Wallagotrema orientalis n. sp.—a New Monogenean from Wallago attu Bloch. and Schn., with a note on Functional and Morphological Peculiarities of its Haptor

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One Text-Figure and one Table

ABSTRACT

A new monogenean viz., Wallagotrema orientalis n. sp. is described from the gill filaments of a fresh water shark, Wallago attu at Meerut, U. P., India. The new species is characterized by number of head organs, shape of cirrus, absence of an accessory piece, and prostate glands, absence of beak-like projection at the base of dorsal anchor. The description of species is supplemented with a note on functional and morphological peculiarities of its haptor.

Keywords : Monogenea ; Wallagotrema orientalis n. sp. ; Wallago attu.

INTRODUCTION

During the course of a study on monogenetic trematodes of fresh water fishes at Meerut, India, few fresh water shark, wallago attu Bloch and Schn., were found to be infected with worms belonging to the genus, Wallagotrema Tripathi, 1959. On subsequent thorough investigation they appeared to be new and are described herein as a new species, namely, W. orientalis, with an additional note on functional and morphological peculiarities of its haptor.

MATERIALS AND METHODS

The fishes for the present investigation were procured from both fish markets and local ponds and reservoirs in the Meerut District. The fishes were identified according to Srivastava (1992), and later kept in a refrigerator for 8-48 hrs. Subsequently, their gills were removed, placed in a tube, half filled with water and shaken vigorously. The fluid was then examined under the microscope for the recovery of flukes. The specimens were fixed in 70% alcohol and processed further for permanent preparation as per standard methods. All measurements were taken in millimeter (mm) and figures were drawn with the help of a camera lucida unit.

OBSERVATIONS

Wallagotrema orientalis n. sp. (Text-Fig. 1, A-E)

Body elongated, with narrower anteriorly and broadened posteriorly, measuring 0.85 – 0.92 in length and 0.15 – 0.18 in width. Head fairly set-off from the body proper, equipped with 3 – 5 pairs of head organs and 2 pairs of eye spots. In most of the forms the posterior pair of eye spots larger as compared to the anterior due to the presence of greater number of melanistic granules.
Text Fig. 1. (A-E) A & B: Head regions C: Haptor D: Male copulatory complex E: Manner of attachment to the host gill filaments (free hand drawing)
Pharynx muscular, round to oval in shape, measuring 0.04–0.05 in diameter. Intestine simple, bifurcated with cruca united posteriorly. Testis elongate-oval, post-equatorial, post-ovarian, intercaecal in position and measures 0.013 – 0.15 × 0.04 – 0.06. A fine vas deferens arises from anterior border of testis, extend anteriorly beneath the ovary and dilate to form an elliptical seminal vesicle in the pre-equatorial region, measuring 0.031 – 0.44 × 0.015 – 0.019 in size. Male copulatory complex in the form of double wall chitinoid tube. Prostate glands absent. Ovary rounded, equatorial in position, pre-testicular, intercaecal and measures 0.04 – 0.05 in length. Vagina dextral in location, funnel-shaped, non-chitinous in organization. Posteriorly, the vagina leads in to an oval receptaculum seminalis through a small oviduct measuring 0.02 – 0.03 × 0.03 – 0.05 in size. Viteline follicles distributed throughout the body from behind the pharynx upto the posterior most extension of intestine. Hapton fairly set-off from the body proper, measures 0.07 – 0.1 in length and 0.11 – 0.16 in width. It bears a pair of dorsal anchor, a pair of ventral anchor, dorsal and ventral transverse bars, and an accessory piece of dorsal anchor and marginal hooklets. Dorsal anchors juvenile type with slightly recurved points and broad base, measuring 0.08 – 0.11 in length. Ventral anchors much smaller as compared to the dorsal anchors, are varicorhinus type with slightly broad and bifid base, stout shaft and recurved points, measuring 0.02 – 0.03 in length. Dorsal

<table>
<thead>
<tr>
<th>Body Parts</th>
<th>W. longicirrus</th>
<th>W. chaulani</th>
<th>W. indiciss</th>
<th>W. orientalis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of head organs</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>3 – 5</td>
</tr>
<tr>
<td>Eye spots</td>
<td>2 pairs</td>
<td>Absent</td>
<td>2 pairs</td>
<td>2 pairs</td>
</tr>
<tr>
<td>Wings in dorsal anchor</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Beak in dorsal anchor</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Wings on ventral anchor</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Testis</td>
<td>Elongate-oval</td>
<td>Oval, post-equatorial</td>
<td>Elongate-oval</td>
<td>Elongate, post-equatorial</td>
</tr>
<tr>
<td>Cirrus</td>
<td>Elongate, tubular, bend on itself</td>
<td>Elongate, tubular, bend of itself</td>
<td>Elongate, tubular, straight</td>
<td></td>
</tr>
<tr>
<td>Accessory piece of cirrus</td>
<td>Absent</td>
<td>Absent</td>
<td>Present, small than cirrus, straight</td>
<td>Absent</td>
</tr>
<tr>
<td>Prostatic glands</td>
<td>Present, paired</td>
<td>Present, paired</td>
<td>Present, paired</td>
<td>Absent</td>
</tr>
<tr>
<td>Ovary</td>
<td>Ovoid, equatorial</td>
<td>Rounded, post-equatorial, pre-testicular</td>
<td>Rounded, equatorial, pre-testicular</td>
<td></td>
</tr>
<tr>
<td>Receptaculum seminalis</td>
<td>Absent</td>
<td>Absent</td>
<td>Present, oviod</td>
<td>Present, oval</td>
</tr>
</tbody>
</table>
transverse bars vestator type straight having slightly upwardly directed endings and measure 0.07 - 0.13 in length and 0.011 - 0.018 in width. Ventral transverse bars paired, unite in the middle region of the body like accessory pieces of the dorsal anchors. They measure 0.04 - 0.07 in length and 0.005 - 0.008 in width. Marginal hooklets 7 pairs, dactylogyrus type, measuring 0.02 - 0.03 in length. (Table 1).

DISCUSSION

The genus Wallagotrema was erected by Tripathi (1959) with W. longicirrus Tripathi, 1959 as the type species, which later was accommodated as such in the Systema Helminthum by Yamaguti (1961). To the knowledge of authors so far two more species, namely- W. chauhani Agarwal and Pandey, 1981 (from River Gomti, Lucknow) and W. indicus Singh and Sharma, 1992 (from River Kali, Meerut) have been added to the genus.

The present form differs markedly from these species in several features, particularly in the number of head organs, shape of cirrus, absence of an accessory piece and prostatic reservoir and also in the absence of beak-like protuberance at the base of dorsal anchors (Table 1). It is therefore regarded as a new species viz., W. orientalis n. sp., named after the Oriental region from which it is described.

A perusal of the literature reveals that practically no attention has been given by previous workers to resolve a key for different species of the genus. Therefore, the authors construct and provide herein an identification key for the different species of the genus Wallagotrema.

During the present study it was observed that the haptor of W. orientalis is spreader type which fastens the parasite with the tissues of the gill filaments of fish (Text-Fig. 1. E.). In most of the specimens it was noticed that the 6th pair of marginal hooks remain stable in position, preventing the anchors from slipping out from the tissue of gill filament. Rest of the marginal hooklets apparently have an additional function of holding the worm during abduction and adductions of anchors at the time of movement of parasite along the gill filament together with the head organs. The function of additional dorsal transverse bars is still obscure. Possibly it appears in connection with the necessities of general strengthening of the haptors. It is also quite probable that the anchors during abduction squeeze between connective and additional transverse bars which provide better fixation of the anchors as compare to those in which additional transverse bars is absent.

Similarly, the dorsal anchors are markedly large as compared to the ventrals which penetrate very deep in the gill filaments and erodes gill filaments significantly while its operation. On the other hand, ventral anchors are too small and are invaded superficially in the distal part of gill lamellae. They show very little damage to the branchial tissue during their torsion and reorientation.

Key to the species of Wallagotrema Tripathi, 1959

1. Dorsal anchor with accessory bar forming a triangle
2. Recurved cirrus without accessory piece
3. Recurved cirrus without accessory piece and prostatic glands
4. Straight cirrus with accessory piece
5. Head organs 3 pairs

W. longicirrus Tripathi, 1959.

W. chauhani Agarwal and Pandey, 1981
W. orientalis n. sp. (this study)
5. Head organs 3–5 pairs, prostate gland absent, dorsal anchor without a beak-like outgrowth and accessory piece of dorsal anchor do not overlap to form a triangle with dorsal transverse bar

--------------- W. orientalis n. sp.

LITERATURE CITED


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