

A New Species of *Rhamnocercus* Monaco *et. al.*, 1954 (Diplectanidae: Monogenea) From Gills of Freshwater Fish *Mystus tengara* (Ham.) at Meerut

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Abstract

A new species of genus *Rhamnocercus* Monaco *et.al.*, 1954 is described from the gills of freshwater fish *Mystus tengara* (Family: Diplectanidae) at Meerut. It is the first report of this genus from Meerut. Genus *Rhamnocercus* was established by Monaco *et al.*, 1954 for the worms collected from the gills of *Umbrina roncadorensis* at California. The present form resembles closely with *Rhamnocercus* Monaco *et.al.*, 1954 in having dagger shaped spikes at the margins of peduncle. But it differs from *Rhamnocercus* in absence of clumps of spines on the haptor. Present form differs from other species of *Rhamnocercus* Monaco, *et. al.*, 1954 in Number of head organs 7-8 pairs in *R. Srivastawa* and 5 pairs in *R. seenghela*; as compared to 6 pairs in the present form); shape of seminal vesicle, cirrus and its accessory piece; shape of dorsal transverse bar (having elongated arms of V); shape and extension of spikes and absence of side connectives. Hence, it is described as a new species viz., *R. pandeyii*.

Keywords: Monogeneans, *Rhamnocercus pandeyii*, peduncular spikes, haptoral spines.

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Introduction

During the course of study of freshwater monogenean fauna of fishes at Meerut, the authors came across one specimen of *Mystus tengara* (Ham.), infected with monogeneans belonging to genus *Rhmannocercus* Monaco *et. al.*, 1954. On subsequent study, the present form appeared new to the author and is described herein as such.

Materials And Methods

Fishes for present investigation were collected from local fish markets of Meerut. The identification of piscine hosts was made with the help of classical work of Day, 1889.

Mizelle's (1936 and 1938) freezing technique was employed for collecting monogeneans. Gills were removed from fishes and placed in separate tubes, half filled with water and kept in refrigerator for 8-48 hours and shaken vigorously. This solution was poured in clean petridishes, diluted with water and examined under a binocular microscope. Care was taken to keep the part of gill, subjected to examination submersed under water. Worms thus collected, were washed thoroughly and fixed in hot 70% alcohol or 10% neutral formalin.

Study of chitinoid hard parts was made in glycerin mounts. Permanent mounts were made after staining in Aceto alum carmine, dehydrating through ascending grades of alcohol, clearing in

Xylene and mounting in Canada balsam. Camera lucida sketches were made both from temporary and permanent preparations. All measurements were taken with the help of stage micrometer and oculomotor by method suggested by Gussev (1973).

Results

The parasite is elongate, bluntly pointed at ends and measures 900 - 1210 μm in length and 109 - 115 μm in width. The prohaptor and opisthaptor are fairly set off from the body proper. Bilobed prohaptor tapers anteriorly and it is equipped with six pairs of head organs and two pairs of eye spots. Head organs communicate with cephalic glands on either postero-lateral sides of pharynx through separate ducts, running along the sides of pharynx. Two pairs of eye spots are present in the region of pharynx. Posterior pair of eye spots is larger on account of presence of greater number of melanistic granules. Pharynx is large, muscular and oval measuring 45 - 50 x 40 - 44 μm . Intestinal crura simple, bifurcate and confluent posteriorly, slightly anterior to peduncle.

Male reproductive system consists of testis, vasa differentia, seminal vesicle and male copulatory complex. Testis single, fusiform, post equatorial, post ovarian and intercaecal, measuring 128 - 134 x 81 - 85 μm . From the anterior border of the testis, a fine duct, the vasa efferentia, arises it opens anteriorly into

seminal vesicle. The seminal vesicle is bilobed. The lobes of seminal vesicle are joined by a long duct like and lightly coiled isthmus. Posterior lobe of the seminal vesicle is horse-shoe shaped measuring 53 - 58 x 11 - 13 μm . Isthmus is long and measures 96 - 110 μm in length. Anterior lobe of seminal vesicle is fusiform and measures 68 - 72 x 19 - 21 μm . Seminal vesicle opens at the base of cirrus. Male copulatory complex consists of cirrus and three accessory pieces. Cirrus is a double walled chitinous tube with a broad base. Curved tube runs anteriorly, takes an anti-clockwise turn, proceeds anteriorly and turn backwards and a little behind the base it again turns and runs anteriorly. It again makes a loop over itself and terminates in the U-turn of the cirrus tube. The cirrus measures 170.9 - 172.6 μm in length. Diameter at the base of the cirrus is 5 - 6 μm while the diameter of the mesial part of cirrus is 1 - 1.5 μm . Diameter of the distal part of cirrus is 4 - 4.5 μm . Accessory piece of cirrus is made up of three pieces. First piece is inverted S-shaped with swollen ends. It measures 49 - 53 μm in length. The other two accessory pieces are similar in shape and size. They are comma shaped (9) and measure 6.1 - 66 μm in length, and are situated on either side at the base of the cirrus.

Female reproductive system comprises of ovary, receptaculum seminis, a vaginal duct and vagina. Ovary

is single, pre-testicular, and sinistral and club shaped. It measures 130 - 170 x 24 - 28 μm . Receptaculum seminis is pre-ovarian, superimposed on the left intestinal crura and elliptical in outline. It measures 44 - 48 x 16 - 19 μm . Anteriorly, a fine vaginal duct arises from the receptaculum seminis and opens into funnel shaped vagina. Vaginal duct measures 33 - 36 μm in length. Vaginal opening is sinistral and measures 0.015 - 0.016 mm in diameter.

Haptor is fairly set off from body proper by a long narrow peduncle. The peduncle bears five pairs of hard sclerotized, leaf shaped spikes arranged in two rows on either side of haptoral peduncle. These spikes are dorsally embedded on the haptor and measure 28 - 30 μm in total length. They are divisible into dagger shaped spike and a long rod-like handle. Spike measures 13 - 20 μm , while its handle measures 14 - 16 μm . Haptor measures 138 - 143 μm in length and 145 - 148 μm in width. Armature of the haptor consists of two pairs of dissimilar anchors (dorsal and ventral) two transverse connective bars (dorsal and ventral) and seven pairs of marginal hooklets. Dorsal anchors are 'Boreal' type measuring 112 - 115 μm in total length. Dorso apical length of dorsal anchor is 112 - 114 μm and ventro apical length is 110 - 112 μm , having equally developed roots. Broad base is divisible into narrow but pointed inner root and

broad and quadrangular outer root. At the base of the inner root, a crochet hook shaped protuberance is present providing the site for the articulation of dorsal transverse bar. Anchor base narrows abruptly into a straight shaft measuring 56 – 61 μm that tapers into a sharp point measuring 22 - 30 μm . Dorsal transverse bar is 'Wunderoid' type measuring 91 - 95 μm in length and median Width of bar is 10 - 12 μm . It is a wide, 'V' shaped bar with outwardly directed blunt lateral ends. Ventral anchors are juvenile type measuring 65 - 89 μm . Dorso-apical length of ventral anchor is 64 - 88 μm and ventro-apical length is 64 - 88 μm . Narrow base is divisible into equal outer and inner root. Anchor roots are poorly demarcated with the help of suture extending from the tip of the root, but not set apart. Base tapers gradually into a curved shaft measuring 55 – 58 μm that tapers into a point measuring 38 - 41 μm . The ventral transverse bar is 'Anchoroid wegeneri' type measuring 108 - 112 μm in length and median width of the bar is 9 - 11 μm . It is a more or less straight bar with an antero-median conical protuberance. Lateral ends of the bar possess a condyle for articulation with the anchors. Marginal hooklets are 'Dactylogyrus' type measuring 20 – 33 μm in total length. Marginal hooklets are divisible into sickle measuring 5 - 10 μm in length and handle measuring 15 - 22 μm . Proximal width

of sickle is 1 - 2 μm . Distal width of sickle is 3 - 3.5 μm .

Discussion

The present form resembles closely with *Rhamnocercus* Monaco *et.al*, 1954 in having dagger shaped spikes at the margins of peduncle. Singh and Agarwal (1994) reported that although, this character is reported in three different genera *viz* ,

1. *Rhabdosynochus* Mizelle and Blatz, 1941
2. *Rhamnocercus* Monaco, *et.al.*, 1954; and
3. *Pedunculospina* Hargins, 1954

The genus *Pedunculospina* was synonymised with the genus *Rhamnocercus* by Hargis (1955). This is the third occasion, when this parasite has been reported from a fresh water fish in India. The author herself discussed about this parasite with Dr. G.C. Kearns. He is of the opinion, that although this parasite is closer to *Rhamnocercus* Monaco, *et al*, 1954; but it differs from *Rhamnocercus* in absence of clumps of spines on the haptor. But despite of repeated efforts, the author failed to collect additional specimens of this parasite. Therefore, at present, it is placed under the genus *Rhamnocercus*. Genus *Rhamnocercus* was established by Monaco *et al.*, 1954 for the worms collected from the gills of *Umbrina roncadora* at California. To the best of my knowledge following species are

known under the genus *Rhamnocercus* Monaco *et. al.*, 1954 as appended in the Table 1.

Table 1 : Showing host parasite list of *Rhamnocercus* sp.

S. No.	Parasite Species	Host	Locality
1.	<i>R. rhamnocercus</i> Monaco <i>et al</i> ; 1954	<i>Umbrina rancador</i>	California
2.	<i>R. bairdiella</i> Hargis, 1955	<i>Bairdiella Chrysur</i>	Florida
3.	<i>R. stichospinus</i> Seamster & Monaco, 1956	<i>Micropogon undulates</i> <i>Menticirrus littoralis</i>	Gulf of Mexico, Texas
4.	<i>R. oliveri</i> Luque and Iannacone, 1991	<i>Stellifer minor</i>	Chorillos, Peru
5.	<i>R. stelliferi</i> Luque and Iannacone, 1991	<i>S. minor</i>	Chorillos, Peru
6.	<i>R. menticirri</i> Luque and Iannacone, 1991	<i>S. minor</i>	Chorillos, Peru
7.	<i>R. srivastavi</i> Singh & Agarwal, 1994.	<i>Wallago attu</i>	Meerut, India
8.	<i>R. margaritae</i> Zambrano, 1997	<i>B. ronchus</i>	Lagoon of La Restinga, Venezuela
9.	<i>R. seenghala</i> Kumar, 2013	<i>Mystus seenghala</i>	Sharanpur, India
10.	<i>R. pandeyii</i> present specimen	<i>M. tengara</i>	Meerut, India

The present form differs from all the known Neotropical forms of *Rhamnocercus* Monaco, Wood and Mizelle, 1954 in: number of head organs, absence of accessory piece of cirrus, number of spikes on the haptor peduncle, absence of clumps of spines on the haptor, shape of dorsal and ventral anchors and transverse bars, reported from marine teleosts.

The present form comes closer *R. srivastavi* Singh and Agarwal, 1994 and *R. seenghala* Kumar, 2013 in: number of spikes on the haptor peduncle, absence of clumps of spines on the

haptor, shape of dorsal anchors, ventral anchors and ventral transverse bar.

However, the present form differs from *R. srivastavi* Singh and Agarwal, 1994 and *R. seenghala* Kumar, 2013 due to difference in: number of head organs (7-8 pairs in *R. srivastavi* Singh and Agarwal, 1994 and 5 pairs in *R. seenghala* Kumar, 2013 as compared to 6 pairs in the present form); shape of seminal vesicle, shape and accessory piece of cirrus, shape of dorsal transverse bar (having elongated arms of V), shape and extension of spikes, presence of side connectives in *R.*

srivastavi Singh and Agarwal, 1994 and
R. seenghala Kumar, 2013.

On the basis of above differences, the present form is identified as a new species viz. *R. pandeyii* n.sp.

Etymology :

It is named after Prof. K.C. Pandey for his valuable contributions in the field of Parasitology.

Explanation Of Figures

PLATE I: *Rhamnocercus pandeyii*,
Figure 1. Prohaptor; Figure 2. Soft anatomy; Figure 3. Cirrus with accessory piece; Figure 4. Peduncular spike; Figure 5. Haptor

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