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**MONOGENEAN FAUNA OF DISTRICT SAHARANPUR, U. P., PART-VII**

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**ABSTRACT**

The present communication deals with known species of the genus *Mizelleus* Jain, 1957 and *Chauhanellus* Bychowsky and Nagibina, 1969 from freshwater fish *Wallago attu* (Bloch and Schn.). On disposal of author they exhibit variation hence re-described.

**Key Words:** *Monogeneans, Mizelleus, Chauhanellus, Mizelleus indicus, Chauhanellus australis, Wallago attu*

**INTRODUCTION**

During the course of study of freshwater monogenean fauna of district Saharanpur, I came across four specimen of *Wallago attu* (Bloch and Schn.), infected with several specimen of *Mizelleus indicus* Jain, 1957 and *Chauhanellus australis* (Bychowsky and Nagibina, 1969) Kearns and Whittington, 1994. On detailed examination, it was found that the worms at disposal of the author exhibit several variations besides measurements. Moreover, it also exhibits new type locality for these species. It is, therefore, briefly re-described. The re-description is based on fresh materials collected by author.

**MATERIALS AND METHODS**

Fishes, for the present investigation, were collected from river Yamuna and local fish markets of district Saharanpur. They were brought to laboratory and identified. The identification of piscine hosts was made with the help of classical works of McInerney and Gerard (1958), Misra (1959), Srivastava (1980), Nelson (2006) and Day (1989). Monogeneans were collected by freezing technique of Mizelle (1936 and 1938). Worms thus collected, were washed thoroughly, and fixed in hot 70% alcohol or 10% neutral Formaline. Study of chitinous hard parts was made in temporary Glycerin mounts. Permanent mounts were also 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. Besides this, morphological studies were made using Motic Microscope and Image analyzing system. All measurements were taken with the help of stage micrometer and oculometer as method suggested by Mizelle (1936 and 1938), Gussev (1955), Malmberg (1957) and Singh (1959). The measurements were also compared with the measurement taken by Motic image analysis software 2000.

**RESULTS AND DISCUSSION**

***Mizelleus indicus* Jain, 1957**

**(Plate- I, Figure 1-9 and Plate- II, Microphotograph 1 and 2)**

The body of worm is stout, elongated, measuring 0.45-0.48 mm. Maximum width was recorded in gonad region, ranging from 0.076-0.079 mm. Prohaptor and opisthaptor are fairly set off from the body proper through a shallow constriction in the anterior and deep constriction posterior regions, respectively. The head is bi-lobed, lodged with four pairs of head organs. Each head organ is provided with a separate duct extending posteriorly and unites with pharyngeal glands. Eyespots are degenerated, scattered melanistic granules are present. Pharynx is spherical, muscular, measuring 0.022-0.025 mm in diameter. At the postero-lateral sides of the pharynx, three pairs of darkly stained pharyngeal glands are present. Intestine is simple, bifurcate and crura are united posteriorly, at the level of haptor peduncle.

Male reproductive system consists of a testis, vas deference, seminal vesicle, a pair of prostate glands and male copulatory complex. Testis is elongated oval, inter-caecal, post-equatorial and measures 0.065-0.068

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x 0.022-0.024 mm. From the anterior border of testis a fine duct, vas deference, arises extend anteriorly, loops with left intestinal limb and dilates to form seminal vesicle. Seminal vesicle is balloon-shaped, located in pre-equatorial region of the body anterior to vagina measuring 0.031-0.033 x 0.011-0.012 mm. Male copulatory complex consists of tubular cirrus and an accessory piece. The cirrus proper is double walled chitinous elongated structure, measures 0.051-0.053 mm. The accessory piece of the cirrus is made up of three pieces. First piece is sickle shaped, having protuberance in inner margins, measures 0.032-0.034 mm. From the posterior part of first accessory piece a tube originates extend posteriorly and then anteriorly and bifurcated before termination, measures 0.041-0.045 mm. Second pieces is bow shaped and measures 0.025-0.026 mm. Third piece is slightly curved rod shaped, measures 0.053-0.055 mm. Anterior part of second and third piece fit into the first piece. A pair of prostate gland is present.

Female reproductive system consists of an ovary, vagina, receptaculum seminis and vitelline glands. Ovary is equatorial, oval in shape, superimposed on testis, measuring 0.031-0.034 x 0.021-0.022 mm. Vagina is sinistral, muscular, funnel shaped, anterior to ovary, measures 0.021-0.022 mm, communicate with well developed receptaculum seminis with a narrow tube. The receptaculum seminis is oval in shape located anterior to ovary, measures 0.028-0.029 x 0.021-0.022 mm. Vitelline follicles are co-extensive with intestinal caeca.

Haptor is discoidal in shape measuring 0.011-0.013 x 0.016-0.018 mm. Armature of haptor consists of two pairs of anchors, double transverse bar, a pair of patches and marginal hooklets. Each dorsal anchor is with rounded base, strong shaft, and recurved points, measuring 0.13-0.14 mm. Each dorsal anchor is with articulate finger-like protuberance on the inner side of basal part. In the shaft region, each anchor is equipped with well developed sleeve sclerite. Each dorsal anchor is with a patch (accessory transverse bar) on its base, measures 0.042-0.043 mm. Patches are with typical thin process at the end. Dorsal transverse bar is strong, well developed, having distinctly marked articulate head by which they articulate with finger-like protuberances of anchors, measuring 0.091-0.093 mm. Each ventral anchor consists of slightly pointed base, shaft and smoothly curved points, measures 0.044-0.048 mm. In the shaft region, each anchor is equipped with well developed sleeve sclerite. Ventral transverse bar is made of two pieces, each piece measures 0.088-0.091 mm. These are joined by elastic filament. Two pairs of haptoral gland present. Marginal hooklets are five pairs, embedded in the margins of haptor; probably other hooks might be shed off during processing of worms. Each marginal hooklet is provided with sickle shaped blade, heel and handle, measuring 0.022-0.025 mm in length.

### Discussion

Jain (1957) created a new genus *Mizelleus* for the worm collected from the gills of *Wallagonia attu* at Lucknow with *Mizelleus indicus* as type species. Gussev (1973) synonymized *Mizelleus linorchis* Kulkarni, 1969 with *M. indicus*. He also described *M. indicus* but he did not describe the soft anatomy.

Present form at the disposal of author differs in some features with *M. indicus* described by Jain (1957).

Jain (1957) reported three pairs of head organs and two pairs of eyespots but there is four pair of head organs at the disposal of author and degenerated type of eyespots. Jain (1957) reported pre-testicular ovary but is superimposed in present specimens. Jain (1957) reported seminal vesicle at the level of cirrus proper but it is at the level of intestinal bifurcation in present specimens.

It is difficult for me to comment upon this variation, however, this could be due to presence of parasite in different host and geographical niche. Jain (1957) also failed to observe vas deference. Jain (1957) reported more or less similar shape of cirrus proper except the shape of accessory piece of cirrus is altogether different. No prostate gland is observed in the specimens at the disposal of Jain (1957) but there are well developed prostate glands in present specimens. Jain (1957) also reported more or less similar anchors but a marked difference is noted in the region of base. Specimens at the disposal of Jain (1957) have feebly developed roots but dorsal anchor is with rounded base and ventral anchor is with slightly conical base in present specimens as also observed by Gussev (1973). In present specimens two pairs of haptoral glands are present, Jain (1959) fail to observe these glands. Jain (1959) and Gussev

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(1973) reported the presence of an opposable piece at the base of sickle which is absent in the specimens under observation.

Besides these, differences were also noted in measurements of various parts of the body and appended in the table 1.

**Table 1: Showing difference in measurement between various body parts of *Mizelleus indicus* Jain, 1957 and *Mizelleus indicus* (Jain, 1957) Gussev, 1973 and present worm (all measurements are in mm)**

	<i>Mizelleus indicus</i> Jain, 1957	<i>Mizelleus indicus</i> (Jain, 1957) Gussev, 1973	Present worm
Host	<i>Wallagonia attu</i>	<i>Wallago attu</i>	<i>Wallago attu</i>
Locality	Lucknow	Bhavanisagar reservoir and Lucknow	Sharanpur
Body length	0.55-0.72	?	0.45-0.48
Body width	0.070-0.073	?	0.076-0.079
Pharynx	0.03 X 0.028	?	0.022-0.025
Testis	0.12-0.0131 x 0.02-0.025	?	0.065-0.068 x 0.02-0.024
Seminal vesicle	0.070-0.082	?	0.031-0.033 x 0.011-0.012
Cirrus	0.032-0.036	0.077-0.082	0.051-0.052
A.P. of cirrus	0.075-0.080	0.003-0.005	0.032-0.034
First			
Second	-	-	0.025-0.026
Third	-	-	0.053-0.055
Vagina	0.03	?	0.021-0.022
Ovary	0.025-0.029 x 0.012-0.015	?	0.031-0.034 x 0.021-0.022
Egg	0.066 x 0.041	-	-
Haptor length	0.140-0.188	?	0.11-0.13
Haptor width	0.14	?	0.016-0.018
Dorsal anchor length	0.108-0.113	0.0105-0.0113	0.013-0.014
Ventral anchor length	0.038-0.040	0.035-0.038	0.044-0.048
Patches	0.070-0.078	0.060-0.063	0.042-0.043
Dorsal transverse bar	0.11-0.12	0.014-0.016	0.091-0.093
Ventral transverse bar	0.17-0.20	0.091-0.097	0.088-0.091
Marginal hooklets	0.018-0.023	0.016-0.033	0.022-0.025

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#### ***Chauhanellus australis* (Bychowsky and Nagibina, 1969) Kearns and Whittington, 1994 (Plate- III, Figure 1-8 and Plate- IV, Microphotograph 1 and 2)**

The body of worm is stout, elongated, measuring 0.57-0.59 mm. Maximum width was recorded in receptaculum seminis region, ranging from 0.095-0.099 mm. Prohaptor and opisthaptor are fairly set off from the body proper through a shallow constriction in the anterior and deep constriction posterior regions, respectively. Head is divisible in two lobes each of which is further divided into three lobes. Head is lodged with three pairs of head organs and two pairs of eyespots. Each head organ is provided with a separate duct extending posteriorly. Eyespots are well developed posterior pair of eyespot is considerably larger than anterior pair on account of presence of large number of melanistic granules. Pharynx is spherical, muscular, measuring 0.047-0.049 mm in diameter. At the postero-lateral sides of the pharynx, four pairs of darkly stained pharyngeal glands are present. Intestine is simple, bifurcate and crura are separated posteriorly.

Male reproductive system consists of a testis, vas deference, vas efference, seminal vesicle and male copulatory complex. Testis is elongated oval, inter-caecal, post-equatorial and measures 0.11-0.12 x 0.045-0.048 mm. From the anterior border of testis a fine duct, vas deference, arises extend anteriorly and dilates to form seminal vesicle. Seminal vesicle is sigmoid, located in pre-equatorial region of the body, anterior to vagina, measuring 0.034-0.037 x 0.015-0.018 mm. From the anterior margin of seminal vesicle, a fine duct, vas efference arises extend posteriorly and opens at the base of cirrus proper. Male copulatory complex consists of tubular cirrus and an accessory piece. The cirrus proper is double walled chitinous 'S' shaped structure, with bubble like base and pointed anterior end, measures 0.051-0.053 mm. The accessory piece of the cirrus is made up of two pieces. First piece is 'S' shaped, having pointed anterior end, measures 0.0081-0.0089 mm. Second piece is slightly curved rod like, bifurcated at posterior end with unequal arms, measures 0.018-0.021 mm.

Female reproductive system consists of an ovary, vagina, receptaculum seminis, reproductive glands and vitelline glands. Ovary is equatorial, balloon shape, slightly imposed on testis, measuring 0.051-0.055 x 0.041-0.043 mm. Vagina is dextral, muscular, funnel shaped, anterior to ovary, measures 0.011-0.012 mm, communicate with well developed receptaculum seminis with a narrow tube. The receptaculum seminis is pear shaped, located anterior to ovary, measures 0.055-0.058 x 0.045-0.048 mm. Pairs of reproductive glands are present at the level of receptaculum seminis. Vitelline follicles are co-extensive with intestinal caeca.

Haptor is pentagonal to somewhat hexagonal in shape measuring 0.15-0.17 x 0.21-0.22 mm. Armature of haptor consists of two pairs of anchors, double transverse bar and marginal hooklets. Each dorsal anchor consists of feebly developed roots, shaft and recurved points, measures 0.085-0.091 mm. Each dorsal anchor is with articulate finger-like protuberance on the inner side of basal part. In the shaft region, each dorsal anchor is equipped with well developed sleeve sclerite. Dorsal transverse bar is 'V' shaped having protuberance in middle, measures 0.071-0.073 mm. Each ventral anchor is with broad base (divisible into poorly demarcated outer and inner root), strong shaft and recurved points, measuring 0.12-0.14 mm. Inner roots of each ventral anchor is provided with fist shaped patches. Ventral transverse bar is strong, well developed, having distinctly marked articulate head by which they articulate with base of anchors, and middle protuberance, measuring 0.11-0.12 mm. Marginal hooklets are six pairs, embedded in the margins of haptor, probably other hooks might be shed off during processing of worms. Each marginal hooklet is provided with sickle shaped blade, heel, handle and papillae, measuring 0.031-0.035 mm in length. Scleroized folds are present just below the haptoral peduncle.

#### **Discussion**

Genus *Chauhanellus* was created by Bychowsky and Nagibina (1969) for the worms collected by Young (1967) from the gills of catfish and he described them as *Hamatopeduncularia australis*. *Chauhanellus australis* is type species for the genus *Chauhanellus*. Kearns and Whittington (1994) described *C. australis* from the gills of *Arius graeffi* in the Brisbane River and Moreton bay, Queensland, Australia.

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Present form at the disposal of author differs in some features from *Chauhanellus australis* described by Kern and Whittington (1994).

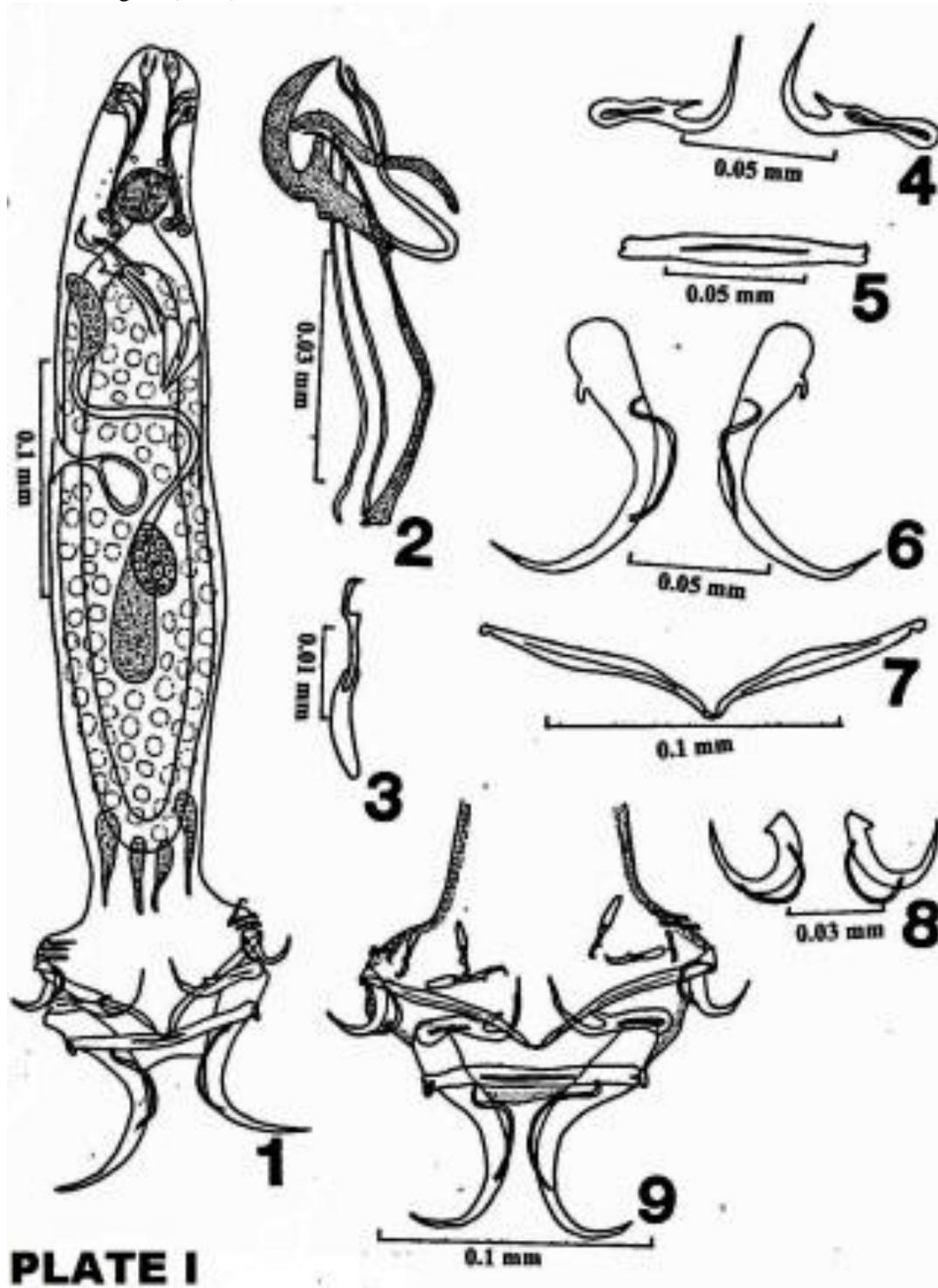
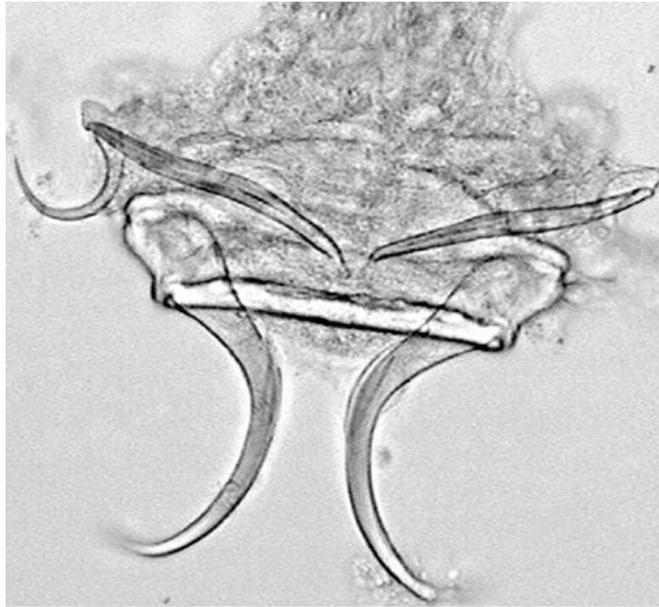


Plate I: *Mizelleus indicus* Jain, 1957, Figure 1: Whole mount. Figure 2: Male copulatory complex. Figure 3: Marginal hooklet. Figure 4: Patches. Figure 5: Dorsal transverse bar. Figure 6: Dorsal anchors. Figure 7: Ventral transverse bar. Figure 8: Ventral anchors. Figure 9: Haptor. ?

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**Plate II: Mizelleus indicus Jain, 1957, Microphotograph 1: Haptor. Microphotograph 2: Male copulatory complex**

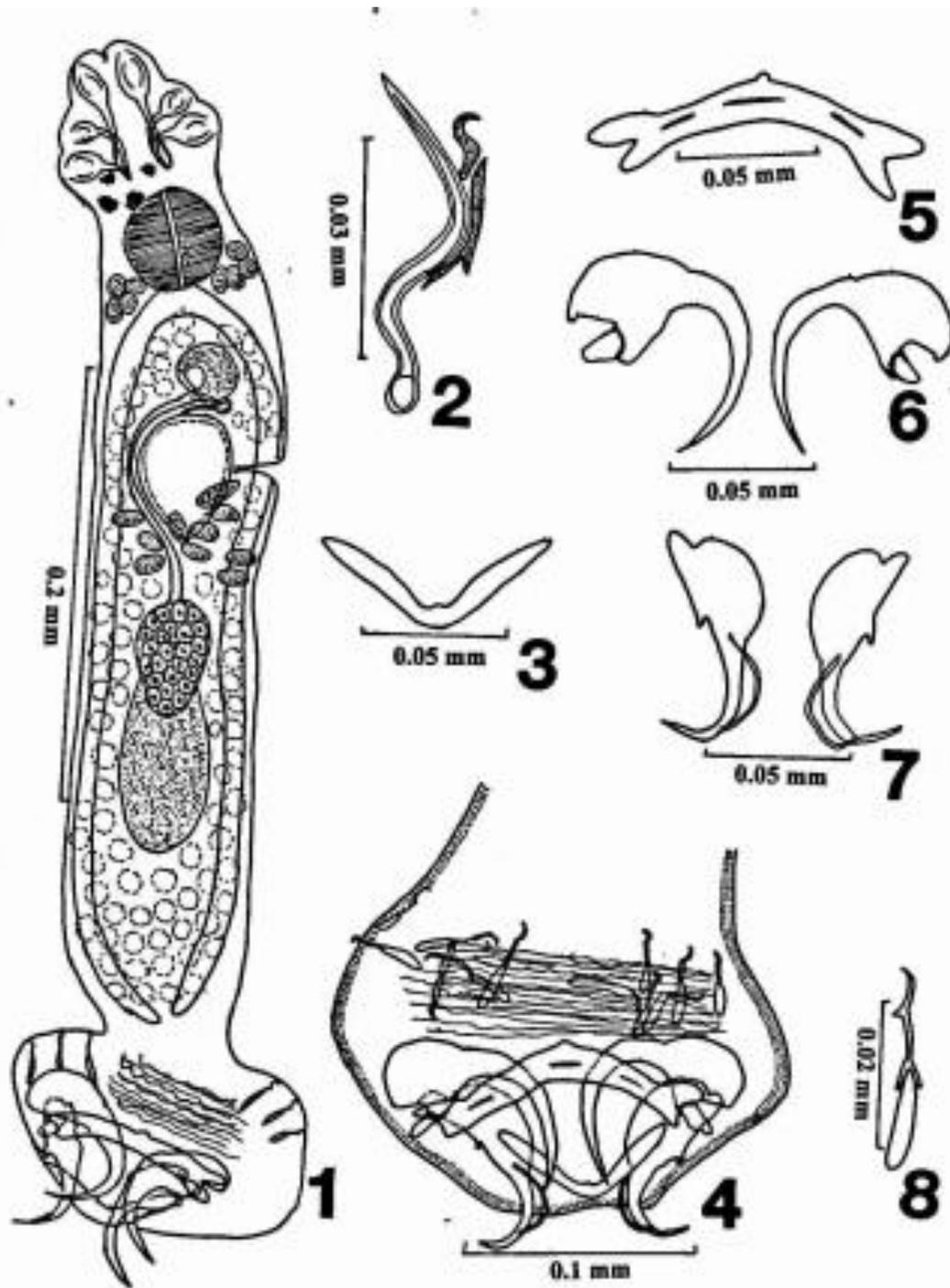


Plate III: *Chauhanellus australis* Karn and Whittington, 1993 Figure 1: Whole mount. Figure 2: Male copulatory complex. Figure 3: Dorsal transverse bar. Figure 4: Haptor. Figure 5: Ventral transverse bar and patch. Figure 6: Ventral anchors. Figure 7: Dorsal anchors. Figure 8: Marginal hooklet.?

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**Plate IV: *Chauhanellus australis* Karn and Whittington, 1993 Microphotograph 1: Haptor. Microphotograph 2: Male copulatory complex**

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**Table 2: Showing difference in measurement between various body parts of *Mizelleus Chauhanellus australis* (Young, 1967; Bychowsky and Nagibina, 1969) Kern and Whittington, 1994 and present worm (all measurements are in mm)**

	<i>Chauhanellus australis</i> (Young, 1967; Bychowsky and Nagibina, 1969) Kern and Whittington, 1994.	Present worm
Host	<i>Arius graeffei</i>	<i>Wallago attu</i>
Locality	Brisbane river, Queens land, Australia	Yamuna River, Sharanpur, India
Body length	0.470-0.612	0.57-0.59
Body width	0.078-0.106	0.095-0.099
Pharynx	?	0.047-0.049
Testis	?	0.11-0.12 x 0.045-0.048
Seminal vesicle	?	0.034-0.037 x 0.015-0.018
Cirrus	0.066-0.088	0.051-0.053
A. P. of cirrus (First)	?	0.0081-0.0089
Second	-	0.018-0.021
Vagina	?	0.011-0.012
Ovary	?	0.051-0.055 x 0.041-0.043
Haptor length	?	0.15-0.17
Haptor width	?	0.21-0.22
Ventral anchor length	0.074-0.083	0.12-0.14
Dorsal anchor length	0.076-0.086	0.085-0.091
Ventral transverse bar	0.062-0.082	0.11-0.12
Dorsal transverse bar	0.081-0.098	0.071-0.073
Marginal hooklets	?	0.031-0.035

Kern and Whittington (1994) reported same pairs of head organs and two pairs of eyespots. Kern and Whittington (1994) reported oval pharynx but it is spherical in present specimens. Kern and Whittington (1994) reported more or less similar female reproductive system except the shape of receptaculum seminis, position of vagina and presence of ootype complex. In present specimens receptaculum seminis is pear shaped and large than reported by Kern and Whittington (1994). Vagina is dextral in present specimens but sinistral vagina is reported by Kern and Whittington (1994). They also fail to observe reproductive glands. Kern and Whittington (1994) reported more or less similar type of male reproductive system except the shape of male copulatory complex. Male copulatory complex is altogether different in shape of cirrus proper and accessory piece. It is difficult for me to comment upon this variation, however, this could be due to presence of parasite in different host and geographical niche. Kern and Whittington (1994) also reported more or less similar anchors but a marked difference is noted in the region of base. Specimens at the disposal of Kern and Whittington (1994) without roots in ventral anchors but there is feebly developed roots in ventral anchor in present specimens.

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Besides these, differences were also noted in measurements of various parts of the body and appended in the table 2.

### ACKNOWLEDGEMENT

I am thankful to Head, Department of Zoology, Ch. C. S. University, Meerut, for providing laboratory facilities and Prof HS Singh, Department of Zoology, Ch. C. S. University, Meerut for his valuable guidance.

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