

Morphology of Monogenean Parasite-Paradactylogyrus Catlaius, Found In fresh water Fish Catla catla

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Abstract:

The world of parasites is enormous. Among parasites the helminths constitute one of the large groups of eukaryotic animal parasites. Most of them live as endoparasites in the gut, and some are ectoparasitic. monogenetic trematodes exists on the external surface of the body of host that is on skin and gills are these worms are devoid of circulatory respiratory systems. Monogenea attach firmly to hosts by using hooks, clamps and a variety of other specialized structures. Monogenea can be categorized into two subclasses (1) monogeneans which have haptor, with hooks or a large attachment disc are Monopisthocotylea whereas (2)Polyopisthocotylea have multiple clamps to the haptor. For correct identification of the worms, Proper. measurements of the parasites are essential. Present work involves in the identification of monogenetic trematodes of fish host Catla catla of Hyderabad by considering morphological characters in to the account.

INTRODUCTION

Parasitism is a very successful way of life because, it evolved independently in nearly every phylum of animals from protistans to arthropods and chordates as well as in many plant groups (Roberts & Janovy, 2000). As such, the parasites are numerous. In fact, various estimates suggest that, more than 50% of all animals are parasitic at some stage of their life-cycle. This may be probably a slight exaggeration, but it is not far from truth for e.g., if we examine any domestic or wild animal, we find at least one species of parasite on (ectoparasite) or with in (edoparasite) it. Even animals reared under strict farm conditions can not escape from one parasite or other.

Most of them live as endoparasites. gut, viscera and other organ systems; a few are ectoparasitic on surface of the body parts which, have immediate access to the external environment for example monogenetic trematodes and crustacean on the skin or gills of fishes. Present study deals with morphology of monogenetic parasites collected from fish host Catla catla.

MATERIAL & METHODS

EXAMINATION OF THE SKIN, FINS AND GILLS

The skin gill mucus was scraped and smears were prepared for examination. Besides, the teased gill preparations were made as following. Exposed gills were cut at their top and bottom from the body and were placed in petridishes containing 0.85% saline and teased gently with soft hair brushes. The preparation was allowed to stand for 20–30 minutes; later supernatant was slowly removed pipette. This process was repeated 2–3 times by adding fresh saline every time to ward off blood and mucus. The remaining sediment is examined taking a pinch, each time in a watch glass using distilled water.

TEMPORARY WHOLE MOUNTS

The monogenetic trematodes being dorsoventrally flattened organisms, their ‘pressed spread’ position (Gussev, 1976, 1983) helped in determining hard parts of the opisthaptor and copulatory complex. The live worms, one-to-a micro slide was laid on small drop of water with the aid of fine pipette. Then an apt sized cover slip (small piece) was laid on it gently to prepare a temporary whole mount. It was quickly examined under E.leitz Wetzlar trinocular microscope to study morphology, hard and soft parts of the specimen

PERMANENT WHOLE MOUNTS

The permanent whole mounts were prepared following alum carmine stain procedure to obtain details of reproductive system (Lucky, 1977). They were removed from the fixative and washed several times in distilled water and a few of glacial acetic acid. The specimens were stained in alum carmine washed a few times in distilled water, were dehydrated in ascending grades of alcohol and mounted in DPX mountant.

MEASUREMENT, TERMINOLOGY AND ILLUSTRATIONS

Measurement of the helminth papasites is recorded in millimeters from semi -permanent and permanent whole mount preparations with the aid of calibrated ocular micrometer and camera lucida profiles; The method of recording measurements and terminology followed was as suggested by Gussev (1976, 1983) to the monogenetic trematodes .

Monopisthocotylea Odhner, 1912

Dactylogyroidea Yamaguti, 1963

Dactylogyridae Bychowsky, 1933

Dactylogyrinae Bychowsky, 1933

***Paradactylogyrus* Thapar, 1948**

***P. catlaius* Thapar, 1948**

(Plate I.1; Figs. 1-3)

Thapar (1948) erected the genus *Paradactylogyrus* with the type species *P. catlaius* collected on the grills of *Catla catla* (Hamilton) from Lucknow. He characterised it with an unpaired central cuticular piece “onchium”, in addition to, one pair of anchors, one bar, 14 marginal hooks; intestinal limbs simple united posteriorly; post-ovarian testis, tubular cirrus with accessory piece; pretesticular elongate ovary, tubular winding vagina with lateral opening; eggs oval with out filament. The species of the genus are parasites of freshwater teleosts.

Monacco and Mizelle (1955) and Gussev (1976) considered the genus *Paradactylogyrus* as synonym to *Dactylogyrus* Diesing, 1850 treating onchium as homologue to the usual ventral

bar. While Tripathi (1959), synonymised it with *Dactylogyrus* and described specimens collected from *Labeo bata* in Calcutta as *D. (P.) bati* recognizing it as subgenus. Agarwal (1980) reported *P. thapari* from the gills of *L. rohita* (Ham.) in Lucknow and Singh and Pragati (2000) reported *P. indicus* from *Mystus tengara* in Meerut; they have considered the genus *Paradactylogyrus* as valid. Yamaguti, much before them in 1963 retained it as valid genus and recombined *D. (P.) bati* Tripathi, 1959 as *P. bati* (Tripathi, 1959).

The parasites collected herein from the gills of *C. catla* did not differ much from all the species of the genus *Paradactylogyrus* so far described including the type species except in characters of little taxonomic significance and misinformations mentioned in some descriptions and differential diagnoses. Further the specimens (*P. catlaius* Thapar, 1948; *P. bati* (Tripathi, 1959); *P. labei proparte* (?) Musselius and Gussev, 1976); *P. thapari* Agarwal, 1980 and *P. indicus* Singh and Pragati, 2000) obtained from *C. catla*, *L. bata*, *L. gonius*, *L. calbasu*, *L. rohita* and *M. tengara* all Indian freshwater fishes appear to be more variable (Gussev, 1976). The specimens collected from *C. catla* are considered to be belonging to *P. catlaius* Thapar, 1948. . A description of the specimens is given here.

Description:

Specimens studied and measured- (12)

The body is elongated measuring 0.72 – 1.65 mm in length and 0.14 – 0.29 mm in greatest width attained in the vaginal region. The anterior end (plate I,fig.1) is lobed with two sub median and two lateral lobes; it is marked with three pairs of head organs. Posterolateral to the pharynx are a group of cephalic glands. The eye spots are lacking. The width of the worms gradually increases from anterolateral lobes to the vaginal region and decreases slowly up to the base of the opisthaptor; the letter is bi-lobed and is set off from the body by a short peduncle.

The mouth opens ventro-subterminally and leads to the buccal cavity, which in turn opens into spherical pharynx. The pharynx leads into a short oesophagus, which divides into two long intestinal caeca;

The Opisthaptor (plate I Fig. 2) measures 0.07 – 0.11 mm in length and 0.09 – 0.19 mm in width. It is armed with a pair of anchors, a transverse bar, seven pairs of marginal hooks and a median onchium. The anchors consist of a wide base, wide but short roots, strongly curved typical shaft and tapering point; the wings are absent. Anchors measure 0.033–0.038 mm in length; main part, inner root, outer root and point measure 0.028 – 0.03 mm, 0.02 – 0.07, 0.003 – 0.006 and 0.021 – 0.026 mm in length respectively. The transverse connecting bar has a median hump and notched ends pointing anteriorly or posteriorly. The seven pairs of marginal hooks, each has a wide handle, narrow and short pivot of handle, sickle shaped point, heel and loop. They measure 0.015 – 0.029 mm in length. The median onchium is spindle shaped with posterior long pointed end; it measures 0.03 – 0.04 in length and 0.001 – 0.002 mm in width.

The gonads are equatorial (Plate I, fig.3). Slightly oval testis is post ovarian and measures 0.04 – 0.05 mm x 0.03 – 0.04 mm. The vas deferens forms seminal vesicle on its course and ends at the base of copulatory complex; the latter consists of long cirrus tube and accessory piece. A prostatic reservoir is associated with the base of cirrus. The cirrus has a basal bulb which measures 0.015 – 0.018 mm in diameter, the long tube measures 0.18 – 0.22 mm in length and 0.001 mm in diameter. The accessory piece is like a thin thread measuring 0.16 – 0.19 mm in length. It is articulated with cirrus at its basal bulb and consists of terminal claw like piece measuring 0.04 mm x 0.02 mm. The ovary is elongated measuring 0.08 – 0.09 mm x 0.05 mm. The vagina is a thick tube, it opens as vaginal aperture on the dextral sub-margin. The uterus is a wide and long tube; the egg is oval without polar filaments. The genital pore opens behind bifurcation of intestinal caeca. The vitellaria are follicular and coextensive with intestinal caeca.

Remarks:

P. catlaius is a predominant gill parasitic monogenetic trematode of catla amongst other species recorded. It is larger to other monogenetic trematodes of catla, herein indicated that it is a regular parasite with relatively more worm burden. It is more pathogenic too to the gills of catla .

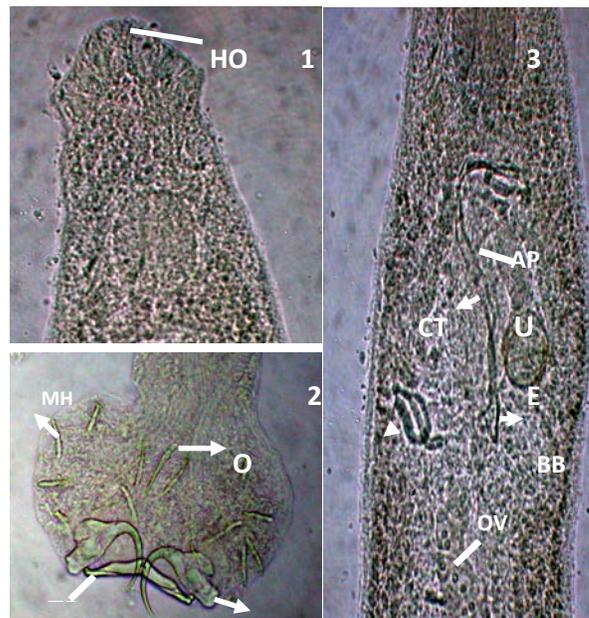


PLATE I. :*Paradyctylogyrus catlaius* Thapar, 1948

Fig. 1 : Anterior end showing head organs and pharynx

Fig.2:Opisthaptor and its anchors, bar, onchium and marginal hook. (All photomicrographs, not to scale)

Fig.3 : Mid body showing capulatory complex (cirrus & accessory piece) vagina and egg in uterus.

**A - Anchors; AP-Accessory piece; BB-Basal bulb;
HO-Head organs; MH-Marginal hooks; O-Onchium,
OV-Ovary; CT Cirrus tube; E-Egg; TB-Transverse Bar; U-Uterus; V-Vagina, VO-Vaginal Opening**

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