

Description of a New Subfamily Heckmanninae (Monorchidae (Odhner, 1911) Nicoll, 1915) With a New Genus and Species From a Freshwater Fish of Sindh, Pakistan

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Abstract.- A new subfamily Heckmanninae is described with a new genus and species *Heckmannia channai* n.gen., n.sp. from the intestine of *Channa striatus* (Bl.). The subfamily is characterized by having elongated body, oral sucker subterminal, rounded, prepharynx very small, pharynx notched in the center, pharyngoesophageal gland cells present between pharynx and esophagus, terminal organ is absent, cirrus sac is preacetabular, genital pore submedian, postbifurcal. Acetabulum is pre-equatorial. Testis single, large, almost L-shaped, postacetabular, postovarian and postequatorial. Ovary is large, pretesticular, rounded with slightly irregular outline. Vitellaria consist of numerous follicles, scattered laterally from the level of ovary to posterior end of body, confluent in the post-testicular region. Uterus not visible.

Keywords: Trematode, Heckmanninae, *Channa striatus*.

INTRODUCTION

Trematodes are the common parasites of freshwater fishes of Pakistan including Sindh province (Bilqees, 1976, 1979, 1986; Bilqees *et al.*, 2009; Shaikh and Bilqees, 2008; Wahid and Perveen, 1969; Zaidi and Khan, 1977)

During the present studies unusual specimens of family (Monorchidae Nicoll, 1915) were recovered from the intestine of *Channa striatus* of Haleji Lake, Sindh. These could not be included in any of the existing subfamilies of the family because of distinctly different diagnostic features. Therefore, a new subfamily Heckmanninae is proposed with a new genus *Heckmannia* and new species *Heckmannia channai*. The subfamily name is in honour of Prof. Dr. Richard A. Heckmann, Department of Biology, Brigham Young University, Provo, Utah, USA who has numerous publications on fish parasite and is a well known parasitologist.

MATERIALS AND METHODS

One hundred and twenty one specimens of

Channa striatus from Haleji Lake were examined for collection of parasites. With other parasites 7 trematodes were recovered from the intestine of two fish, 5 from one and two from other. These were fixed in 70% ethanol with few drops of acetic acid under slight pressure of cover slip, stained with Mayer's carmalum, dehydrated in graded series of alcohols, cleared in clove oil and xylene and mounted permanently in Canada balsam. Photographs were taken with a Nikon (Optiphot-2) photomicroscope using Fuji colour film. Diagram was made with the help of a camera Lucida. Measurements are in millimeters, length by width. Holotype and paratype specimens are in the Department of Zoology, Jinnah University, Karachi, and are accessible to scientists on loan.

Heckmanninae n.subfam.

Diagnosis

Monorchidae, body elongate, oral sucker rounded, subterminal, prepharynx very small, thick, pharynx notched in the centre anteriorly end posteriorly, pharyngoesophageal gland cells present between pharynx and esophagus. Terminal organ is absent. Acetabulum is larger than oral sucker, pre-equatorial. Cirrus sac is preacetabular, containing elongate seminal vesicle, pars prostatica and long ejaculatory duct. Genital pore submedian,

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postbifurcal, testis single, large, almost L-shaped, postacetabular, postovarian and postequatorial. Ovary large, pretesticular, rounded with slightly irregular outline. Vitellaria consist of numerous, rounded to irregular follicles, scattered laterally from the posterior level of acetabulum on one side and from the level of ovary on the other, confluent in the post-testicular region. Uterus not visible. Excretory vesicle large, reaching to the posterior level of testis.

Type genus

Heckmannia n.gen.

Genus HECKMANNIA n.gen.

Diagnosis

Monorchiidae, Heckmanninae n.subf. with the characters of subfamily.

Type host: *Channa striatus* (Bl.)
Type species: *Heckmannia channai* n.sp.
Location: Intestine
Locality: Haleji Lake

***Heckmannia channai* n.gen., n.sp.**

(Fig. 1)

Host: *Channa striatus* (Bl.)
Location: Intestine
Locality: Haleji Lake, Sindh
No. of specimens: 7 from two fishes (2+5), 127 fishes examined
Holotype No.: BMC-T151

Diagnosis (based on 7 specimens)

Body aspinose, elongate, with rounded anterior and posterior ends, anterior end slightly narrow. Body 1.90 – 2.30 × 0.65 – 0.67 in size, maximum width at the acetabular region. Oral sucker subterminal, rounded, 0.17–0.19 in diameter with small preoral lobe. Prepharynx small, pharynx notched in the centre 0.09–0.10 × 0.13–0.15 in size. Esophagus is long, 0.19 – 0.21 in length, tubular end slightly twisted with pharyngoesophageal gland cells between the pharynx and esophagus. Intestinal caeca extend posteriorly to slightly behind middle of postacetabular region. Acetabulum pre-equatorial, larger than oral sucker, rounded, 0.24 – 0.26 in diameter. Testis one, elongate, bent dorsally



Fig. 1. *Heckmannia channai* n.gen., n.sp., A, holotype; B, holotype, entire; C, anterior region enlarged.

appearing as L-shaped, postovarian, postacetabular, and postequatorial in position. Testis length 0.61 – 0.66, width 0.11 – 0.13. Cirrus sac preacetabular, broader posteriorly, narrow, tubular anteriorly, 0.35 – 0.37 in length, 0.07 – 0.08 in width containing elongate seminal vesicle, 0.16 – 0.18 × 0.07 – 0.08 in size, small pars prostatica and long ejaculatory duct 0.15 – 0.17 in length. Genital pore far anterior to acetabulum and little posterior to intestinal bifurcation at outer margin of left caecum. Ovary rounded, irregular in outline 0.17 – 0.19 × 0.17 – 0.18 in size. Vitellaria consist of numerous, rounded to irregular follicles, extracaecal, commencing at the posterior level of acetabulum on the left and at the level of ovary on the right, mostly postacetabular reaching to posterior extremity, and confluent in post-testicular region. Uterus not visible in any of the specimens. Excretory vesicle wide and large reaching to the posterior level of testis.

Discussion

The present specimens are included in the family Monorchidae Nicoll, 1915 in having a single testis but cannot be included in any of the existing subfamilies of this family because of distinct differences in the diagnostic features.

The present specimens have pharyngoesophageal glands between pharynx and esophagus, esophagus tubular twisted, terminal organ is absent, cirrus sac and genital pore submedian, preacetabular and postbifurcal, testis is single almost L-shaped, post-acetabular, postovarian and post-equatorial. Ovary is larger pretesticular, vitellaria are postacetabular from the level of ovary to posterior end of body, overlapping caecae and confluent in post-testicular region. While in the subfamily Opisthomonorchinae Yamaguti, 1952, genital pore is median, postacetabular, vitelline follicles massed into symmetrical bunches just behind acetabulum. Opisthomonorchidinae Yamaguti, 1971, has terminal organ, vitelline follicles extending diffusely between cirrus pouch and testis, well apart from acetabulum, testis single or double, tandem in posterior half of body. In Asymphalodorinae Szidat, 1943, genital pore is submarginal, cirrus pouch is postacetabular and vitellaria in lateral fields of hind body.

Specimens of Pseudopalaeorchinae Kamegai,

1970 have cirrus pouch anterolateral to acetabulum, genital pore immediately preacetabular, testis dorsal or posterodorsal to acetabulum, vitelline glands are lobed, asymmetrical, immediately anterodorsal to testis, terminal organ is present.

Pseudoproctotrematinae Yamaguti, 1958 is characterized by having vitellaria in two compact masses, ovary and vitellaria preacetabular, testis dorsal or posterodorsal to acetabulum, seminal vesicle is absent.

In the subfamily Monorchinae (Odhner, 1911) Nicoll, 1915, vitellaria are follicular or tubular in bunches of compact lobes, in preacetabular or acetabular zone, testis one or two, cirrus pouch extending posterior to acetabulum or not genital pore median, postbifurcal or bifurcal.

In Anomonorchinae Yamaguti, 1970, acetabulum is in posterior half of body, testis in anterior half of body, cirrus pouch preacetabular, ovary is post-testicular between testis and cirrus pouch, vitellaria consisting of a pair of lateral bunches of several compact lobes, largely in acetabular zone.

Subfamily Postmonorchidinae Yamaguti, 1958 has terminal organ, testis single or double in posterior half of body, cirrus pouch may or may not extend posterior to acetabulum, genital pore median, preacetabular, ovary is pretesticular, vitellaria are clustered mostly or entirely in intercaecal field anterior or anterodorsal to ovary.

Family Ancylocoelinae Skrjabin *et* Koval, 1957 is peculiar in having very short, M-shaped caeca, with its two limbs terminating a little behind level of intestinal bifurcation. Vitellaria are tubular, lateral and posterior to testes, ovary is between anterior testis and acetabulum, testes two, oblique, in middle third of body, cirrus pouch is behind right caecum and genital pore is postbifurcal.

In Hurleytrematinae Yamaguti, 1958 ovary is pretesticular, vitellaria is separated by testis into an anterior and a posterior group, testis is single, in posterior half of body, cirrus pouch is elongate and genital pore is paracetabular.

In Lasiotocinae Yamaguti, 1958, vitellaria are largely or entirely pretesticular, occasionally testicular with their zone coinciding with or partly overlapping ovarian zone, ovary pretesticular, testis single or double in posterior half of body, cirrus

pouch extending posterior to acetabulum, genital pore pre or paracetabular.

Telolecithinae Yamaguti, 1958, has ovary pretesticular, vitellaria testicular or post-testicular, posteromedian to double testis or posterolateral to single postequatorial testis, cirrus pouch extending well posterior to acetabulum.

The morphological variations and position of testes, cirrus pouch, genital pore, ovary and vitellaria between the present specimens and the 11 subfamilies mentioned above are very distinct and it appears that the present specimens belong to an undescribed subfamily. Therefore, a new subfamily Heckmanninae is proposed with a description of new genus *Heckmania* and new species *H. channai*.

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