

## A New Species Of *Bychowskyella* from Gills Of *Wallago Attu* at Ghaziabad.

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### Abstract

A new species of genus *Bychowskyella* Achmerow 1952 is described from the gills of *Wallago attu* (Family: Siluridae) from Hindon River, Ghaziabad. It is the first report of this genus from Hindon River. The present specimen differs from all the known species in the structure of dorsal anchor which is 'boreal type' in the present specimen. Ventral anchor in the present specimen is 'boreal' type whereas ventral anchor is 'nanus type' in *Bychowskyella asiatica* (Jain, 1959) Gussev, 1961, 'Pterocleidus type' with a prominent clamping formation in *Bychowskyella gomia* (Jain, 1959) Gussev, 1961, *Bychowskyella indica* (Jain, 1959) Gussev, 1961, *Bychowskyella gharui* (Tripathi, 1959) Gussev, 1961, whereas ventral anchor is 'juvenile type' in *Bychowskyella wallagonia* (Jain, 1959) Gussev, 1961, *Bychowskyella vacha* (Tripathi, 1959) Gussev, 1961, *Bychowskyella bychowskii* Gussev, 1977, *Bychowskyella chauhani* Venkatanarasaiah, 1989, *Bychowskyella raipurensis* Majumdar and Agrawal, 1989, *Bychowskyella fossilisi* Majumdar and Agrawal, 1989, *Bychowskyella jaini* Agrawal, et. al., 1996. The ventral transverse bar is different from all the above species in its structure. The onchium is absent in *Bychowskyella wallagonia* (Jain, 1959) Gussev, 1961 and *Bychowskyella indica* (Jain, 1959) Gussev, 1961. It is a variation of broad triangular heart shaped to leaf like structure in rest of the species except *Bychowskyella asiatica* (Jain, 1959) Gussev, 1961. The onchium of *B. asiatica* (Jain, 1959) Gussev, 1961 is rod like. But in the present specimen, onchium bears three finger like projections towards its posterior end. On the basis of above variations the present specimen is described as new species *Bychowskyella hindoni*.

**Keywords:** Monogeneans, *Bychowskyella hindoni*.

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### Introduction

Achmerow (1952) established genus *Bychowskyella* for the worm collected from the fishes of Amur River. Since then, several different species of the genus have been reported from different parts of the globe like India, Yunnan, Malaysia and Czech Republic. Tripathi (1959) described several species of the new genus *Silonditrema*. In the same year, Jain determined genus *Silonditrema* as synonym of *Bychowskyella*. During the course of study of freshwater monogenean fauna of catfishes of Hindon River at Ghaziabad, the authors came across one specimen of *Wallago attu* (Bloch and Schn), infected with monogeneans belonging to genus *Bychowskyella* Achmerow 1952. On subsequent study, the present form appeared new to us and is described herein as such.

### Materials And Methods

Fishes for the present investigation were collected from Hindon Bairaj, Indirapuram, Ghaziabad. They were brought to laboratory and identified. The identification of piscine hosts was made with the help of classical works of Day (1989). Monogeneans were collected by freezing technique of Mizelle (1936 and 1938). Worms thus collected, were washed thoroughly with distilled water, and fixed in hot 70% alcohol or 10% neutral Formaldehyde. Study of chitinoid 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 Motic image analysis software 2000.

### Results

Worms are elongated and elliptical in shape measuring 1574.2 - 1578.2  $\mu\text{m}$  in length. Maximum width 148.2 - 152.2  $\mu\text{m}$  is attained in the region of testis. Prohaptor and opisthaptor are fairly set off from body proper. Bilobed prohaptor is equipped with nine pairs of head organs and two pairs of eyespots. Posterior pair of eyespots is larger than the anterior pair, due to presence of greater number of melanistic granules. Cephalic glands are present on postero-lateral sides of pharynx. Pharynx is small, muscular and spherical structure measuring 75.7 - 79.7  $\mu\text{m}$  in diameter. Oesophagus is short and measures 16.9 - 20.9  $\mu\text{m}$  in length and 11.1 - 15.1  $\mu\text{m}$  in width. Oesophagus leads to intestine. The intestine bifurcates soon after its origin. Intestinal crura simple and unite posterior to testis.

Male reproductive system comprises of testis, vas-deferens, seminal vesicle, vasa efferentia, cirrus and male gonopore. Testis is single, equatorial, post-ovarian, intercaecal, elongated and elliptical in shape. It measures 237.1 - 241.1  $\mu\text{m}$  in length and 36.8 - 40.8  $\mu\text{m}$  in width. Anterior end of testis narrows into a fine vas deferens. Vas deferens runs anteriorly, measures 194.5 - 198.5  $\mu\text{m}$  in length. Vas deferens dilates into a bilobed fusiform seminal vesicle in the pre-equatorial, inter-caecal region. The proximal lobe is smaller and measures 30.0 - 33.8 x 21.2 - 23.6  $\mu\text{m}$ . While, distal lobe is larger and measures 36.8 - 38.0 x 23.3 - 25.6  $\mu\text{m}$ . Seminal vesicle opens at the base of male copulatory organ through a short vasa efferentia or ejaculatory duct measuring 38.6 - 41.7  $\mu\text{m}$  in length.

Copulatory organ consists of a double walled tube like cirrus, with a broad base that tapers into a fine coiled tube anteriorly. Cirrus is equipped with a curved spatulate accessory piece. Near the base of cirrus accessory piece is spatulate and tapers and curves anteriorly. Anterior extremity of accessory piece terminates into two finger like projections. A pair of long prostate glands is also present in the vicinity of cirrus. Male gonopore is sinistral and funnel shaped measuring 22.4 - 26.1  $\mu\text{m}$  in length and 13.5 - 17.7

$\mu\text{m}$  in width with an oval opening and fringed margin.

Female reproductive system consists of ovary, oviduct, ootype complex, receptaculum seminis, vagina and vaginal duct. Ovary is pre-equatorial, intercaecal, pre-testicular and pear shaped. It measures 151.3 - 155.3  $\mu\text{m}$  in length and 70.9 - 74.9  $\mu\text{m}$  in width. Ovary opens into ootype complex through lightly coiled oviduct. Oviduct measures 85.4 - 89.4  $\mu\text{m}$  in length. Ootype complex is fusiform, and dextral. It measures 25.4 - 27.6  $\mu\text{m}$  in length and 19.8 - 23.8  $\mu\text{m}$  in width. Ootype complex leads into fusiform intercaecal receptaculum seminis through a fine tube measuring 75.1 - 79.3  $\mu\text{m}$  in length. Receptaculum seminis measures 28.3 - 32.6  $\mu\text{m}$  in length and 19.4 - 23.7  $\mu\text{m}$  in width. A short vaginal duct measuring 63.4 - 67.7  $\mu\text{m}$  in length leads from receptaculum seminis to the vagina. Vagina is pre-ovarian and funnel shaped. It measures 37.7 - 41.8  $\mu\text{m}$  in length and 13.1 - 17.5  $\mu\text{m}$  in width. Vaginal opening is muscular and circular.

Vitellaria are follicular, extending from pharynx to the base of haptoral peduncle. The vitellaria on either postero-lateral side of ovary give out a fine vitelline duct. The vitelline ducts fuse to form a single vitelline reservoir. It measures 146.1 - 150.4  $\mu\text{m}$  in length and 3.4 - 4.8  $\mu\text{m}$  in width. Fairly large oval egg is present in the pre-ovarian, pre-equatorial region. It measures 47.4 - 51.4

x 31.0 - 35.0  $\mu\text{m}$ . Egg bears a curved hook like spur at its posterior end.

Haptor is fairly set off from body proper. Haptoral armature comprises of two pairs of anchors, a dorsal transverse bar, a ventral transverse bar, a pair of patches and an onchium together with seven pairs of marginal hooklets. Dorsal anchors measures 95.7 - 97.9  $\mu\text{m}$  in length are 'boreal type' (outer root and inner root are equally developed) with short root. Curved shaft measures 72.3 - 76.1  $\mu\text{m}$  in length and recurved point measures 17.9 - 22.3  $\mu\text{m}$  in length. Dorso-apical length of dorsal anchor is 55.9 - 60.1  $\mu\text{m}$  and ventro-apical length of dorsal anchor is 37.3 - 41.6  $\mu\text{m}$ . Anchors are further strengthened by the presence of sleeve sclerite. Dorsal transverse bar measures 21.8 - 26.2  $\mu\text{m}$  in length and median width is 10.5 - 14.7  $\mu\text{m}$  is wide 'V' shaped and fenestrated. Dorsal anchors are provided with additional long recurved patches or capitulum measuring 30.2 - 34.5  $\mu\text{m}$  in length and 3.1 - 7.5  $\mu\text{m}$  in width. Ventral anchors measuring 55.6 - 59.8  $\mu\text{m}$  are also 'boreal type' (outer root and inner root are equally developed) with short root. Curved shaft measures 32.8 - 36.9  $\mu\text{m}$  in length and fairly recurved point measures 10.7 - 14.9  $\mu\text{m}$  in length. Dorso-apical length of ventral anchor is 36.0 - 40.4  $\mu\text{m}$  and ventro-apical length of ventral anchor is 31.1 - 35.4  $\mu\text{m}$ . Ventral anchors are further strengthened by the

presence of sleeve sclerite. Ventral transverse bar measures 61.3 - 65.5  $\mu\text{m}$  in length and median width is 4.6 - 8.8  $\mu\text{m}$  is paired. It is made up of two identical rod like pieces. The proximal part is broad and gradually tapers into a distal curved point. Onchium is unpaired and is present medially over the anchors. It is a rod like structure with rounded anterior end. The posterior end terminates into three finger like projections. Seven pairs of marginal hooklets are present. Marginal hooklet is divided into sickle shaped hooklet and a handle. Handle is divided into a thin pivot of handle and swollen distal end. Three pairs of marginal hooklets are 'definitive type' (with thick end, oblong and spindle shaped handle), while four pairs are 'larval type' (with handle like rounded swelling at the end) with a sickle and handle.

#### Discussion

Genus *Bychowskyella* was erected by Achmerow 1952. Tripathi (1959) described several species of the new genus *Silonditrema*. In that very year Jain (1959) correctly determined genus *Silonditrema* as synonym of *Bychowskyella*. The authors agree with him in this opinion.

#### Generic Diagnosis

Dactylogyridae, Ancylostoidinae, Moderate or large worms 1.3 mm long. Two pairs of glandular head lobes present. Two pairs of eyespots

which sometimes in adult forms are dispersed pigment granules. Haptor is armed with seven pairs of hooks, which are considerably different in length. With two pairs of anchors without roots (usually ventral anchors are smaller than dorsal ones), with pairs of patches in dorsal anchors, with three articulating connective bars (non paired dorsal and paired ventral) and sometimes with additional non paired shield ("onchium"). Copulatory complex is composed of a tube and usually connected with it an accessory piece. Vagina is dextral (sometimes sinistral). Parasite of freshwater Asiatic catfishes, Schilbeidae, Bagridae, Siluridae.

To the best knowledge of the authors following species of *Bychowskyella* have been described in India (Table 1).

The present specimen comes closer to *Bychowskyella asiatica* (Jain, 1959) Gussev, 1961, *Bychowskyella gomtia* (Jain, 1959) Gussev, 1961, *Bychowskyella wallagonia* (Jain, 1959) Gussev, 1961, *Bychowskyella indica* (Jain, 1959) Gussev, 1961, *Bychowskyella gharui* (Tripathi, 1959) Gussev, 1961, *Bychowskyella vacha* (Tripathi, 1959) Gussev, 1961, *Bychowskyella tchangi* Gussev, 1973, *Bychowskyella bychowskii* Gussev, 1977, *Bychowskyella chauhani* Venkatanarasaiah, 1989, *Bychowskyella raipurensis* Majumdar

and Agrawal, 1989, *Bychowskyella fossilisi* Majumdar and Agrawal, 1989, *Bychowskyella jaini* Agrawal, et. al., 1996 in the structure of accessory piece of cirrus, dorsal transverse bar and additional dorsal bar or patches. The egg of *Bychowskyella indica* (Jain, 1959) Gussev, 1961 is similar to the egg in present specimen.

The present specimen differs from all the above species in the structure of dorsal anchor which is 'larval type' in the above species whereas it is 'boreal type' in the present specimen. Ventral anchor in the present specimen is 'boreal type' whereas ventral anchor is 'nanus type' in *Bychowskyella asiatica* (Jain, 1959) Gussev, 1961. 'Pterocleidus type' with a prominent clamping formation in *Bychowskyella gomtia* (Jain, 1959) Gussev, 1961, *Bychowskyella indica* (Jain, 1959) Gussev, 1961, *Bychowskyella gharui* (Tripathi, 1959) Gussev, 1961, whereas ventral anchor is 'juvenile type' in *Bychowskyella wallagonia* (Jain, 1959) Gussev, 1961, *Bychowskyella vacha* (Tripathi, 1959) Gussev, 1961, *Bychowskyella bychowskii* Gussev, 1977, *Bychowskyella chauhani* Venkatanarasaiah, 1989, *Bychowskyella raipurensis* Majumdar and Agrawal, 1989, *Bychowskyella fossilisi* Majumdar and Agrawal, 1989, *Bychowskyella jaini* Agrawal, et. al., 1996. The ventral transverse bar is

different from all the above species in its structure.

Table 1: Showing different species of genus *Bychowkyella* reported from India.

S. No.	Species	Host	Locality
1.	<i>B. asiatica</i> (Jain, 1959) Gussev, 1961	<i>Ompok pabda</i> , <i>Callichrous pabda</i> and <i>O. bimaculatus</i>	Lucknow
2.	<i>B. gomti</i> (Jain, 1959) Gussev, 1961	<i>Eutropiichthys vacha</i>	Lucknow
3.	<i>B. wallagonia</i> (Jain, 1959) Gussev, 1961	<i>Wallago attu</i>	Lucknow
4.	<i>B. indica</i> (Jain, 1959) Gussev, 1961	<i>E. vacha</i>	Gomti river, Lucknow
5.	<i>B. gharui</i> (Tripathi, 1959) Gussev, 1961	<i>Clupisoma garua</i>	Allahabad, Barrackpore and Delhi-on Son
6.	<i>B. vacha</i> (Tripathi, 1959) Gussev, 1961	<i>E. vacha</i>	River Ganges, Allahabad, Buxar
7.	<i>B. cauveryi</i> (Tripathi, 1959) Gussev, 1961	<i>Silondia silondia</i>	Mettur Dam, River Cauvery, Mettur and River Ganges, Buxar
8.	<i>B. tangi</i> Gussev, 1973	<i>Clarias batrachus</i>	Water bodies near Lucknow
9.	<i>B. bychowskii</i> Gussev, 1977	<i>Pseudotropius taakree</i>	Bay of Bengal
10.	<i>B. caballeri</i> Gussev, 1977	<i>C. garua</i>	Deccan
11.	<i>B. tripathii</i> Kumar and Agrawal, 1981	<i>W. attu</i>	River Ganges, Varanasi
12.	<i>B. singhi</i> Rajeswari and Kulkarni, 1983	<i>W. attu</i>	Hyderabad
13.	<i>B. bagariusi</i> Sharma, 1983	<i>Bagarius bagarius</i>	River Yamuna
14.	<i>B. chauhani</i> Venkatanarasiah, 1989	<i>W. attu</i>	River Manair, Andhra Pradesh
15.	<i>B. raipurensis</i> Majumdar and Agrawal, 1989	<i>Rita rita</i>	Water bodies, Raipur
16.	<i>B. gussevi</i> Majumdar and Agrawal, 1989	<i>C. garua</i>	Water bodies, Raipur
17.	<i>B. pricei</i> Majumdar and Agrawal, 1989	<i>C. garua</i>	Water bodies, Raipur
18.	<i>B. fossilis</i> Majumdar and Agrawal, 1989	<i>Heteropneustus fossilis</i>	Water bodies, Raipur
19.	<i>B. lucknowensis</i> Agrawal and Sharma, 1990	<i>E. vacha</i>	Gomti river, Lucknow
20.	<i>B. kanpurensis</i> Agrawal, Shukla and Vishwakarma, 1996	<i>O. bimaculatus</i>	Ganges river, Kanpur
21.	<i>B. jaini</i> Agrawal, Shukla and	<i>C. garua</i>	Rapti river, Gorakhpur

The onchium is absent in *Bychowskyella wallagonia* (Jain, 1959) Gussev, 1961 and *Bychowskyella indica* (Jain, 1959) Gussev, 1961. It is a variation of broad triangular heart shaped to leaf like structure in rest of the species except *Bychowskyella asiatica* (Jain, 1959) Gussev, 1961. The onchium of *B. asiatica* (Jain, 1959) Gussev, 1961 is rod like. But in the present specimen, onchium bears three finger like projections towards its posterior end.

On the basis of above variations the present specimen is described as new species *Bychowskyella hindoni*.

#### Etymology

Present species is named after the place of collection of host.

#### Explanation Of Figures

**Plate I:** *Bychowskyella hindoni*,

**Figure 1.** Whole mount,

**Figure 2.** Cirrus and accessory piece,

**Figure 3.** Male gonopore,

**Figure 4.** Female reproductive system,

**Figure 5.** Egg,

**Figure 6.** Dorsal Anchors,

**Figure 7.** Ventral Anchors,

**Figure 8.** Dorsal transverse bar,

**Figure 9.** Capitulum,

**Figure 10.** Ventral transverse bar,

**Figure 11.** Onchium,

**Figure 12.** Marginal hooklets

**PLATE II:** *Bychowskyella hindoni*,

**Microphotograph 1.** Whole mount,

**Microphotograph 2.** Male copulatory complex,

**Microphotograph 3.** Female reproductive tract and Egg,

**Microphotograph 4.** Haptor

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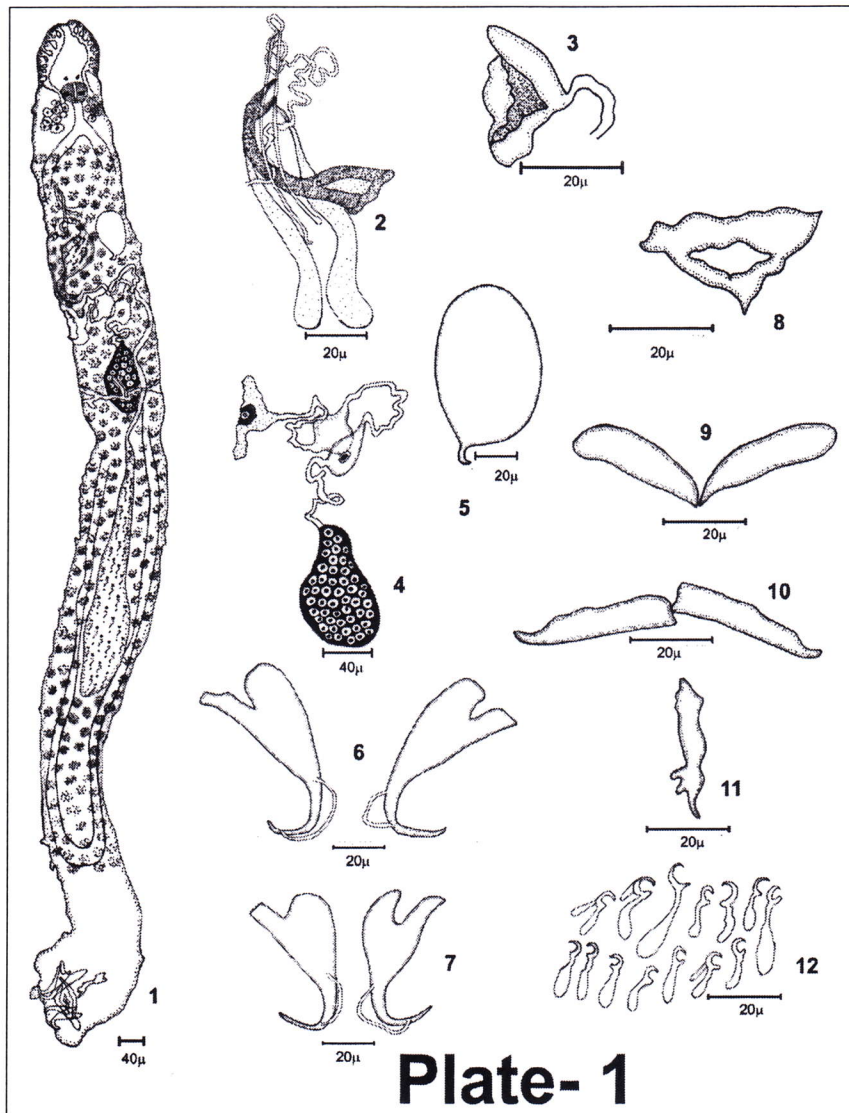
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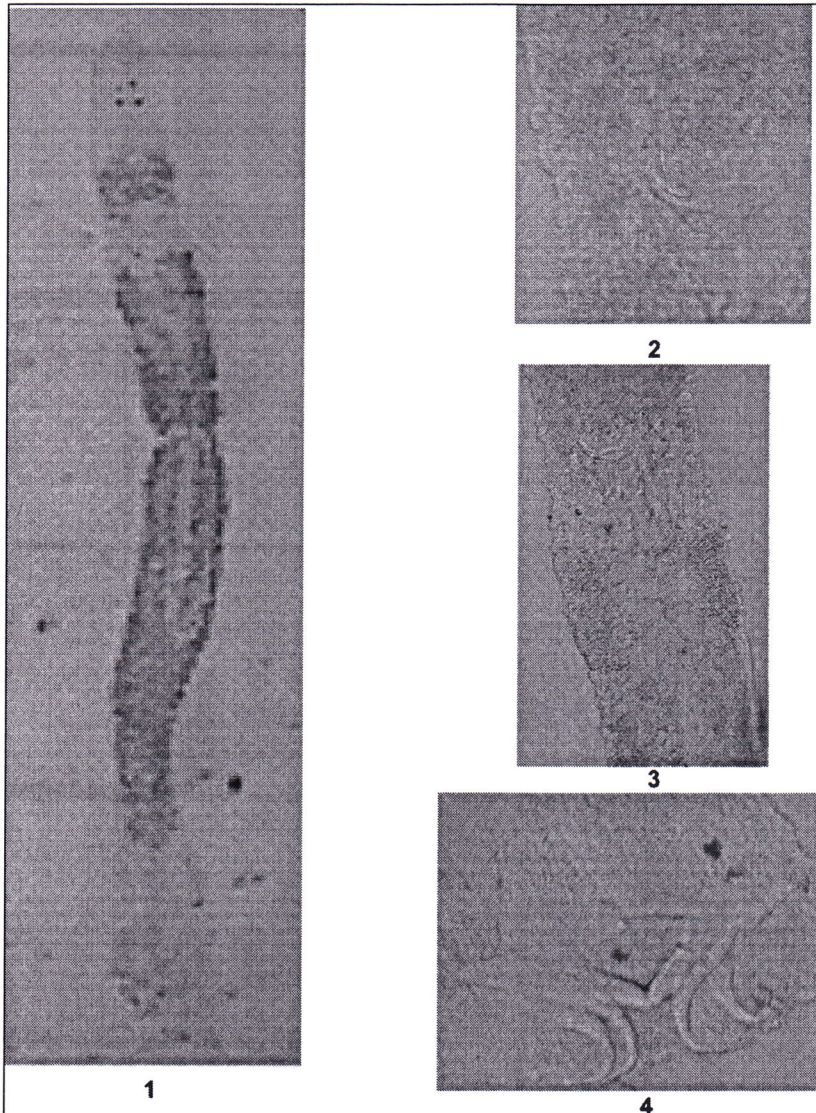
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**Plate- 2**