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New Record of Parasitic Praniza Larva of *Gnathia pantherina*; Smit and Basson, 2002; from Arabian Gulf Greasy Grouper *Epinephelus tauvina* Caught from Saudi Coastal Water of Dammam

[1,2]*Elsayed M. Bayoumy,* [2]*Hanadi B. Baghdadi and* [3]*Mohey A. Hassanain*

[1]Hydrobiology Department, National Research Center, Giza, Egypt
[2]Department of Girls Science College, Dammam University, Saudi Arabia
[3]Zoonotic Diseases Department, National Research Center, Giza, Egypt

Abstract: Praniza Larvae of *Gnathia pantherina* were collected fromgills, pectoral fins and mouth cavity especially tongue and palate of *Epinephelus tauvina*. The total incidence (58.33%) 35 out of 60 examined fish. The effects of feeding on fishes in the infested *E. tauvina* are reported and the role of gnathiids as vectors is assessed. Ecological interactions between gnathiid larvae, client and cleaner fishes are summarized. Identification of parasitic praniza larvae of *G. pantherina* were done through light and scan electron microcopies and it characterized by large size (5.6±0.1mm, n=10). Compounds eyes large, each one is consist of number ocelli that penta-shaped. Maxilliped consists of five-articles, proximal article the largest and the distal four ones with plumose setae. Palp 4 times as long as wide, with three articles and article 3 with 6-8 simple setae. Other morphological features were compared with the most related described species of the same genius. The present work recorded gills, pectoral fins and mouth cavity record as new predilection site of these gnathiid larvae. *E. tauvina* and Arabian Gulf, especially off Dammam are new host and new geographical distribution of *G. pantherina*.

Key words: Parasite · Isopoda · Gnathiidae · *Gnathia pantherina* · Praniza larvae · *Epinephelus tauvina*

INTRODUCTION

Each parasite has two-sided effect on host, one beneficial to the host and the other is harmful. To find out the point of benefit or harm, we must know the exact structures of this parasite. Parasites are becoming recognized as significant players in the evolutionary game and are being seen as excellent model systems for general evolutionary studies [1]. Most parasitic crustaceans spend part of their life cycle as particularly male ones, where the fertilized female are parasitic to lay their eggs and to maintain the continuation of their life and developmental stages in the water column [2-4].

Crustaceans are increasingly serious problems in cultured fish and can impact wild populations. Isopods are crustaceans that associate with many species of commercially important fishes around the world and cause significant economic losses to fisheries by killing, stunting, or damaging these fishes [5]. In fact, they are one of the most morphologically diverse of the crustacean groups. The relation between parasite specially crustaceans life cycle, host, host-parasite and parasite-parasite associations are considered very complicated biological relations [6, 7]. Isopods of the family Gnathiidae have free-living adults and parasitic juveniles feeding on the blood and tissue fluids of teleost and elasmobranch fishes [8].Gnathiids infest many species of marine and estuarine teleosts and elasmobranchs [3,9].

Marine fishes are parasitized by a variety of copepods so parasitic copepods are increasingly serious problems in cultured fish and can also impact wild

Corresponding Author: Elsayed M. Bayoumy, Hydrobiology Department, National Research Center, Giza, Egypt and Department of Girls Science College, Dammam University, Saudi Arabia.

populations [3, 10, 11]. Many of species parasitic copepods have long been recognized to have the potential to affect the growth, fecundity and survival of wild hosts [12-14]. Arabian Gulf represents one of the most important sources of animal protein in Saudi Arabia as it contains numerous types of fishes. Groupers are one of the most important of these fish and it is also among the highest priced fish. Literatures on copepod parasites of Arabian Gulf grouper are relatively rare. For that reason, the present work aims to study the prevalence and description of gnathiid isopod from Greasy Grouper *Epinephelus tauvina* caught from Saudi coastal waters off Dammam through light and scan electron microscopes.

MATERIALS AND METHODS

Fish: A total of 60 Arabian Gulf greasy grouper *E. tauvina* were purchased freshly-caught from the local fish market in Dammam area for parasitological examinations.Fish samples were collected at a period extended from January to February 2012.

Clinical Examination: Fish samples under investigation were grossly examined for determination of clinical signs and any external parasite [15].

Parasitological Preparations: For light microscopy, Parasites were collected from the gills, branchial chambers and mouth cavity of the investigated fish species. The copepods were preserved in 70% ethyl alcohol. They were then dissected and mounted in lactophenol as temporary slide preparations and examined on an Olympus compound microscope.

For scan electron microscopy, gnathiids were rehydrated in a descending sequence of acetone and washed in distilled water to clean them of any salt and debris, according to techniques described by Smit and Van As [14], the gnathiid larvae were post-fixed in1% osmium tetroxide (Oso4) for one hour, then dehydrated through graded acetone and dried in a CPD 750 critical-point-dryer using liquid CO2. The specimens were whole-mounted on an aluminum stub and fixed by double- phase sticker. The specimens were then coated with gold palladium in a sputter coating unit (Polaron E5000; Polaron Equipment, UK) and examined using a scanning electron microscope (JEOL SEM T330; JEOL, Japan) operating at 20 Kev.

RESULTS

Gnathiid Prevalence and Intensity: The obtained results indicated that (58.33%) 35 out of 60 examined *E. tauvina* found infested by gnathiid parasite. The intensity of infestation ranged 15-35 (22) parasites/infested fish with weight range 150-230 g. While, it ranged 5-12 (8) parasites/infested fish with weight range 90-150 g.

Clinical Examination: Female gnathiid parasites were collected from the gills, pectoral fins and mouth cavity especially tongue and palate of upper jaw (Fig. 1A-C). Abundance of mucus surrounds the gill filament and the inner surface of the operculum and their erosion (Fig. 1B and C). Moreover, tongue and palate of upper Jaw of the infested fish showed multifocal hemorrhagic spots below and between the pectoral and pelvic fins (Fig.1A).

Description: Total length of *Gnathia praniza* larva (5.6±0.1mm, n=10) 3.8-5.9 mm.

Cephalosome: Posterior margin straight, slightly wider than anterior margin, almost as wide as long, lateral margins slightly convex (Figs. 1D and 2B). Many sensory pits and three pairs of simple setae are on dorsal surface of cephalosome (Figs. 1D, 2A and B). Compounds large eyes, well developed, oval-shaped, on lateral margins of cephalosome. Each one consists of a number ocelli that penta-shaped (Fig. 2A and B). Medio-anterior margin of cephalosome is straight with lateral concave excavation to accommodate first articles of antennae (Figs. 1D and 2B).

Labrum: semicircular with apical process, truncate posterior margins, anterior margin concave. Ventral part of it covers mandibles dorsally and laterally (Fig. 2B and C). Antennae: Both antennae are approximately of equal size (Fig. 2B). Antenna 1 with three peduncle articles, a pair of feather-like setae on articles 1 and 2 respectively, article 3 largest with hair-like setae. Antenna 2 with four 4 peduncle articles and the fourth one is the largest.

Mandible: Long, almost the same length as cephalosome, more than twice as long and wide, curved inwards with seven to nine processes (Fig. 2B and C). Apex conical and incisor present, terminating in acute point.

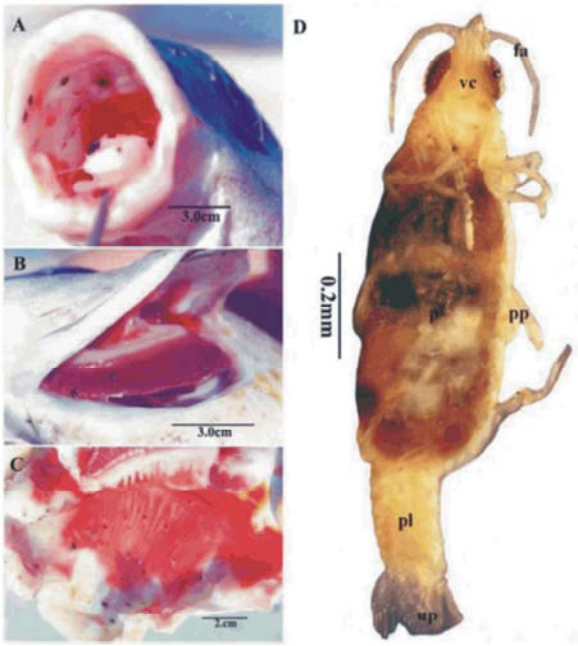

Fig. 1: A-C: Photograph of *E. tauvina* on the anterior-ventral view. A: Buccal cavity infested with Gnathiid Isopods showing extensive areas of erosion and hemorrhages; B and C: Heavy infested gills and branchial chambers; D: light photomicrograph of *G. pantherina*, eye (e), first antenna (fa), Pelion (p), pleotelson (pl), parapod (pp), ventral cephalosome (vc) and uropods (up).

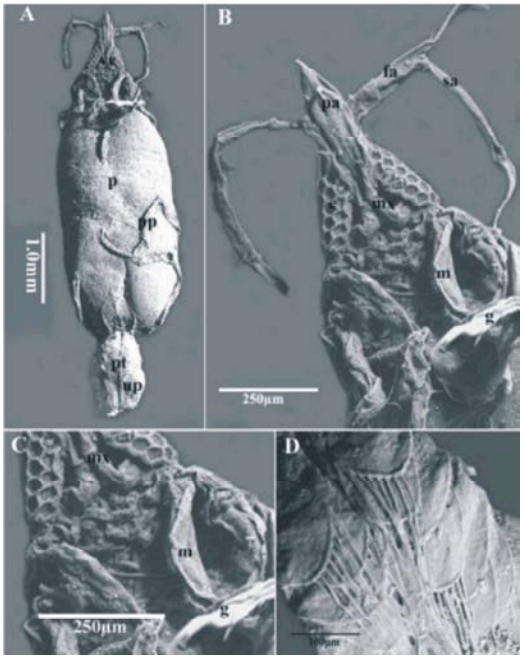

Fig. 2: Scanning electron micrographs of *G. pantherina*. A: ventral view of whole parasite; B and C: ventral view of cephalosome and D: dorsal view of pleoteson, eye (e), first antenna (fa), gnathopod (g), mandible (m), maxillule (mx), Pelion (p), paragnaths (pa), pleotelson (pl), parapod (pp), second antenna (sa), ventral cephalosome (vc) and uropods (up).

Maxilliped: Five-articles, proximal article the largest and the distal four ones with plumose setae (Fig.2B and C). Palp 4 times as long as wide, with three articles, first article acute with 3-5 small teeth and article 3 with 6-8 simple setae.

Gnathopod: Smaller than pereopod, setae on the basis are feather-like (Fig.2D).

Pylopod: Four articles; article 1 and 2 fused. Article 1 broad, robust, with a single simple seta mid-dorsally and short curved seta dorso-laterally. Article 2 and 3 each one of them with two to four simple setae distally. Article 4 is small with one to two simple setae.

Pereon: Almost one and half times as long as wide, swollen, round, structure between pereonites 4-6 and wider than cephalosome. Pereonite 6 dorsally visible, small with rounded posterior margin and pereonite 1 fused with cephalosome.

Pleon: Pleon and pleotelson more than a half of total length (Figs. 1D and 2A). Five sub-equal pleonites dorsally visible, epimera not distinct, short hair-like setae randomly distributed on pleonites.

Pleotelson: Triangular, its base is wider than length and lateral margins tapering in two steps towards apex, its dorsal surface with twopairs of simple setae and pectinate scales, distal apex terminating in pair of long simple setae (Fig. 1D).

Pereopods: Pereopod 2 basis elongated, with four to nine feather-like setae and short simple setae anteriorly, two to four posterior simple setae (Figs. 1D and 2). Ischium hastwo-thirds length of basis, three to five anterior simple setae and three simple setae posteriorly. Merus half the length of ischium with anterior bulbous protrusion, three simple setae on bulbous protrusion, posterior margin with two to three tooth-shaped tubercles.Carpus of almost the same size and shape as merus but without anterior bulbous protrusion, posterior margin with eight to ten tooth-shaped tubercles, simple setae and a single feather-like seta. Propodus is about twice the length of carpus, tooth-shaped tubercles on posterior margin, two robust denticulated setae situated on middle and distal part of posterior margin respectively, single simple seta and one featherlike seta anterio-distally. Dactylus half the length of propodus, terminates in sharp posterior pointing unguis, robust seta on posterior side proximal to unguis, few simple setae on dorsal and ventral sides of robust seta.Pereopods 3 to 6 similar to pereopod 2 in basic form, differ in setation, shape and number of tubercles.

Uropod: Rami extending beyond apex of pleotelson, endopod longer and wider than exopod, both with long simple setae, pectinate scales on dorsal area of uropods (Fig. 2D).

DISCUSSION

Marine fishes are parasitized by a variety of isopods so they represent serious problems in cultured fish and can also impact wild populations [16]. In the present work, the obtained gnathiid parasite collected from gills, branchial chambers and mouth cavity of the examined fish, while it previously obtained by Smit and Basson and Smit *et al.,* [17, 18] from the body of the fish is preferred, followed by the dorsal fin, pectoral fin and anal fin. The previous author attributed the presence of the gnathiid parasite on the caudal and pelvic fins as sampling artifact. Therefore, the present study improve that it was not artifact, gnathiid can infest other sites and sites of infestation that recorded in the present study could be as new predilection site to gnathiid.

Concerning the gnathiid prevalence (58.33%) and intensity (8-22 parasites/infested fish), approximately the same results were obtained by Jones and Grutter [9] and the attributed they change of parasite prevalence and intensity to host type and seasons (temperature). With regard to the damage (mucus, gill erosion and multifocal hemorrhagic spots) caused by gnathiids, allow us to conclude that the result of a double parasitic action; mechanical damage on the skin, gills and pharyngeal mucosa [19-21]. Additionally, the gnathiids are blood sucking parasite, so it has a well developed and strong mouth parts where, the mouthparts of the parasite penetrate the epidermis and cause hemorrhage from vessels in the dermis [21-23]. The feeding times for the three praniza stages of *G. africana* are approximately 2, 3 and 10 h [17, 18]. *G. piscivora* that attach to the skin leave the host within 2–4 h, while those that attach to gills and the walls of the gill cavity remain for 1 or more days [24, 25].

The lack of detailed description of *Gnathia* species before from Arabian Gulf or from similar host makes it difficult to provide comprehensive comparison with those already described. The present parasite has measurements larger than that of both *G. pantherina* [17] and *G. africana* [14] larva. According to Smit and Basson

[17] the basic morphology of *G. pantherina*is very similar to that of *G. africana* larva. The present material pleotelson triangular, its base wider than length and lateral margins tapering in two steps towards apex that is similar to *G. africana* while, that of *G. pantherina* concave antero-lateral margins. The parasite under discussion can however, be distinguished from *G. africana* by the flowing characteristics. The first palp article of the maxilliped of *G. africana* has 5 to 7 teeth Vs 6-8 of the present material. It can also be distinguished from *G. pantherina*, where its pereopod with 4-9 feather-like setae and short simple setae anteriorly; two to four posterior simple setae while that of *G. pantherina* with single feather-like bristl and 2-4 simple setae anteriorly.

From the previous discussed points, the present parasite is more relatively closest similar to *G. pantherina* than to *G. africana*. The gills, pectoral fins and mouth cavity record as new predilection site of this gnathiid larvae. *E.tauvina* and Arabian Gulf, especially off Dammam are new host and new geographical distribution of *G. pantherina*.

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