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DIGENEA OF PAKISTAN FRESHWATER FISHES I. HAPLORCHOIDES SINDICUS N. SP. (FAMILY: CRYPTOGONIMIDAE) FROM THE INTESTINE OF MYSTUS AOR (HAM.), SUKKUR, WEST PAKISTAN

S.S.H. Rizvi,*

Government Degree College, Sukkur, Sind

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A new species *Haplorchoides sindicus* n.sp. (Family: Cryptogonimidae) has been recorded from the intestine of *Mystus aor* (Ham.) of the Indus river, Sukkur, West Pakistan. The new species resembles closely *H. attenuatum* (Srivastava, 1935) obtained from the same host.

Forty-five specimens of *Haplorchoides sindicus* n. sp. were found in the intestine of a freshwater fish *Mystus aor* (Ham.) from the river Indus at Sukkur (Sind) in the month of October, 1969. The parasites appear to be common as out of fourteen fish of 35–70 cm in length examined eleven were infested with the worms.

Materials and Methods

Live parasites were collected from the intestine of the fish and were kept in cold tap water to relax and die. After they have died, the worms were fixed and stored in alcohol–formol–acetic solution. The specimens were stained in Horen's trichrome and cleared in methyl salicylate for the study of general morphology and anatomy. Glycerine-jelly preparations of some worms were made to study the chitinous structures of gonotyl. Ten stained parasites and as many worms in glycerine-jelly were selected for sketches and measurements.

Haplorchoides sindicus n. sp.

It is a small delicate elongated parasite with anterior $\frac{1}{3}$ part more flattened dorsoventrally than the remaining 2/3 of the body as seen in Fig. 2. The anterior part is more or less like the handle of a coat-brush (Fig. 1) in shape with a ventrally bent tip. The whole body of the worm is covered with backwardly directed spines. The body measures 1.05–1.23 mm in length and 0.15–0.16 mm in breadth.

The oral sucker is subterminal, dimensions 0.036–0.047 × 0.050 mm. It encircles a pocket-shaped mouth which leads into a long pre-pharynx, length 0.133–0.249 mm. At the end of pre-pharynx a muscular pharynx, dimensions 0.036–0.042 × 0.026–0.030 mm, is present. Behind the pharynx a long oesophagus, length 0.106–0.168 mm, is placed. The ratio of the length of oesophagus and pre-pharynx is 1:1.3–1:1.5. The oesophagus bifurcates slightly in front of the middle of the body into two intestinal caeca which end blindly about 0.168 mm away from the posterior end of the body.

The excretory bladder is a Y-shaped sac opening at the posterior end of the body by a terminal aperture.

There is one oval testis, dimensions 0.104–0.133 × 0.066–0.116 mm, lying behind the receptaculum seminis at a distance of 0.675–0.0855 mm from the anterior end. The seminal vesicle is situated behind the genital sac slightly on the left side of the body at a distance of 0.420–0.600 mm from the anterior end. It is dorsally placed and bipartite, the anterior lobe is large, dimensions 0.093–0.116 × 0.087–0.133 mm and the posterior lobe is small, dimensions 0.073–.100 × 0.050–0.116 mm. The ejaculatory duct arises from the anterio-dorsal angle of the anterior lobe of the s. vesicle and opens on the left side of the genital sac, length 0.033–0.042 mm. The genital sac is globular lying in between the two intestinal caeca slightly overlapping the right one. It is situated at a distance of 0.286–0.464 mm from the anterior end and opens to the exterior ventrally at genital pore, diameter 0.040–0.042 mm. It encloses gonotyl bearing about 40–45 minute chitinous spines varying in length from the size of a dot to a rodlet, length 0.017 mm, arranged more or less in a circle around the genital pore. When a complete spine is in view it appears like a beaded or serrated rodlet but when only head is fucussed it looks like a minute denticle or arrow head as seen in Fig. 4.

The ovary, diameter 0.066–0.080 mm is globular and ventrally placed (Fig. 2) slightly behind the middle of the body at a distance of 0.525–0.750 mm from the anterior end. The thick walled receptaculum seminis, dimensions 0.070–0.150 × 0.033–0.116 mm, is oval shaped and lies in the dorsal region of the body behind the ovary. The vitellarian glands are scattered dorsally and laterally in the form of patches of small follicles from behind ovary and receptaculum seminis to the first half region between the hind end of testis and excretory pore. The follicles show concentra-

*Present address: Government College, Larkana, Sind.

tion on the left side of the body. The uterus arises from the ootype behind the r. seminis and descends down to the right side of the testis. After filling up the space behind the testis with eggs the uterus ascends up through the route it came down, extending further up to open into the genital sac slightly above the enterance of the ejaculatory duct (Fig. 3). The eggs, dimensions 0.030–0.033 × 0.014–0.017 mm, are large, oval, operculated and appear yellowish brown in colour.

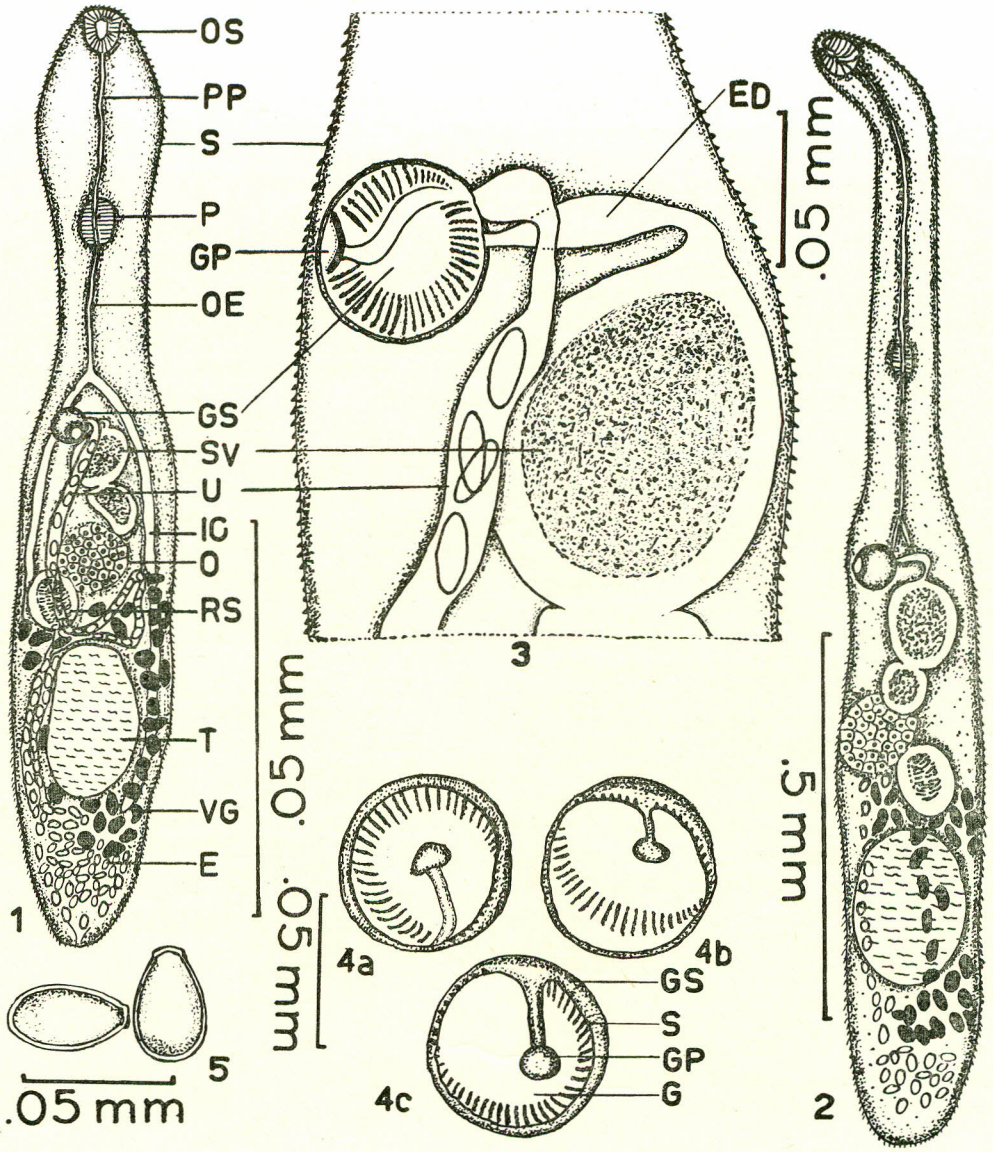

Fig. 1.—*Haplorchoides sindicus*, ventral view; Fig. 2.—*Haplorchoides sindicus*, lateral view; Fig. 3.—*Haplorchoides sindicus*, middle region enlarged. Fig. 4.—(a,b,c) *Haplorchoides sindicus*, genital sac enlarged; Fig. 5.—*Haplorchoides sindicus*, eggs enlarged;

Abbreviations Used

E, egg; ED; ejaculatory duct; G, gonotyl; GP, genital pore; GS, genital sac; IC, intestinal caeca; OE, oesophagus; OS, oral sucker; O, ovary; PP, prepharynx; P, pharnyx; RS, receptaculum seminis; S, spines; SV, seminal vesicle; T, testis; U, uterus VG, linvitee gland.

Discussion

Before the erection of the genus *Haplorchoides* (Chen[2], 1949) all its species belonged to the genus *Haplorchis* (Looss,[8] 1899). (Chen[2] 1949) divided the genus into *Haplorchis* and *Haplorchoides* and thus brought under the latter genus sixs pecies, viz., *Haplorchoides cahirinus* (Looss, 1896); Looss,[8] 1899, *K. piscicola* (Srivastava,[7] 1935) *H. gangeticum* (Srivastava,[7] 1935), *H. silundii* (Srivastava,[7] 1935) and *H. taakree* (Dayal[3], 1935), syn *Monorchotrema taakree* (Dayal,[3] 1935) as they are characterised by a long pre-pharynx, a short or rudimentary oesophagus and forward psition of the testis and vitellaria. But Martin[6] (1950) opposed this division because of little importance he gave to these characters for generic differences. However, Gupta[5] (1935) supported Chen's view by adding to this genus four new species, viz., *H. retai*, *H. gomtioensis*, *H. brahamputraensis* and *H. seenghali*. Yamaguti[9] (1958) mentioned a total record of eleven species including *H. macrones* (Dayal[4], 1949), syn. *Pseudohaplorchis macrones* (Dayal,[4] 1949 under this genus. Agrawal[1] (1964) described *H. macronis*. Out of these twelve species, eleven have been recorded from India.

H. attenuatum, *H. macrones*, *H. seenghali*, *H. macronis* and *H. sindicus* have been obtained from the intestine of *Mystus* spp. Thus *H. sindicus* which resembles the four species in the general structure of the organs stands very close to *H. attenuatum* owing to a common host. The new species resembles *H. attenuatum* in the general topography of the organs, the extent and arrangement of vetellaria and the lateral position of the genital sac but differs from it in the shape of the body, in the hinder position of the ovary which lies in the posterior half of the body behind the posterior lobe of seminal vesicle, in having little space between receptaculum seminis and testis, in the placement of testis nearer to the posterior end and in the slightly overlapping position of genital sac on the right intestinal caecum.

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