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First Record of *Anuretes similis* Ho & Lin, 2000 (Siphonostomatoida: Caligidae) Parasitic on Sordid Rubberlip *Plectorhinchus sordidus* (Perciformes: Haemulidae) from Northwest of Arab Gulf, Iraq

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ABSTRACT

The copepod *Anuretes similis* Ho & Lin, 2000 was found attached to the gill filaments of *Plectroinchus sordidus* which were collected from northwest of the Arab Gulf during the period from October 2013 to July 2014. The species was recorded for the first time in the Iraqi territorial waters of the Arab Gulf and *P. sordidus* was a new host record for this parasite in the Arab Gulf. This copepod was confirmed taxonomically by Prof. Dr. G.A. Boxshall, British Museum (Natural History), London and deposited as a voucher specimen in this museum under Reg. No. NHMUK 2014.54-55.

KEY WORDS: *Plectorhinchus sordidus*, *Anuretes similis*, northwest of Arab Gulf, Iraq

Introduction

The geographical distribution of the haemulid *Plectorhinchus sordidus* extends from the Arab Gulf, Red Sea and Indian Ocean to China (Kuronuma and Abe, 1986). Most fishes in wild or cultivated population exposed to many problems including competition, parasitism and predation (Nikolsky, 1963). *Anuretes* was established by Heller (1865) to accommodate species in the family Caligidae, that lack a well-defined abdomen, within the group of genera without lunules on the paired frontal plates (Venmathi Maran and Ohtsuka, 2008), one difficulty with the generic concept has been that the degree of reduction of the abdomen is variable, in some species a small but distinct abdomen is present, whereas in others the abdomen is fully incorporated into the genital complex

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and the caudal rami appear to originate directly from its surface (Venmathi Maran and Ohtsuka, 2008 and Chad, 2014).

Shiino (1954) discussed the status of *Anuretes* and concluded that it had been used as a waste basket for those species which could not be placed in *Lepeophtheirus* (von Nordmann, 1832). Yamaguti (1963) retained *Anuretes* as a distinct genus and erected a new subfamily to accommodate it together with *Pseudanuretes*. Ho and Dojiri (1977) pointed out the overlap between these two genera and recommended treating the species of *Anuretes* as members of *Lepeophtheirus*. However, it was Dojiri (1983) who resurrected *Anuretes* and distinguished it from *Lepeophtheirus* by a combination of six different characteristic features.

The character state noted by Pillai (1967) that a pinnate seta is located on the surface between the two bifurcate distal spines on the terminal exopodal segment of leg 1. Finally, *Anuretes* was re-instated as a valid genus by Ho and Lin (2000), who provided a key to the 19 species recognized at that time, and this proposal was followed by Boxshall and Halsey (2004). Adday (2013) reported two species of *Anuretes* in Iraqi territorial waters: *Anuretes branchialis* and *A. anomalus*.

This study was designed to investigate the parasitic copepods from *Plectorhinchus sordidus* in the northwest part of the Arab Gulf within the Iraqi territorial marine waters.

Materials and Methods

Six out of 239 perciform fish specimens examined during the period from October 2013 to July 2014 belonged to *P. sordidus* were examined for any ectoparasitic infection. They were captured from the Iraqi territorial waters, northwest of the Arab Gulf (latitudes 47° 30′ to 48° 15′; longitude 30° 50′ to 30° 00′). The fishes were transported to the laboratory of Parasitology at the Department of Fisheries and Marine Resources, College of Agriculture, University of Basrah, where copepod parasites were removed from the gill filaments and put in 70% ethyl alcohol. After dissection, the copepods were cleared in 85% lactic acid using the wooden slide method (Humes and Gooding, 1964). Measurements were made by using an ocular micrometer. Drawings were made by using a camera Lucida.

Copepods were identified on the basis of their morphological features according to Kabata (1979), Pillai (1967) and Yamaguti, (1963). Some specimens were sent to Prof. Dr. G.A. Boxshall, Department of Zoology, British Museum (Natural History), London for their confirmation.

Results

Five specimens of copepod of *A. similis* were found attached to the gill filaments of *P. sordidus* (Table 1).

Family: Caligidae

Order: Siphonostomatoida.

Host: *P. sordidus*

Site of infection: Gills

Locality: Northwest Arab Gulf within the Iraqi territorial waters.

Material deposition: Voucher specimens were deposited in the Natural History Museum, London accessions NHMUK 2014. 54-55.

Description of female body: (Fig. 1A) 1.36 mm long, excluding setae on caudal rami. Cephalothoracic shield longer than wide, 0.88 × 0.82 mm, excluding marginal hyaline membrane. Fourth pediger, 0.09 × 0.16 mm, only partially covered by free margin of cephalothorax. Genital complex usually slightly longer than wide, 0.45 × 0.58 mm. Abdomen (Fig. 3C) much reduced, represented by reduced, bilobate anal somite located at the end of the genital complex. Caudal ramus (Fig. 3F) small, longer than wide, 64 × 80 µm, carrying 3 short and 3 long plumose setae. Egg sac 0.92 mm long, containing as many as 11 eggs. Armature on rami of legs 1-4 as follows (Roman numeral indicating spines and Arabic numerals indicating setae):

	Exopod	Endopod
Leg 1	1-0; III,1,3	(vestigial)
Leg 2	I-1; I-1; II,I,5	0-1; 0-2; 6
Leg 3	I-0; 9	0-0; 6
Leg 4	I-0; III	(missing)

Table 1. The number of examined, infected fishes *P. sordidus* with prevalence and intensity of infection with *A. similis*.

No. of examined Fishes	No. of infected Fishes	Fish length (cm)		Fish weight (gm)		Parasite prevalence (%)	Mean Parasite intensity
		Mean	±SD	Mean	±SD		
6	5	34	5	528	299	83.3	1

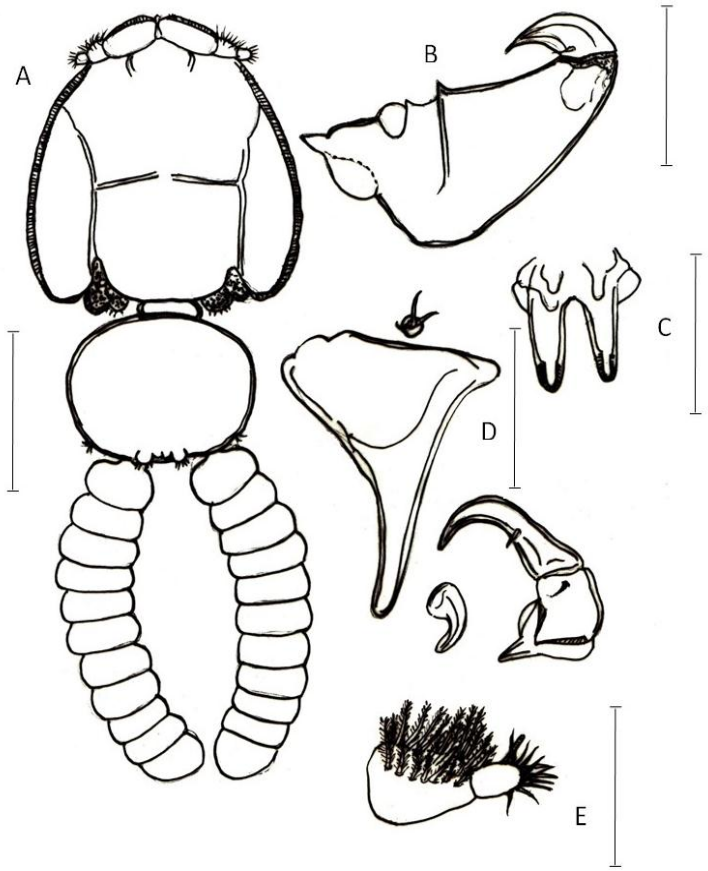

Fig (1). *Anuretes similis*, Female
A: habitus, dorsal; B: maxilliped; C: Sternal furca; D: maxillule; E: antennule; (postantantennal process) (Scale bars 1.3 in A; 0.1 in B, C, D, E).

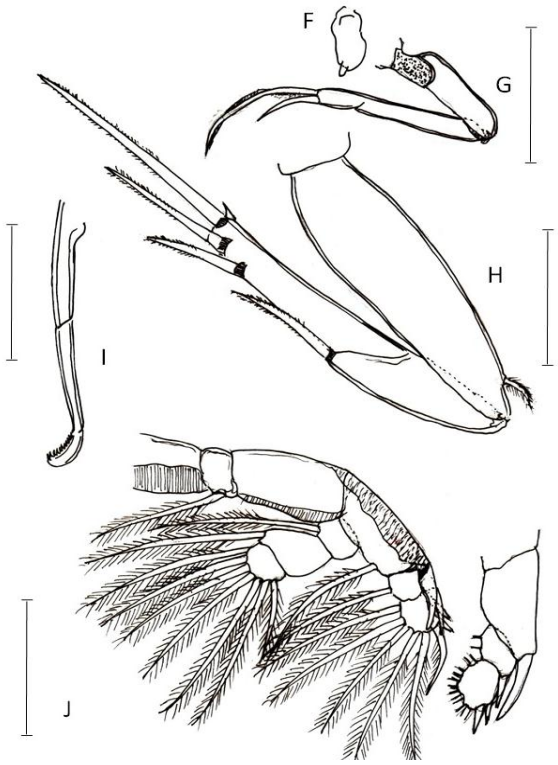

Fig (2). *Anuretes similis*, Female
F: maxillary whip; G: maxilla; H: leg 4; I: mandible; J: leg 2; (Scale bars 0.1 in F, G; 0.04 in H, I, J).

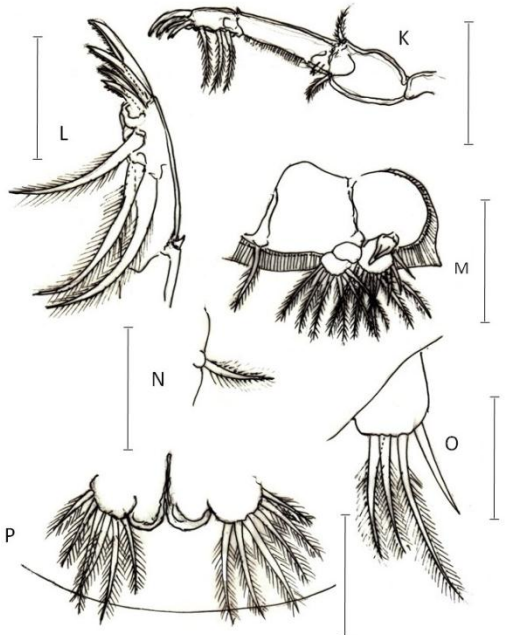

Fig (3). *Anuretes similis*, Female
K: leg 1tip of leg 1 exopod; L: leg 3; M: leg 5; N: leg 6; O: caudal rami; P: post antennal process; (Scale bars 0.04 in K, L, O, P; 0.1 in M, N).

Discussion

In 1863 when Henrik Krøyer described *Lepeophtheirus heckelii* found on the spadefish (*Ephippus gigas*), from Brazil and New Orleans, Louisiana, he noticed the copepod bearing a vestigial abdomen and commented that this unusual feature might warrant the creation of a new genus for *L. heckelii* (Ho and Lin, 2000). Krøyer's (1863) comment was adopted by Heller (1865) who proposed a new genus *Anuretes* to accommodate *L. heckelii*.

A new species of caligid copepod (Siphonostomatoida), *Anuretes grandis* sp. n., parasitic on the lips *Diagram mapictum* (Thunberg)] in Taiwan is described by Ho and Lin (2000), the new species is distinguished from its congeners by having: (1) free margin of cephalothorax not covering the fourth pediger, (2) large genital complex longer than 2/3 of the cephalic shield, (3) no maxillary whip, (4) leg 3 with 9 setae on the terminal segment of exopod and 8 plumose setae on the terminal segment of endopod, and (5) armature of I,III on leg 4 exopod.

A new species of caligid copepod, *A. justinei* is described from off New Caledonia, It is parasitic on the gill filaments of *Plectorhinchus lineatus* (L.). The new species is distinguished from its congeners by the combination of the following characters: (1) the fourth pedigerous somite is covered dorsally by the expanded free posterior margin of the cephalothorax; (2) a maxillary whip is present; (3) the relatively small genital complex is less than half the length of the cephalothorax; (4) leg 3 is armed with nine setae on the terminal exopodal segment and six setae on the terminal endopodal segment; and (5) leg 4 is long and slender with a setal armature of I, III twisted spines (Venmathi Maran *et al*., 2007).

Metacaligus uruguayensis n. sp. is described from specimens found parasitic in the oral and gill cavities of the cutlass fish, *Trichiurus lepturus* L., caught from the Strait of Taiwan and landed at Dong-Shih Fishing Port in Chiayi County, Taiwan. It is close to *M. uruguayensis* (Thomsen, 1949), but can be distinguished from the latter by the possession of shorter caudal rami in both sexes and wider cephalothorax and genital complex in the male (Ho and Lin, 2002).

The Cephalothorax of *Anuretes anomalus* found in Iraq territorial waters of the Arab Gulf is slightly longer than wide excluding marginal hyaline membrane, fourth pediger is wider than long, partially covered by free posterior margin of cephalothorax. Genital complex is slightly wider than long, Abdomen is reduced represented by small bilobate and somite, at the end of the genital complex, Caudal ramus is slightly wider than long carrying three short and three long plumose setae (Adday, 2013).

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