World Journal of Fish and Marine Sciences 7 (3): 209-213, 2015
ISSN 2078-4589

DOI: 10.5829/idosi.wjfms.2015.7.3.95269

First Report of *Polylabris lingaoensis* (Monogenoidea: Polyopisthocotylea) Infesting the Gills of *Acanthopagrus bifasciatus* From the Red Sea, Off Hurghada; Egypt

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Abstract: Skin, gills and intestines of sixty *Acanthopagrus bifasciatus* sample from Red Sea were examined parasitologically. Fish behavior, swimming, respiration were also observed. Clinical examination showed that gills of freshly dead fishes showed marbling appearance with excessive mucus secretion. Out of 60 fish, examined only 32 were found infested with polyopisthocotylean parasite with an infestation rate of 53.3%. The present specimens have all the morphological characters of *Polylabris lingaoensis*. The characters are discussed and compared with related species. Furthermore, *A. bifasciatus* is considered as a new host.

Key words: Fish Disease · Parasites · Monogenea · Polyopisthocotylea · Red Sea

INTRODUCTION

Fish are important hosts of parasites in aquatic ecosystems, harboring wide variety of adult and immature forms and acting either as sole host or as one in a series of hosts [1]. Some parasites are responsible for outbreaks of diseases to fish populations [2]. Economically, parasites can devaluate fish market value as it can cause spoilage and it is transmittable to humans [3]. On the other hand, prevalence of parasites in one habitat is indicative of the health of an ecosystem [4]. Due mainly to its considerable economic importance, Doublebar bream *Acanthopagrus bifasciatus* have attracted a great deal of attention from parasitologists [5].

Parasitism plays a significant role in fish biology and ecology [6]. Parasites infection on fish is a usual ecological event, because parasites are natural component of the aquatic environment and fish forms an important part of their life cycle [3].

Although numerous studies on marine fish parasites from the Red Sea, Hurghada area have been conducted, little is known about Monogenea at this location. Most of them are parasites mainly on the gills of fish and may be exhibit both host and site specificity [7, 8] causing economic losses and become pathogenic in some cases [9]. Hence, this work aims to study the incidence and description of monogenean parasites that infest Doublebar bream *A. bifasciatus* as well as clinical picture attributable to infestation by this parasite.

MATERIALS AND METHODS

Study Area, Fish Samples and Clinical Picture Investigation: Fish were obtained weekly and directly from the fishing boats before marketing, for a year starting at October 2013 from the Red Sea, Hurghada area (27o 13' N and 33o 50' E). Sixty fish specimens were collected alive and/or freshly dead, they were classified according to Heemstra and Randall [10] as *Acanthopagrus bifasciatus* (Doublebar bream; local name: Faskar)

Fish behavior, swimming, respiration were observed. Skin, gills and internal organs were examined by naked eyes for any attached parasites, lesions, or external changes according to Noga [11].

Parasitological Examination: Skin, gills and intestines of each fish were freshly examined microscopically for external and internal metazoans parasites. For identification purposes, the isolated parasites were fixed in 4% formalin and preserved in 70% ethanol. Monogenea were stained with acetic carmine [12] dehydrated, cleared with Eugenol and mounted in Canada balsam. Parasite identification followed standard identification literature and original descriptions.

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A few specimens were mounted in ammonium picrate glycerin medium of Rohde and Hayward [13] for observing details of the hard parts of the haptor and organization of the terminal genitalia. Measurements, all in micrometers, were taken from unflatten stained specimens using an ocular micrometer and body length includes the haptor.

RESULTS

Clinical Picture: The clinical picture of naturally infested fish showed respiratory distress, rapid movement of the operculum, reaching to water surface to gulp air. Fish showed flashing, sluggish movement, rubbing the body against hard objects, sloughing of scales, haemorrhagic ulcers, and somewhat emaciation. Gills of freshly dead fish showed marbling appearance with excessive mucus secretion, sometimes it was congested. Liver showed pale color while kidney was congested in some cases (Fig. 1).

During theparasitological investigations of *A. bifasciatus*, one monogenean fluke was found parasitizing the gills. It was identified as *Polylabris lingaoensis* [14]. Out of 60 fish, examined only 32 were found infested with this parasite with an infestation rate of 53.3%.

Parasite Description: Body lanceolate, 1,231 (1,120-1.426; n = 25) long; width at level of transverse portion of germarium 256 (179-286; n=25). Prohaptoral suckers elliptical to subcircular in outline, septate, open medially, with muscular anterior, posterior and lateral walls; septum extending diagonally across anterolateral half of sucker; sucker 43 (34-48) long, 46 (39-54) wide. Pharynx spherical, 34 (27-42) in diameter; oesophagus relatively long with bilateral pair of inconspicuous diverticula. Intestinal bifurcation at level of common genital pore; caeca blind, subequal in length with lateral and medial transverse diverticula extending to posterior limit of trunk. Haptor 623 (528-814) long, arising from ventral surface of trunk beginning at level of posterior testes, armed with 2 parallel subequal rows of 33-45 microcotylid clamps each, with free posterior end usually recurved dorsally. Clamp bilaterally symmetrical; clamp sclerites include single medial sclerite having broad truncate dorsal end and ventral end with 2 diverging spine like projections, paired anterolateral sclerites bent to form short dorsal and elongate ventral ends and paired posterolateral sclerites flattened, lightly sclerotized, incorporated into muscular wall of clamp; largest clamps near midlength of each row. Common genital pore midventral, surrounded by weak circular muscle; genital atrium unarmed. Six to eight testes intercaecal in posterior half of body; each usually transversely elongate. Vas deferens dilated immediately anterior to testes, then winding anteriorly along body midline to male copulatory organ; sigmoid seminal vesicle with thick wall, a simple dilation of vas deferens, lying just posterior to male copulatory organ; short ejaculatory duct enters base of male copulatory organ. Male copulatory organ conical, 41 (37-48) long, 29 (25-36) wide, consisting of inner tube and outer sheath; inner tube slightly expanded and with nearly parallel margins basally, narrowing before entering distal portion of outer sheath; tip of male copulatory organ flat, recurved dorsally. Pair of bilateral prostatic ducts uniting to form single common prostatic duct entering small circular pore on dorsal side of outer sheath of male copulatory organ. Germarium shaped as an interrogation mark, pretesticular, intercaecal, dorsal to vitelline ducts

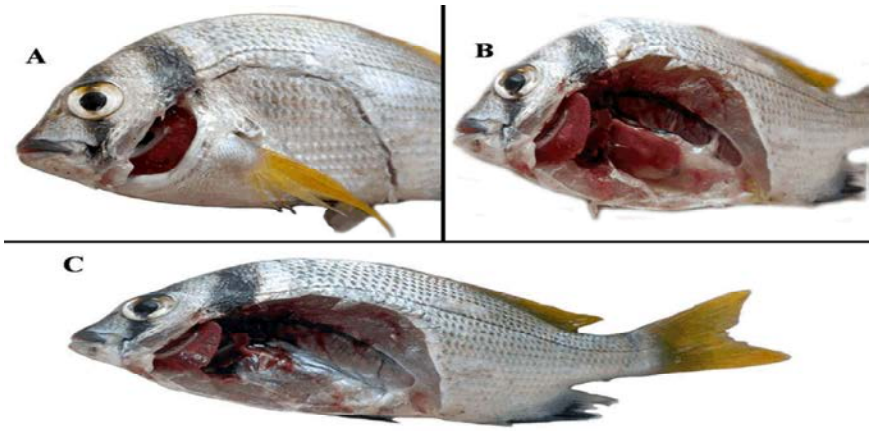

Fig. 1: *Acanthopagrus bifasciatus*, A: Gills showing congestion, B: Pale anemic liver and congested kidney and C: Marbling appearance of gills with excessive mucus secretions

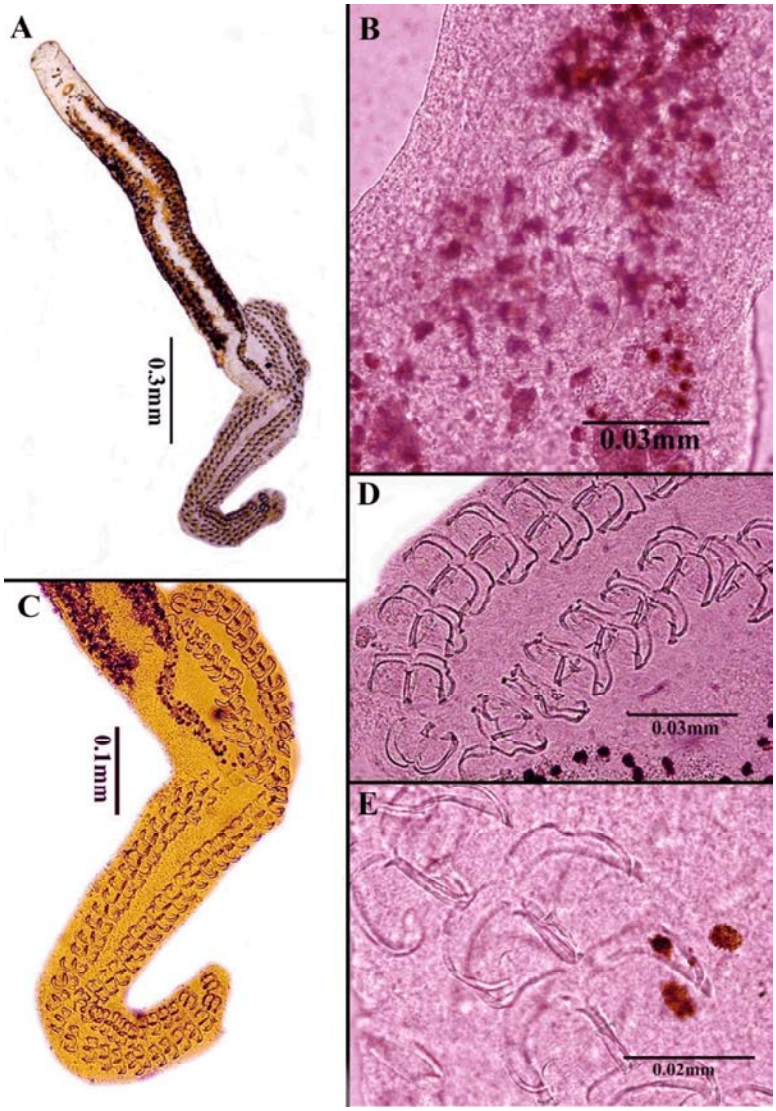

Fig. 2 (A–E): Photomicrograph of *Polylabris lingaoensis*: A. Whole mounted stained specimen (ventral view); B. Male copulatory organ and Sclerotised vagina; C. Prohaptor; D and E Sclerotised Clamps.

and uterus. Germarium originating on right side of trunk, extending anteriorly before traversing intercaecal region to left side of trunk, then looping anteriorly back to right side of trunk and finally directed posteriorly where it narrows to form oviduct. Seminal receptacle saccate; oviduct receiving genitointestinal canal before vitellovaginal reservoir; genitointestinal canal uniting with right intestinal caecum; uterus arising from base of vitellovaginal reservoir, initially directed posteriorly, reflexed anteriorly, extending along body midline to genital atrium as relatively straight delicate tube dorsal to vitellovaginal reservoir, ventral to germarium and vas deferens; proximal portion of uterus usually filled with vitelline material and infrequently single oocyte. Vaginae unarmed, opening via single medioventral pore posterior to common genital pore; 2 bilateral vaginal ducts looping ventrodorsally around respective intestinal caeca, extending diagonally toward body midline, joining, then bifurcating into paired vitelline ducts; paired vitelline ducts uniting to form vase-shaped vitellovaginal reservoir near level of transverse portion of germarium. Vitelline follicles coextensive with intestinal caeca. Egg fusiform, with long distally tangled opercular filament (Fig. 2).

DISCUSSION

Monogenea are usually considered to be host and site specific parasites. In the current study, clinical signs observed in the infested fishes were flashing; sluggish movement and rubbing the body against hard objects to

get rid the irritation caused by monogenea, which may result in sloughing of scales and hemorrhagic ulcers. These are in agreement with Hassan *et al*. [15] who recorded *Benedenia acanthopagri* from the same fish. These results may be due to the mobility of the monogenea results in wounds over a broad area reducing local damage. Respiratory distress and rapid movement of the operculum were recorded with trying of fish to reach water surface and gulp air. These results are agreed with those reported by Noga [11] and Khalil *et al*. [16]. Active feeding, attachment and motility of monogenean parasites cause severe damage of respiratory epithelial cells result in the inability of destructed gill epithelium to take oxygen [7]. Emaciation and anemia of internal organs may be attributed to that monogenean infestation reduce fish appetite until it became off food besides they are a blood feeding parasites, these results were in agreement with Hassan *et al*. [15] and Khalil *et al*. [16].

Regarding the Postmortem examination, it was revealed marbling of gills with excessive mucus secretions leading to sticking of the gill tips. This result agreed with Hassan *et al*. [15] and Khalil *et al*. [16].These lesions may be due to severe irritation caused by motility, feeding activity and fixation of *Polylabris lingaoensis*, which result in asphyxia and then death. Marbling appearance may be attributed to efferent vessels destruction where the low blood pressure and extensive hemorrhages cause a hard clotting of blood resulting in rapid obstruction of the vessel and thrombus formation then ischemia, which leads to necrosis in some gill filaments and congestion of others giving the marbling appearance [17]. Excessive mucus secretion may be to dilute the irritation and to act as a mechanical defense against the infestation.

Out of 60 fish examined only 32 were found infested with *Polylabris lingaoensis* with an infestation rate of 53.3%. This was higher than that obtained by Hassan *et al*. [15] who found *Acanthopagrus bifasciatus* infested with 22.91% by *Benedenia acanthopagri*. This may be due to different locality, geographical distribution and detected monogenea. In addition, it was higher than the result of Mahmoud *et al*. [17] who found 32% among *Sparus aurata*. This may attributed to different fish species locality, geographical distribution and detected monogeneans.

Concerning the taxonomic characters of the obtained monogenea parasite; Hayward [18] in his revision of *Polylabris* EuzetetCauwet, 1967 (Microcotylidae, Prostatomicrocotylinae), recognized 17 valid species. *P. acanthopagri* Mamaevet Parukhin, 1976 from *A. bifasciatus* (Forsskål) (Sparidae); It is characterized by the symmetrical haptor, genital atrium armed, cirrus unarmed and one vagina, the new monotypic genus *Polylabris* belongs to Microcotylinae. Certain characters, including the presence of a constriction near the proximal end of the male accessory glands and the anterior extent of clamps in the body were taxonomically unreliable because of intraspecific variation and potential introduction of artifacts during fixation [14]. While the numbers of clamps and testes could become useful for species identification if more data becomes available.

The obtained monogenea parasite possesses relatively few, rather than numerous, male copulatory spines and that; these are arranged in a crown. (This character is also shared with the one member of the subfamily Thoracocotylinae Price, 1936, *Thoracocotyle crocea* MacCallum, 1913. However, the spines of this worm are un-rudimentary and late-developing, the clamps differ markedly in structure (They are open and sucker-like rather than closed) and they also differ in other characters such as the number of hamuli and vaginae and shapes of the haptor.)

Comparing the morphological features of the present material to those obtained by Tingbao *et al*. [14] it became clear that the present specimen have all the morphological characters of *P. lingaoensis*. Moreover, *A. bifasciatus* is considered as a new host and Red Sea, Hurghada Area is new geographical distribution for this monogenean parasite.

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