

A New Trematode of the Genus *Genarchopsis* Ozaki, 1925 from Freshwater Fish of Sindh, Pakistan

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Abstract:- During a survey of helminth parasites of fishes twelve trematodes were collected from the small intestine of fish *Channa (Ophiocephalus) striatus* (Bl.) and *Channa (Ophiocephalus) maculatus* (Bl.) and identified as *Genarchopsis gibsoni* new species and *G. kalriai* Bilqees and Khan, 1991. The present new species is separated from the previously described species of the genus in having body elongate, rounded at anterior extremity, narrower at hind body and bluntly pointed at posterior extremity, widest at the acetabular region. Forebody much longer than hindbody. Pharynx oval. Prepharynx and esophagus absent. Acetabulum near the posterior end, very large almost occupying the whole width of the body. Testes, postacetabular and transversely elongated. Genital opening at the level of the posterior margin of the pharynx. Cirrus sac long, intercecal, curved dorsally containing prominent elongate seminal vesicle and long pars prostatica. Vitellaria consist of two very small, dark, elongate masses. Ovary, vitellaria and testes are all close to each other. Uterus occupying preacetabular region and reach to end of ceca posterior to acetabulum. While *G. kalriai* Bilqees and Khan, 1991 is being reported from a different host, earlier this species was reported from freshwater fish *Channa (Ophiocephalus) marulius* (Ham.)

Keywords: Trematodes, freshwater fish, *Genarchopsis gibsoni* n.sp., *Genarchopsis kalriai* Bilqees and Khan, 1991, Sindh, Pakistan

INTRODUCTION

Ozaki (1925) proposed the genus *Genarchopsis* in the family Hemiuridae Lühe, 1901 with *G. goppo* as the type species. Later, Srivastava (1933) synonymised *Genarchopsis* Ozaki, 1925 with the genus *Progonus* Looss, 1899 and described *Progonus piscicola* and *P. ovocaudatus*. He proposed the genus *Ophiocorchis* with *O. lobatum* as its type species from *Ophiocephalus striatus*. His proposition was based on the presence of a well defined oesophageal pouch and certain other differences such as the presence of a well developed globular pars prostatica, a highly muscular metraterm and a protrusible ductus hermaphroditicus in the specimens, which otherwise resembled the genus *Genarchopsis* (syn. *Progonus* Looss, 1899).

Chauhan (1953), reviewing the trematode fauna of India, proposed a key to Indian species of the genus *Genarchopsis* Ozaki, 1925 in which, he

considered the Indian species, *G. ovocaudatus* (Srivastava, 1933) Manter, 1938 and *G. piscicola* (Srivastava, 1933) Manter, 1938 as valid species. Yamaguti (1956) taking into consideration one common character, the presence of caudal anastomosis in all the genera, synonymised the genus *Ophiocorchis* Srivastava, 1933 (*Genarches* Looss, 1902 preoccupied and *Progonus* Looss, 1899 preoccupied) with *Genarchopsis* Ozaki, 1925. Dwivedi (1965) described *G. melanostictus* from *Bufo melanostictus* from India.

Yamaguti, 1971 listed fourteen species in the genus, *G. goppo* Ozaki, 1925 in *Moguranda obscura* from Hiroshima, Japan; *G. anguillae* Yamaguti, 1938 in *Anguilla japonica* and *Chaenogobius urotaenia* from Tutiura, Japan; *G. cameroi* Kakaji, 1969 in *Mystus seenghala* from Lucknow, *G. cuchini* Kakaji, 1969 in *Amphipnous cuchia* from Muzaffarnagar, India; *G. dasus* (Gupta, 1951) Yamaguti, 1958 in *Ophiocephalus punctatus* from India, *G. faruquis* (Gupta, 1951) Yamaguti, 1958 in *Mastacembelus armatus* from India; *G. gigi* Yamaguti, 1939 in *Pelteobagrus nudiceps* from Lake Biwa, Japan; *G. indica* (Gupta, 1951) Yamaguti, 1958 in *Ophiocephalus punctatus* from India; *G. lobata* (Srivastava, 1933) Yamaguti, 1954;

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G. macrocotyle Coil and Kunz, 1960 in *Ophiocephalus punctatus*, Dacca, E. Pakistan; *G. muelleri* (Levinsen, 1881) Yamaguti, 1954 in *Cottus scorpius*, *Gadus ovak* from Edgedesminde; *G. ovocaudata* (Srivastava, 1933) Manter, 1938 in *Ophiocephalus punctatus* from India; *G. punctati* Agarwal, 1966 in *Ophiocephalus punctatus* from Lucknow, India and *G. singularis* (Srivastava, 1933) Yamaguti, 1954 in *Ophiocephalus striatus* from India. Rai (1972) synonymized *G. piscicola*; *G. ovocaudata*; *G. lobata*; *G. indicus*; *G. dasus*; *G. singularis*; *G. melanostictus* and *G. faruguis* with *G. goppo*. Hafizuddin and Khan (1973) reported *G. bashiri* from *Heteropneustes fossilis* from Bangladesh.

Pandey (1973) redescribed *G. goppo* from four hosts including *Channa punctatus*, *C. striatus*, *Rana cyanophlyctis* and *Tropidonotus piscator*. Bashirullah and Elahi (1972) described *G. ozakii* and *G. bangladesensis* in freshwater fish *Channa (Ophiocephalus) punctatus* from Dacca, Bangladesh. Madhavi (1978) reported lifecycle in detail of *G. goppo* found in the stomach of *Channa punctatus*.

Gibson and Bray (1979) argued that *G. thapari* Gupta and Chakrabarti, 1967, from the intestine of a snake is known only from four immature specimens, which were probably fish-parasite which had been ingested by the wrong host. Rai (1972) and Pandey (1975) noted Laurer's canal in *G. goppo*; Madhavi and Rao (1974) and Ajaneyulu (1967) described Juel's organ in *G. punctati* Agarwal, 1966, while Ozaki (1925) reported Laurer's canal in *G. goppo*. The present author agrees with Gibson and Bray (1979) who suggested that it was unlikely that such apparently different seminal and vitelline disposal apparatus could be congeneric, more detail information is required on all the species present. Ahmed (1981) in his checklist of helminthes from freshwater fishes of Bangladesh reported *G. lobata* Srivastava, 1933 from *Channa gachua*, *G. bengalensis* Bashirullah and Elahi, 1972 and *G. ozaki* Bashirullah and Elahi, 1972 from *Channa punctatus*. Varma and Sahay (1983) considered both *Ophiocorchis* Srivastava, 1933 and *Genarchopsis* Ozaki, 1925 as separate valid genera, they further transferred *G. melanostictus* Dwivedi, 1965 and *G. cuchial* Kakaji,

1969 to the genus *Ophiocorchis* as they possess an esophageal pouch.

According to Varma and Sahay (1985) the genus *Genarchopsis* Ozaki, 1925 includes only three valid species viz. *G. piscicola*; *G. ovocaudatum* and *G. cameroni* and to this they added *Ophiocorchis dasus* Gupta, 1951 which does not possess an oesophageal pouch and they *Ophiocorchis dasus* should infect be *Genarchopsis dasus* (Gupta, 1951). Varma and Sahay (1983) described *G. avitellarium* from stomach of *Ophiocephalus punctatus* from Assam, India. Wang (1984) recorded *G. elongatum* from *Zacco* sp. from Fujian Province, China. Qiu and Lin in Shen and Qiu (1995) reported *Genarchopsis clupeae* from a fish *Clupea pallasii* from the Yellow Sea.

Bhadauria and Dandotia (1954) during studies of trematodes parasites of freshwater fishes from Gwalior region, India, described *G. folliculate* from *Mastacembelus* sp. and *Channa* sp. Bilqees et al. (1972) Rehana and Bilqees (1980) described *G. macrocirrus* and recorded *G. macrocotyle* (Coil and Kunz, 1960) from *Channa striatus* of Kalri Lake, Sind, Pakistan. Bilqees and Khan (1991) reported *Genarchopsis kalriai* from *Channa marulius* from Kalri Lake, Sindh, Pakistan. Shimazu (1995) during studies on freshwater fish trematodes of Japan reported *Genarchopsis fellicola* from *Chaenogobius urotaenia*.

A new species *Genarchopsis gibsoni* and a known species *G. kalriai* is reported here from the fishes *Channa (Ophiocephalus) striatus* and *Channa (Ophiocephalus) maculates*, respectively.

MATERIALS AND METHODS

Sixty nine *Channa (Ophiocephalus) striatus* (Bl.) and fifty-seven *Channa (Ophiocephalus) maculatus* (Bl.) were purchased from Keenjhar Lake, Sindh, Pakistan. Trematode specimens recovered from these fishes were fixed in AFA solution under slight cover glass pressure for 24 hours, washed several times with 70% alcohol, stained with Mayer's carmalum, dehydrated in graded series of alcohols, cleared in clove oil and xylene and mounted permanently in Canada balsam. Measurements are given length by width in millimeters. Drawings were made with the help of

camera Lucida. Holotype and paratype specimens are with the senior author.

***Genorchopsis gibsoni*, new species**

(Fig. 1)

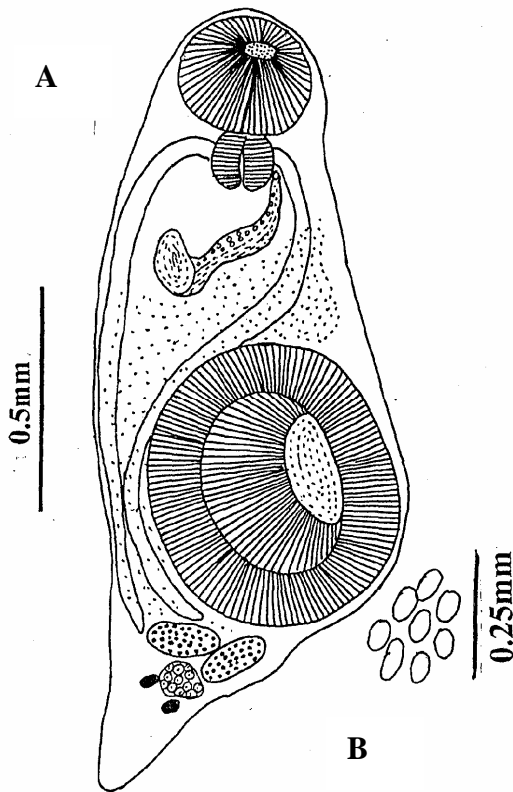


Fig. 1. *Genorchopsis gibsoni*, n.sp., A, holotype; B, eggs.

Host: *Channa (Ophiocephalus) striatus* (Bl.)
 Location: Small intestine
 Locality: Keenjhar Lake
 No. of specimens: 5 from a single fish, 69 fishes examined
 Specimens number: SU 2015 – 2019

Body elongate, rounded at anterior extremity, narrower at hind body and bluntly pointed at posterior extremity, widest at the acetabular region. Forebody much longer than hindbody. Body length 1.74–1.77, width 0.65–0.67. Oral sucker subterminal, almost rounded, slightly broader, 0.25–

0.27 by 0.27–0.29 in size. Prepharynx absent, pharynx oval, 0.11–0.13 in length 0.12–0.14 in width. Esophagus is absent, ceca reaching to post acetabular region terminating anterior to testes. Acetabulum near the posterior end, very large almost occupying the whole width of the body, 0.55–0.59 by 0.47–0.49 in size. Testes two, postacetabular, transversely elongated, close together 0.06–0.07 by 0.15–0.16 in size. Genital opening at the level of posterior margin of the pharynx. Cirrus sac long, intercecal, curved dorsally, containing prominent, elongate seminal vesicle, and long pars prostatica. Seminal vesicle 0.13–0.15 by 0.09 – 0.11. Ovary post-testicular, and close to testes, rounded to oval in shape 0.06–0.09 by 0.06 – 0.08 in size. Vitellaria consist of two very small, dark, elongate, masses 0.021–0.032 in length. Uterus occupying preacetabular region and reach to the end of ceca posterior to acetabulum. Eggs very small, 0.006–0.008 by 0.004–0.006 in size.

Remarks

The new species *G. gibsoni* most closely resembles *G. kalriai* Bilqees and Khan, 1991 but differs in several diagnostic features such as larger body and testes are not intercaecal. Also caeca not reaching post testicular region; vitellaria smaller and less prominent. Cirrus sac is bigger as compared to *G. kalriai* and at a distance from acetabulum. In the present specimens the testes are transversely elongate while in *P. kalriai* they are oval and flattened. Similarly the vitellaria and testes nearly touch the ovary while in *P. kalriai* they are at a distance from the ovary. This is the fourth species of *Genorchopsis* Ozaki, 1925 being described from freshwater fish of Pakistan (Rehana and Bilqees, 1980; Bilqees and Khan, 1981). In view of these differences it is regarded as a new species and given the specific name *G. gibsoni* in honour of Dr. David I. Gibson, British Museum (Natural History), London.

Genorchopsis kalriai Bilqees and Khan, 1991

Genorchopsis kalriai Bilqees and Khan, 1991 was reported from *Channa (Ophiocephalus) marulius* (Ham.) while in the present study *G. kalriai* Bilqees and Khan, 1991 is being reported

from a different host *Channa (Ophiocephalus) maculatus*. Besides this most of the characters are same as the original description of Bilqees and Khan, 1991 and this is regarded as the same species.

REFERENCES

- AGARWAL, V., 1966. Studies on some trematode parasites of freshwater fishes from Lucknow. *Amls. Parasit.*, **24**: 217-231.
- AHMED, A.T.A., 1981. Helminth infection in freshwater fishes of Bangladesh. *Fish Path.*, **15**: 229-236.
- ARJANEYULU, G., 1968. Observations on the female reproductive system of *Genarchopsis punctati* Agarwal, 1966. *Indian J. Helminth.*, **19**: 118-121.
- BASHIRULLAH, A.K.M. AND ELAHI, M., 1972. Two new species of *Genarchopsis* Ozaki, 1925 from a freshwater fishes of Dacca, Bangladesh. *Riv. Parasit.*, **33**: 277-280.
- BHADAURIA, S. AND DANDOTIA, M.R., 1954. Studies on trematode parasites of freshwater fishes with species reference to Gwalior region. Part II. On one new genus and some unknown and known species. *Riv. Parasitol.*, **45**: 341-383.
- BILQEES, F.M., SAEED, R., REHANA, R., KHATOON, A. AND KAIKABAD, S.H., 1972. *Helminth parasites of some vertebrates chiefly from fishes of West Pakistan*. Agricultural Research Council, Government of Pakistan.
- BILQEES, F.M. AND KHAN, A., 1991. Two digenetic trematodes from freshwater fishes of Kalri Lake, Sindh, Pakistan. *Pakistan J. Zool.*, **23**: 105-113.
- CHAUHAN, B.S., 1953. Studies on trematode fauna of India Part IV. Subclass Digenea (Prostomata) (A revision of Hemiuroidea from Indian region). *Rec. Ind. Mus.*, **11**: 289-393.
- COIL, W.H. AND KUNZ, R.E., 1960. Trematode parasites of vertebrates of East Pakistan. *Trans. Am. microscop. Soc.*, **79**: 145-150.
- DWIVEDI, M.P., 1965. On a new species of the genus *Genarchopsis* Ozaki, 1925 from the stomach of *Bufo melanostictus* Schneid (Hemiuridae, Trematoda). *Ind. J. Helminth.*, **17**: 37-42.
- GIBSON, D.I. AND BRAY, R.A., 1979. The Hemiuroidea: terminology, systematics and evolution. *Bull. Brit. Mus. nat. Hist. Zool.*, **36**: 35-146.
- GUPTA, S.P., 1951. On a new trematode, *Phyllodistomum singhii* new species of the family Gorgoderidae Looss, 1899, from the intestine of a freshwater fish *Mastacembelus armatus* (Lacep.). *Ind. J. Helminth.*, **3**: 21-28.
- GUPTA, S.P. AND CHAKRAVARTI, K.K., 1967. On a trematode, *Genarchopsis thapari* n.sp. from the intestine of a snake from Lucknow. *Indian J. Helminth.*, **18**: 177-180.
- HAFIZUDDIN, A.K.M. AND KHAN, H.R., 1973. On a new record of the genus *Genarchopsis* Ozaki, 1925 (Digenea: Hemiuridae). *Bangladesh J. Zool.*, **1**: 107-110.
- KAKAJI, V.L., 1969. Studies on helminth parasites of Indian fishes. Part II. Some trematode parasites of freshwater fishes of Uttar Pradesh. *Ind. J. Helminth.*, **21**: 49-80.
- LEVINSEN, G.M.R., 1881. Bidrag til kundskao am Gronlands trematode fauna. *Overs K. Danske Vidensk. Selsk. Forh.*, **1**: 52-84.
- LOOSS, A., 1899. Weitere Beitvage zur Kenntnis der Trematodenfauna aegyptens zugleich versuch einer maturalichen Gliederung des Genus *Distomum* Retzius. *Zool. Jahrb. Syst.*, **12**: 521-784.
- LÜHE, M., 1901. Über Hemiuriden. *Zool. Anz.*, **24**: 394-403.
- MADHAVI, R. AND RAO, K.H., 1974. Anatomy of female reproductive system in digenetic trematodes Part II. Hemiuroidea. *Riv. Parasitol.*, **35**: 23-36.
- MADHAVI, R., 1978. Lifecycle of *Genarchopsis goppo* Ozaki, 1925 (Trematoda: Hemiuridae) from freshwater fish *Channa punctatus*. *J. Helminth.*, **52**: 251-259.
- MANTER, H.W., 1938. A collection of trematodes from Florida Amphibia. *Trans. Am. microscop. Soc.*, **57**: 26-37.
- OZAKI, Y., 1925. On a new genus of fish trematodes, *Genarchopsis* and a new species of *Asymphylo dara*. *Jap. J. Zool.*, **1**: 101-108.
- PANDEY, K.C., 1973. A restudy of *Genarchopsis goppo* (Tubangui) Ozaki, 1925 with a note on validity of certain species. *Indian J. Zool.*, **14**: 167-174.
- PANDEY, K.C., 1975. Studies on some known and unknown trematode parasites. *Indian J. Zool.*, **14**: 197-219.
- RAI, P., 1972. On the genus *Genarchopsis* Ozaki (Trematoda: Hemiuridae) from freshwater fishes of India. *Agra Univ. J. Res. (Sci.)*, **20**: 27-33.
- REHANA, R. AND BILQEES, F.M., 1980. *Genarchopsis macrocima*, new species (Trematoda: Hemiuridae) from *Ophiocephalus striatus* III of Kalri Lake, Sind, Pakistan. *Pakistan J. Zool.*, **12**: 131-135.
- SHEN, J.W. AND QIU, Z.Z., 1995. *Studies on the trematodes of fishes from the Yellow Sea and Boltai Sea*. Science Press, Beijing. pp. 207.
- SHIMAZU, T., 1995. Trematodes of the genus *Genarchopsis* (Digenea, Derogenidae, Halipeginae) from freshwater fishes of Japan. *Proc. Jap. Soc. System. Zool., Tokyo*, **54**: 1-18.
- SRIVASTAVA, H.D., 1933. On new trematodes of frogs and fishes of the United Province, India. Part I. Distomes of the family Hemiuridae from North Indian fishes and frogs with systematic discussion on the family Halipegidae and the genera *Vitellotrema*, *Guberlet* and *Genarchopsis* Ozaki. *Bull. Acad. Sci. U.P. Agra and Oudh. Allahabad*, **3**: 41-60.
- VARMA, B.P. AND SAHAY, U., 1985. On *Genarchopsis*

- avietallarium* sp.nov. from the stomach of *Ophiocephalus punctatus* in North Kamrup (Assam). *Ind. J. Helminth.*, **35**: 162-166.
- WANG, P.O., 1984. Some digenetic trematodes from fishes in Fujian Province, China. *Acta Zoolax. Sin.*, **9**: 122-131.
- YAMAGUTI, S., 1938. *Studies on helminth fauna of Japan. Trematodes of fishes IV*. Satyu Yamaguti, Kyoto, pp. 139.
- YAMAGUTI, S., 1939. Trematodes of fishes VI. *Jap. J. Zool.*, **8**: 211-300.
- YAMAGUTI, S., 1954. *Systema helminthum. Part 1. Digenetic trematodes of fishes*. Tokyo, pp. 405.
- YAMAGUTI, S., 1956. Studies on the helminth fauna of Japan 52. Trematodes of fishes. *XI Public Seto Mar. Biol. Lab.*, **6**: 369-384.
- YAMAGUTI, S., 1958. *System helminthum. Vol. 1. The digenetic trematodes of vertebrates*. Interscience, New York.
- YAMAGUTI, S., 1971. *Synopsis of digenetic trematodes of vertebrates*. Keigaku Publishing Co., Tokyo, Japan.

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