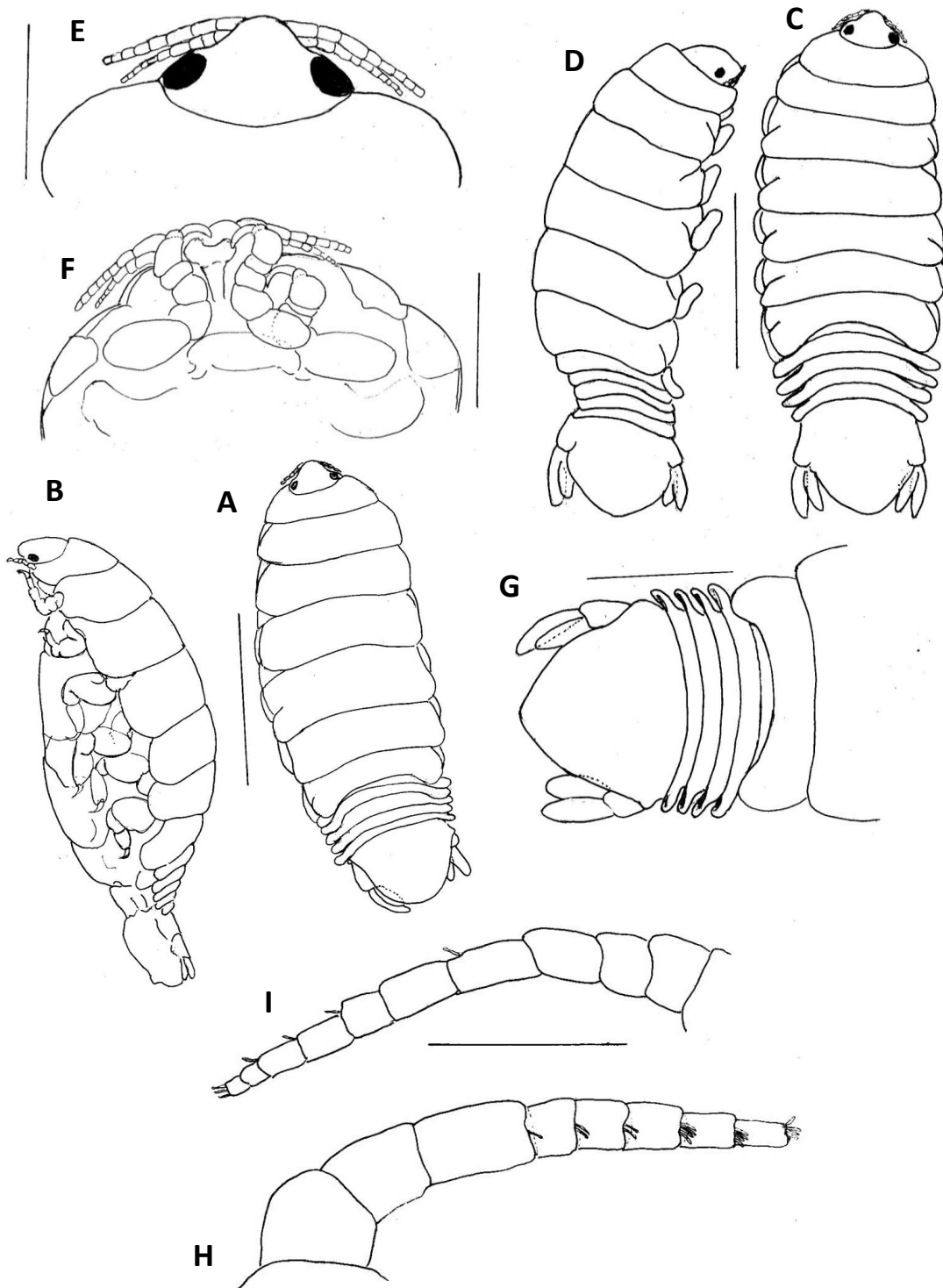


Fig. (1): *Catoessa gruneri* Bowman & Tareen, 1983 Female

A habitus, dorsal; B lateral view, ovigerous; C habitus, dorsal; D lateral view, non-ovigerous; E cephalon; F cephalon, ventral view; G pleonites; H antennule; I antenna (Scale bars 5.0 in A, B, C, D; 0.5 in E, F, G, H, I).

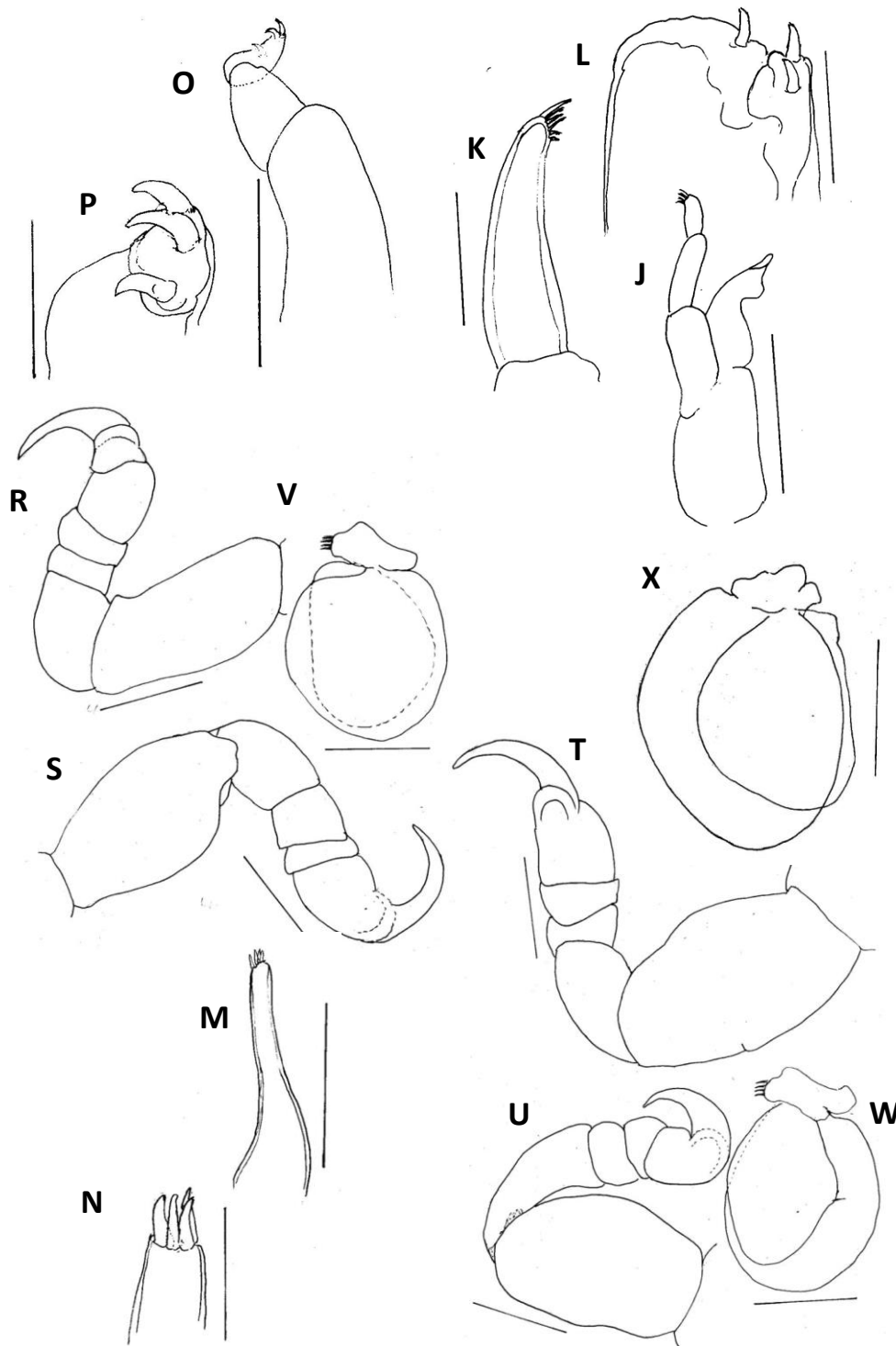


Fig. (1): *Catoessa gruneri*, female (cont.)

J mandible; K mandible palp distal; L maxilla; M maxillule, N maxillule apex; O maxilliped, P maxilliped apex; R pereopod 1; S pereopod 2; T pereopod 4; U pereopod 7; V pleopod 1; W pleopod 2; X pleopod 5 (Scale bars). (Scale bars 0.5 in J, K, N, P; 1.5 in R, S, T, U, V, W, X; 0.1 in L, M, O, Q).

Pereonite 6 being about 1.3 times as long as pereonite 7. Posterior margin of pereonite 7 as in the female. Coxa of pereonites 2, 5 and 6 are long, while coxae of pereonites 3, 4 and 7 are much smaller than their pereonites. Pereonite 7 overlaps pleonite 1 (Fig. 2 C). Pleonites 2-5 (Fig. 2 A) of the same width and slightly less wider than pereonite 7, all about the same length. Epimera as in female. Pleoteson small, semicircular in shape narrowing posteriorly. Antennule slightly bigger than antenna, both about of the same length (Fig. 2 D, F). Articles as in female. Articles of both antennule and antenna bearing more aesthetascs than that of female. Mandible (Fig. 2 H, I), maxilla (Fig. 2 J), maxillule (Fig. 2 K) and maxilliped (Fig. 2 L, M) all as in the female. Pereopods (Fig. 2 O-R) as in female. Pleopods (Fig. 2 S-W) as in female, except inner branches of pleopods 1 and 4 being smaller than outer branches. Appendix masculine being on a endopod of pleopod 2 (Fig. 2 T). Uropods (Figs. 2 X) being as in the female.

***C. gruneri* Manca larva 2:**

Two manca larvae were found attached on the gills of *P. bindus*, The description and measurement based on two specimens. Body (Fig. 3 A) being 2.74-2.80 mm (2.77 mm) long and 0.88-0.90 mm (0.89 mm) wide, widest at pereonites 3-4, not twisted and flattend. Cephalon pyriform as wide as the anterior margin of pereonite 1. Eyes moderate 0.46 width of cephalon, elongate about 0.3 of lateral margin of cephalon. Pereon consists of seven pereonites but with 6 pereopods only, as pereonite 7 without pereopod. Pereonite 7 is much smaller than pereonite 6, not overlaps pleonite 1 and without indentations. All

pleonites about the same size but slightly narrowing backward. Pleoteson large, semi triangular in shape, posterior margin with marginal setae (Fig. 3 A). Antennule (Fig. 3 B, C) composed of eight articles extending to anterior part of pereonite 1, with two simple spiny short setae on antero-distal margin of articles 2, 3, 6 and 7 in addition to two large setae on distal margin of articles 4, 6 and 7, distal article tipped with 7 large setae. Antenna (Fig. 3 D) composed of 10 articles, slightly longer than antennule, with one seta on antero-distal margin of articles 2, two setae on antero-distal margin of articles 3, 7, 8 and 9, distal article slender with 7 unequal setae (Fig. 3 E). Mandible (Fig. 3 F), three articulated, proximal article longest, middle moderate and distal article small, selender with four setae increasing gradually in length along disto-lateral margin. Maxillule (Fig. 3 G) slender tipped with one robust curved spine and another three smaller spines. Maxilla (Fig. 3 H) as in the adults. Maxilliped (Fig. 3 I) was as in adults except that the basal and distal articles much larger. All pereopods (Fig. 3 J-O) were with acute dactyli and spines on pereopod 2, 4, 5 and 6, pereopod 2 with one spine on carpus and six on propodus; pereopod 4 with two spines on propodus; pereopod 5 with six spines on propodus; pereopod 6 with four very small spines on basis, one spine on each ischium and merus, two spines on carpus and six spines on propodus. Pleopods (Fig. 3 P-T) 1-4 were have protopod with coupling hooks and phyllopodus rami with long plumose setae except inner rami of pleopod 5. Pleopod 4 and 5 (Fig. 3 S, T) with only the endopod ramus without plumose setae.

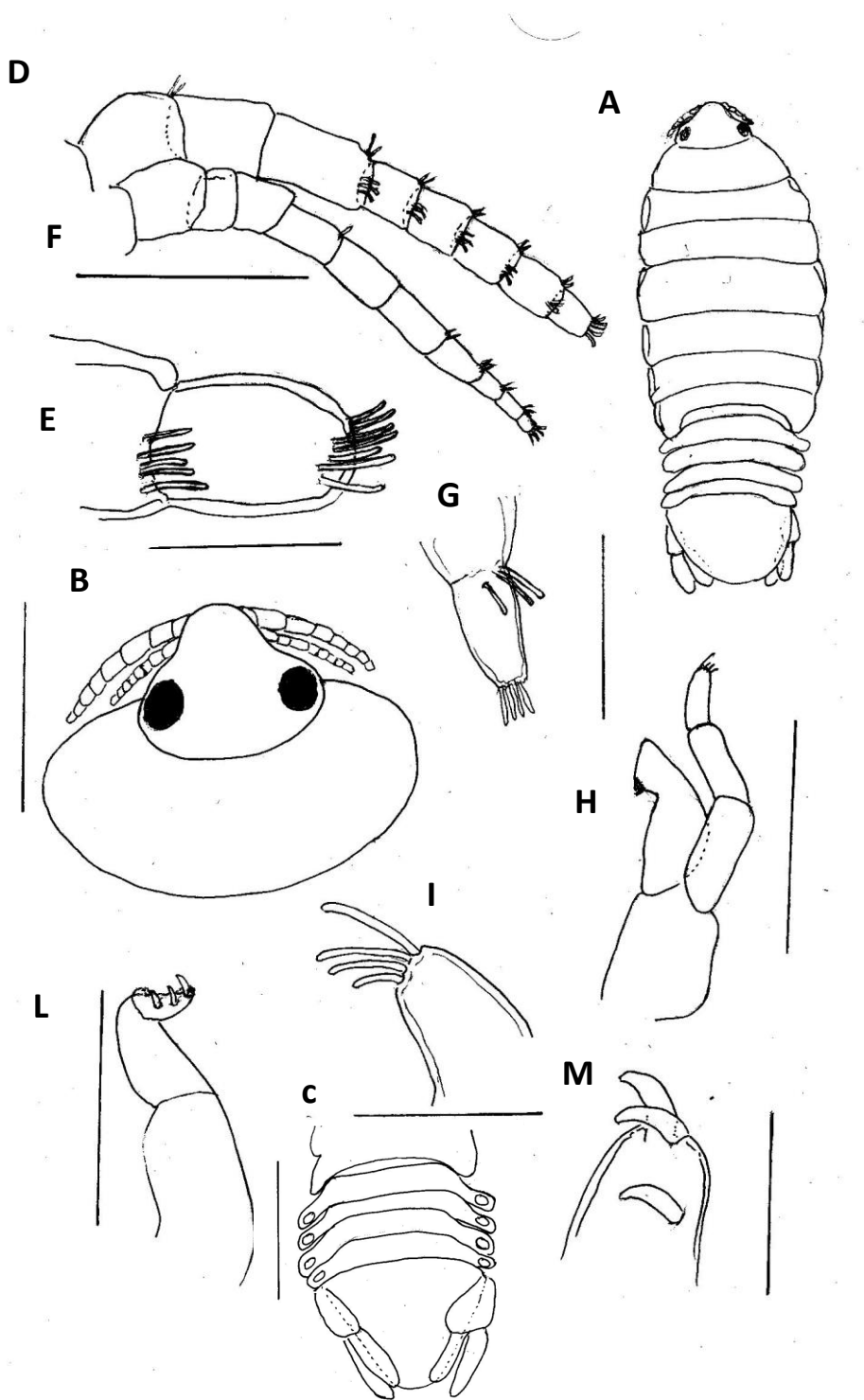


Fig. (2): *Catoessa gruneri*, male.

A habitus, dorsal; B cephalon; C pleon, ventral view; D antennule; E antennule distal articles; F antenna; G antenna distal articles; H mandible; I mandible apex; L maxilliped; M maxilliped apex (Scale bars 3.0 in A; 0.5 in B, D, M F, H, L; 1.5 in C; 0.1 in E, G, I, M).

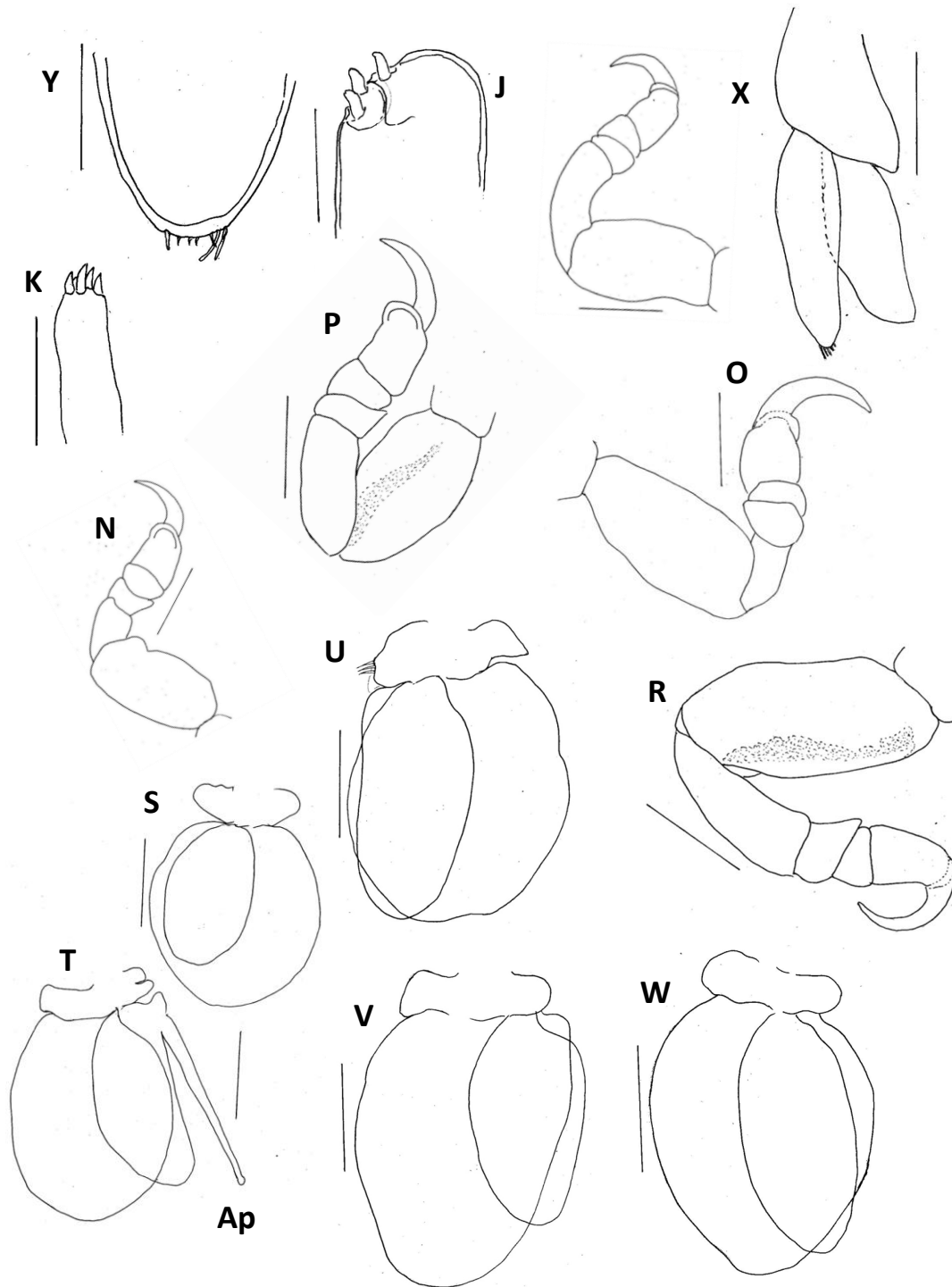


Fig. (2): *Catoessa gruneri*, male (cont.)

N pereopod 2; O pereopod 3; P pereopod 5; Q pereopod 6; R pereopod 7; S pleopod 1; T pleopod 2; U pleopod 3; V pleopod 4, W pleopod 5; X uropod, Y distal margin of uropod exopodite; Ap appendix masculina (Scale bars 1.5 in C; 0.1 in J, K, Y; 0.5 in N, O, P, Q, X; 0.5 in R, S, T, U, V, W).

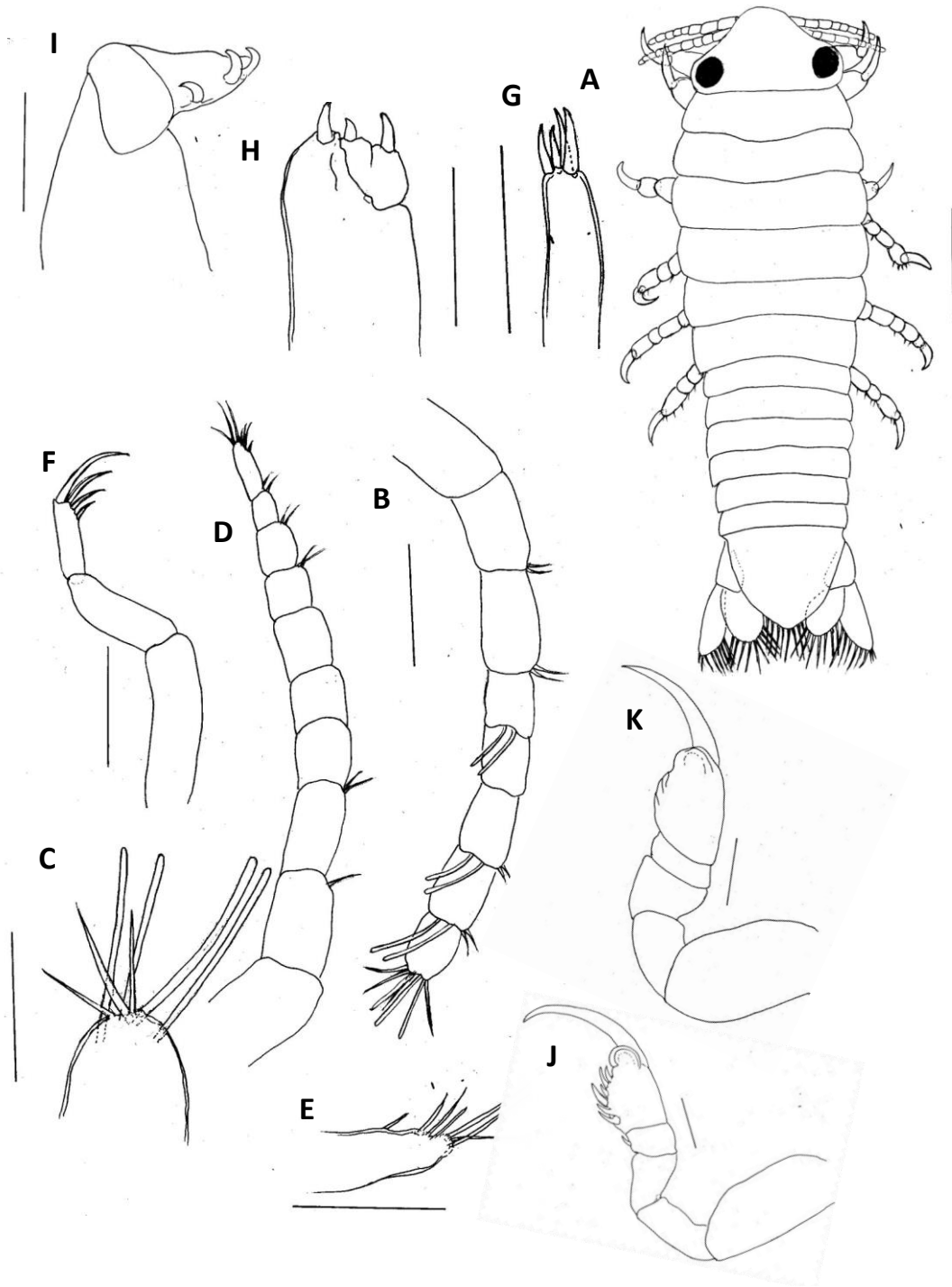


Fig. (3): *Catoessa gruneri*, manca larva 2

A habitus, dorsal, B antennule; C antennule distal article; D antenna; E antenna distal article; G maxillule; F mandible; H maxilla; I maxilliped; J pereopod 1; K pereopod 2 (Scale bars 0.5 in A, 0.1 in B, D, F, J, K; 0.05 in C, E, G, H, I).a

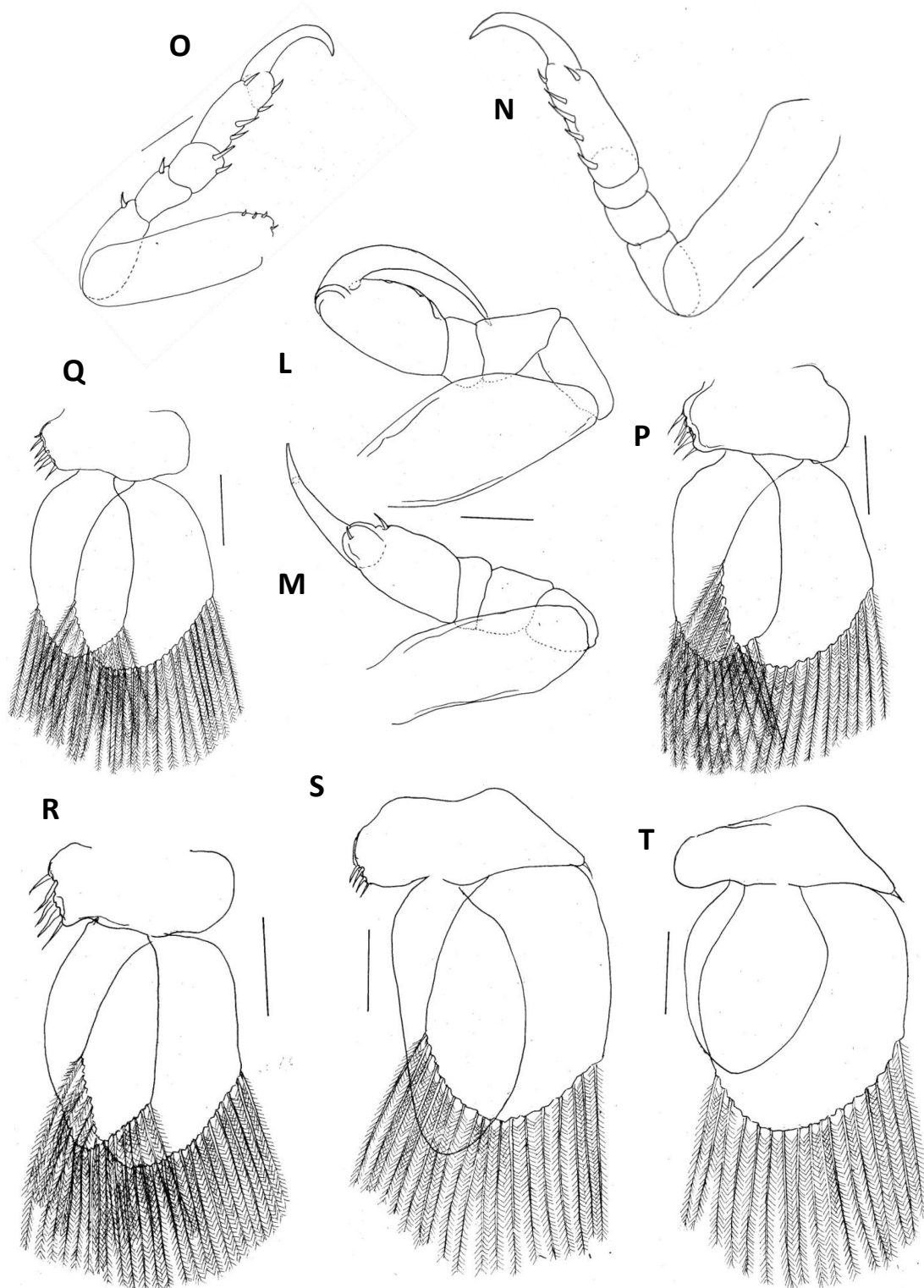


Fig. (3): *Catoessa gruneri*, manca larva 2 (cont.)

L pereopod 3; M pereopod 4; N pereopod 5; O pereopod 6; P pleopod 1; Q pleopod 2; R pleopod 3; S pleopod 4; T pleopod 5 (Scale bars 0.1 in J, K, L, M, N, O, P, Q, R, S, T).

Discussion

The family Cymothoidae consists of 43 valid genera with its oldest being *Cymothoa* Fabricius, 1787 and the most recent being *Smenispa Özdikem*, 2009 (Bruce and Schotte, 2013). *Catoessa* Schioedt and Meinert, 1884 is a valid cymothoid, includes four valid species, namely *C. ambassae*, *C. boscii*, *C. gruneri* and *C. scabricauda* (Shotte, 2013). All these species are marine parasites of teleosts. According to Dr. Niel Bruce (pers. comm., 16. 10. 2013) members of *Catoessa* can be easily distinguished from other members of the two close genera *Elthusia* and *Livoneca* by having more elongate and twisted body in addition to having gaps between the lateral margins of the pleonites. *C. gruneri* was reported as a new species from the gills of *Leiognathus fasciatus* [now *Aurigequula fasciata* (Lacepède, 1803)], *L. daura* [now *Karalla daura* (Cuvier, 1829)], *Ilisha indica* [now *I. melastoma* (Bloch and Schneider, 1801)] and *Therapon puta*, all were collected from the Arabian Gulf (Bowman and Tareen, 1983).

C. gruneri differs from the rest of species of the genus by having a rounded rostral point and posteriorly narrowed pleotelson (Bruce, 1990). Trilles *et al.* (2012) redescribed *C. boscii* based on numerous female and male specimens collected from the gills of *Carangoides malabaricus* from India, their attempt gave more detailed information of the morphology and ecology of this species. The same authors stated that this species was transferred from *Livoneca* by Bruce (1990). The specimens of *C. gruneri* of the present study were confirmed by Dr. Jean- Paul Trilles (Pers. comm. 16. 9. 2011) based on photos and detailed illustrations of camera lucida drawings. According to another

communication with the same expert on 18. 5. 2013, he confirmed that the present descriptions of the male and manca of *C. gruneri* represent the first report around the world.

Al-Daraji (1995) reported this parasite in the buccal cavity of *L. bindus* [*Photopectoralis bindus* (Valenciennes, 1835)] and *I. elongata*, he proposed both fishes as new hosts for this isopod. In the present study the specimens are identical with that of the description of Bowman and Tareen (1983) and add additional descriptive information including the ratio of eye -head, body twist, general body measurements. According to J.-P. Trilles (pers. comm., 19. 9. 2011) the present record of *C. gruneri* represents its third occurrence from fishes of the Arabian Gulf from the same host.

Conclusions

Catoessa is a rare genus of the family Cymothoidae, includes only four valid species. *C. gruneri* is slightly a big parasite recorded from a small fish *P. bindus* . The first record of its male and manca larva in the world is documented.

Acknowledgements

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Conflicts of interest

The authors-declare-that they-have-no-conflict of interests.

Ethical approval

All applicable institutional, national and international guidelines for the care and use of animals were followed.

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ظهور أنثى القشري *Catoessa gruneri* (قشريات: متشابهة الأقدام) المتطفلة على أسماك الحصان برتقالي الزعنفة *Photopectoralis bindus* من الخليج العربي مع أول وصف للذكر واليرقة

ثامر قاطع عداي ونجم رجب خميس

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المستخلص: جمع 170 نموذج من أسماك ذيل الحصان برتقالي الزعنفة *Photopectoralis bindus* خلال المدة من كانون الثاني 2011 حتى حزيران 2012 من جنوب غرب الخليج العربي (29° 44' الى 29° 49' شمالاً ومن 48° 35' الى 5148° شرقاً). فحصت الطفيليات لنماذج الاسماك المصابة. سجل متشابه الاقدام *Catoessa gruneri* من التجويف الغصمي ووصفت الاناث والذكور ويرقة manca لمتشابه الاقدام المفحوص وسجلت بعض القياسات البيئية لها. كانت أعلى نسبة اصابة لليرقة 98.8% وأعلى شدة اصابة للذكور كانت 1.8. يمثل الوصف الحالي للذكر واليرقة أول تسجيل لها حول العالم.