

GENARCHOPSIS HECKMANNI SP. N. (TREMATODA: HEMIUROIDEA) FROM CHANNA O. STRIATUS IN THATTA, SINDH, PAKISTAN

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ABSTRACT

A new species *Genarchopsis heckmanni* is described from freshwater fish *Channa O. striatus* purchased from Thatta fish market, Sindh, Pakistan. The new species differs in possessing a large voluminous, hen's egg-shaped 'metraterm' like structure which is packed with thousands of eggs, yellowish brown in colour. Additionally the new species can also be distinguished by its larger body size, sucker size, shape and position of gonads.

Keywords: *Genarchopsis heckmanni* sp.n., *Channa O. striatus*, Thatta, Sindh, Pakistan

INTRODUCTION

Fairly good number of species of the genus *Genarchopsis* Ozaki, 1925 (Super family Hemiuroidea: Hemiuridae Lühe, 1901) are known to parasitize freshwater and marine fishes and occasionally amphibians, reptiles and shrimps (Gibson and Bray, 1979). The available literature reveals over twenty species of the genus *Genarchopsis* Ozaki, 1925 from different hosts and localities including India, Pakistan and Bangladesh.

Ozaki (1925) proposed the genus *Genarchopsis* in the family Hemiuridae Lühe, 1901 with *G. goppo* as the type species. Srivastava (1933) synonymised *Genarchopsis* Ozaki, 1925 with the genus *Progonus* Looss, 1899 and described *Progonus piscicola* and *P. ovocaudatum* from *Ophiocephalus punctatus* in India.

Later Srivastava (1933) proposed the genus *Ophiocephalus striatus*. The remarkable points of difference for creation of a new genus were: Presence of well-developed globular pars prostatica, a large and highly muscular metraterm, a protrusible ductushermaphroditicus capable of functioning as the copulatory organ and presence of a peculiar oesophageal pouch in the specimens which otherwise resembled the genus *Genarchopsis* (syn. *Progonus* Looss, 1899).

Chauhan (1953) reviewed the trematode fauna of India and proposed a key to the Indian species of the genus *Genarchopsis* Ozaki, 1925 in which he considered *G. ovocaudatum* (Srivastava, 1953) Manter, 1938 as valid species. Yamaguti (1958) considering a single common character i.e. the presence of caudal anatomosis in all the genera synonymised the genus *Ophiochorchis* Srivastava, 1933 (*Genarches* Looss, 1902 preoccupied and *Progonus* Looss, 1899 preoccupied) with *Genarchopsis* Ozaki, 1925.

According to Varma and Sahay (1983) the genus *Genarchopsis* Ozaki, 1925 includes only three valid species i.e. *G. piscicola*; *G. ovocaudatum* and *G. cameroni*, the authors further added *Ophiochorchis dasus* Gupta, 1951 which does not possess an oesophageal pouch and thus *Ophiochorchis dasus* should in fact be regarded *Genarchopsis dasus* (Gupta, 1951). Varma and Sahay (1983) also described *G. avitellaruim* from the stomach *Ophiocephalus punctatus* from Assam, India. Bilkees and Khan (1990) described *G. kalriai* from a related host *Channa O. marulius* in Sindh, Pakistan, the authors agreed with Varma and Sahay (1983) that only four valid species of the genus exists, and the synonymy of species proposed by them is also reasonable. Shimazu (1995) described three species of *Genarchopsis* (*G. goppo* Ozaki, 1925, *G. anguillae* Yamguti 1938 and *G. felicola* Shimzu, 1995) from freshwater fishes of Japan. Urabe (2001) reported and described the developmental stages of *Genarchopsis goppo* during a study of lifecycle of cystophorus cercariae collected from Nara, Honshu, Japan.

Moravec *et al.* (2003) conducted a systematic survey of trematodes and cestodes based on helminthological examination of 176 specimens of 22 freshwater fishes, belonging to 11 families of six fish orders from central China.

Genarchopsis goppo was recorded along with other trematodes and cestodes, and *G. anguillae* was considered a junior synonym of *G. goppo*. Almost all the parasites were briefly described and illustrated and problems concerning their morphology, taxonomy, host and geographical distribution were discussed.

Chandra (2006) reviewed available literature concerning marine and freshwater fish parasites in Bangladesh. The author presented a list of fish-parasites with their hosts, which included 290 species of parasites along with the following species of the genus *Genarchopsis*: *Genarchopsis bengalensis* from *Channa punctata*, *G. bashiri* from *Heteropneustes fossilis*, *G. dasus* from *Channa punctata* and *Glossogobius giuris*, *G. lobata* from *Channa gachua*, *G. microcotyle* from *Channa punctata*, *G. ozaki* from *C. punctata*, *G. willagani* from *Wallago attu*, *Genarchopsis* sp. from *Clupisoma garua*, *Glossogobius giuria* and *Silonia Silondia*.

Surender and Bikshapathi (2007) studied proteins and related molecular changes in a post helminth infection in the liver and intestine of *Channa punctatus* due to intestinal infection *Genarchopsis goppo* Ozaki (1925). All parameters assayed showed an increase in the myotoma muscles of the infected fish.

To date three species of the genus are known in Pakistan, these are *G. macrocotyle* (Coil and Kuntz, 1960) Bilqees *et al.*, 1972; *G. macrocirrus* Rehana and Bilqees, 1980 both *Ophiocephalus striatus* collected from Kalri Lake and *G. kalriai* Bilqees and Khan, 1990 from a related host *Channa O. marulius* of the same locality. Present species is described from the small intestine of *Channa O. striatus* purchased from fish market in Thatta, Sindh, Pakistan.

MATERIALS AND METHODS

Twenty-two freshwater fishes *Channa O. striatus* were purchased from a local fish market in Thatta district, Sindh, Pakistan. These were examined in laboratory for helminth parasites. Out of twenty-two fish, one harboured a single trematode was fixed in F.A.A. fixative under slight pressure of a cover glass for 24 hrs. later the parasites was removed, washed well with 70% ethanol, stained with Mayer's carmalum, dehydrated in graded series of alcohol, cleared in clove oil, rinsed in xylene and mounted permanently in Canada balsam. All measurements are in millimeters, unless otherwise indicated. The Holotype specimen is deposited in the Livestock and Fisheries Research Unit, southern zone Agricultural Research Centre, Karachi University Campus, Karachi-75270.

Genarchopsis heckmanni sp.n.

Figs. 1a, b, c- Fig 2

Host: *Channa O. striatus*

Location: Thatta fish market, Sindh, Pakistan

No. of host examined/infected: Twenty-two/five

No. of specimen recovered: One

Date of collection: February 2006

Specimen number: L.F.R.U 01-05

DESCRIPTION

Based upon five mature, gravid, permanently mounted specimens.

Body elongate cuticle smooth, attenuated posteriorly with a comparatively narrow posterior extremity. Total body length 5.03-5.12 by 1.01-1.12, widest at the posterior level of the voluminous 'metraterm' which is situated in the anterior half of the body; oral sucker muscular, well developed and subterminal in position; measures 0.50-0.52 by 0.49-0.51 in size. Pharynx well developed 0.14-0.15 by 0.18-0.20 in size. Pre-pharynx and esophagus not conspicuous. Ceca bifurcate immediately below the pharynx and appear to unite in the posterior extremity above the vitelline glands. Ventral sucker larger than the oral sucker, rounded 0.98-0.99 by 0.72-0.75 in size. The ventral sucker is situated below the anterior half of the body. The testes are comparatively smaller oval in shape, symmetrical and lie on either side of the body; these are separated from each other by the uterine coils, post acetabular in position. The right testis measure 0.25-0.30 by 0.16-0.19 in size and the left is 0.24-0.29 by 0.16-0.18 in size; it is situated nearer to acetabulum as compared to the right testis. Vesicular is stout, compact tabular structure, forming a bending curve to open in the genital opening. The vesicula seminalis is situated on the anterior half region of the body above the voluminous 'metraterm', just below the cecal bifurcation. The seminal vesicle forms a pit like structure. The stouter, tubular portion of the vesicle measures 0.71 by 0.11 in size while the rest of the narrower tubular portion is 0.51 long and 0.08 wide. The ovary is a rounded structure 0.32-0.33 by 0.29-0.30 in size. It is larger than the testes and lie immediately over the compact vitellaria, toward the right side far below the right testis. The vitellaria are two-lobed glands, lie on either side of the posterior extremity and partly overlap the caudal anastomosis. Each gland is composed of varying number of lobes forming compact, oval and elongated masses. The right vitelline gland measures 0.30-0.32 by 0.2 size while the left is 0.30-0.31 long and 0.2 wide.

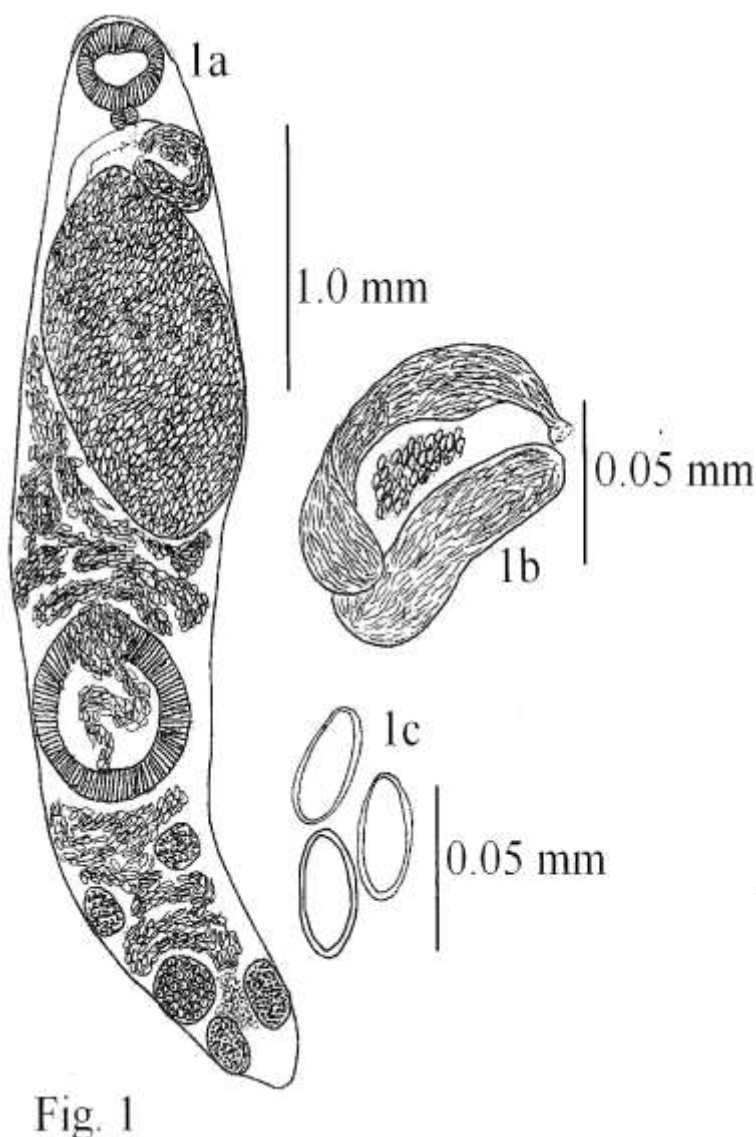


Fig. 1

Fig. 1 (a) *Genarchopsis heckmanni* sp.n. entire specimen, ventral view; (b) Seminal vesicle and associated structures; (c) Eggs, enlarged.



Fig.2. *Genarchopsis heckmanni* sp.n., Photomicrograph.

The uterus is ascending type; it starts from just above the ovary, fills the space above ovary, passes between the two testes below the acetabulum. The uterine coils cross the acetabulum and occupy entire place above it. At the left side lies a voluminous, hen's-egg shaped structure which may termed as 'metraterm' as the whole thing appears to be packed with thousands of eggs, it measures 1.8-1.9 by 0.9-1.0 in size.

The egg are yellowish brown in colour, thin shelled, oval to elongate and measure 0.031-0.035 by 0.011-0.019. a tail like small appendage is present.

DISCUSSION

According to available literature, over twenty five species of the genus *Genarchopsis* have been reported, majority among them are from India, while three species have been reported from freshwater fishes in Pakistan;

these are: *G. macrocotyle* (Coil and Kuntz, 1960) Bilqees *et al.*, 1972 from *Ophiocephalus striatus* and from *O. punctatus* by the original authors in Bangladesh (Former East Pakistan); *G. macrocirrus* Rehana and Bilqees, 1980 from *O. striatus* and *G. kalriai* Bilqees and Khan, 1990 from *Channa O. marulius*. The present specimen is 5.3 long and 1.1 wide in the interior half region. It can be differentiated in having a greater body length from most of the species ranging from 0.90 to 3.4 or less than 5 millimetres in total body length. *G. cuchiai* Kakaji, 1969 is however 5.6 - 5.75 long and 1.78-2.2 wide reported from Indian freshwater fish and *G. macrocirrus* Rehana and Bilqees, 1980 is 5.25-6.09 by 0.86-1.37 in size. Present specimen is although reported from the same host i.e. *C.O. striatus* but differs in: (i) absence of an oesophagus, (ii) absence of voluminous cirrus sac, (iii) smaller size of testes and large size of ovary, (iv) vitelline glands with smooth walls, non-filamentous, smaller sized eggs and above all it differs in having a voluminous, hen's-egg shaped 'metaterm' packed with thousands of eggs. Similarly the present specimen differs from *G. macrocotyle* and *G. kalriai* reported from *O. striatus* and *C.O. marulius* in Pakistan mainly in having a larger body size, a different sucker ratio and position of gonads and size of the eggs and above all in having a voluminous metaterm.

The present specimen appear unmatched from the previous reported and described species from freshwater fishes mainly in possessing a large, voluminous, hen's-egg shaped 'metraterm' not reported earlier. Srivastava (1933) however, described and figured 'muscular metraterm' in *G. lobatum* and *G. singularis*. The present specimen does not possess any such type of structure, further the eggs are stated to bear polar filaments in the above species while the eggs do not bear polar filaments in present specimen. Additionally present specimen also differs in the body size, sizes of the oral and ventral sucker and relative sizes of the gonads and their positions. Although the present specimen is reported from the same host that is *Channa O. striatus* but it appears quite different on the basis of the character stated above and therefore it is proposed to be a new species as *Genarchopsis heckmanni*. The species is named in honour of Dr. Richard Heckmann, Brigham Young University, Provo, Utah, U.S.A.

ACKNOWLEDGEMENT

Authors wish to thank the Director General, southern zone Agricultural Research Centre for providing necessary research facilities. Thanks are also extended for financial support through ASPL-II Research project of the A.S.D/PARC, Islamabad.

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(Accepted for publication May 2011)