

Astomatus ciliate Anoplophrya chakrawartii and Anoplophrya krishnamurthii n.sp. from Intestine of Earthworm (*Perionyx excavatus* and *Pheretima posthuma*) in Jalna district (M.S.) India

Bhandari J.C. and S.V. Nikam

Department of Zoology Dr. Babasaheb Ambedkar Marathwada University Aurangabad. (M.S.)

Abstract- The present communication deals with description of two ciliate species *Anoplophrya chakrawartii* and *Anoplophrya krishnamurthii* n.sp. isolated from the intestine of *Perionyx excavatus* and *Pheretima posthuma* collected respectively from different localities of Jalna district. *Anoplophrya chakrawartii* redescribed here which is previously described by Lalpotu as new species (1979) in Marathwada region. A new species (*Anoplophrya krishnamurthii*) differs from previously described species in having elongated macronucleus with irregular outlines. Micronucleus is small, elongated, somewhat banana shaped, 2 rows of contractile vacuoles, 2 vacuoles in each row and it measuring about 25.63-39.6 μm in length and width from 16.2-20.97 μm .

Index Terms- Anoplophrya, Intestine, *Perionyx excavatus*, *Pheretima posthuma*.

I. INTRODUCTION

The genus *Anoplophrya* belong to class Oligohymenophorea, sub class Astomata, order Astomatida and family Anoplophryidae. Genus *Anoplophrya* was reported by Stain (1860) [12] and redscribed by Claparede (1860) [3], Leidy (1877) [5], Vejdovsky (1869) [14], Kent (1881) [6], Balbiani (1885) [4], Butschli (1888) [1], Shevyakov [11]. *Astomatus* ciliate commonly found in annelid worms and other invertebrates. As the name implies, this parasite has no mouth. Some astomes attach themselves to their hosts by suckers; others use various types of hooks or barbs. Asexual reproduction is by transverse fission. In some cases, chains of individuals form by repeated fission without separation of the cells. The sexual phenomenon of conjugation (nuclear exchange between individuals) also occurs. The general body form is elongate, cylindrical or slightly flattened, with rounded ends. The posterior end of the body is tapering in some species. Contractile vacuoles present, in one or two rows and scattered. Cytoproct absent; universally endosymbiotic, majority found in digestive tract of oligochaete annelids from soil, fresh-water, brackish, or marine habitats; but some species in polychaetes, leeches, turbellarians, or molluscs, and one major group exclusively in tailed amphibians. The macronucleus is almost always long and band formed, and generally extending through the entire length of the body. Micronucleus may be distinct in some species where absent in other.

II. OBJECTIVE

In the present paper two ciliates (*Anoplophrya chakrawartii* and *Anoplophrya krishnamurthii* n.sp.) described from two different host of earthworm and their morphological characteristics, similarities and differences were discussed compared with other species of this genus.

III. METHODOLOGY

Hosts were collected from different localities of Jalna district. The earthworms were kept in loose littoral soil in the laboratory. The worms quickly dissected out after the anesthetized. The content of the intestine were removed in different watch glasses. Smear made were added in physiological salt solution and observed in the light microscope. Fixation was done by Schaudinn's fixative and stained with Haematoxyline.

IV. DESCRIPTION OF THE SPECIES

1. *Anoplophrya chakrawartii* (Lalpotu 1979)

In living condition the ciliate appears extremely flattened and transparent with a relatively thin pellicle. It moves very fast with anterior narrow end forwards and swims in wide circle. The bodies appear to be flexible. The body of the ciliate is elongated with narrow, bluntly rounded anterior end and broad posterior one third. The body covered with the uniform coat of cilia. Cytoplasm appears uniform granular and there is no distinct ectoplasm and endoplasm. There are about 75 to 80 kineties, of which, 35 to 40 being on dorsal side and 40 to 45 on the ventral side. The length of this ciliate varies from 83.2 to 114.17 μm and width from 34.95 to 53.59 μm . The macronucleus is elongated and centrally placed with rounded end, slightly bent at posterior end. In some cases the outline appears to be slightly irregular. It measures about 27.96 to 55.92 μm in length 4.66 to 9.32 μm in width. Micronucleus is typically small, spherical and located at right side of the macronucleus. There is a single row of contractile vacuoles in which 4 are seen at a lateral side of macronucleus. In living condition all feeder vacuoles open near the posterior end of macronucleus. The funnel like passage opens to the outside of the posterior end of the body.

V. DISCUSSION

The present species compared with previously described species, the shape of the body is elongated and oval resemble with *A. lumbrici*, (Shrank, 1803) [10], *A. marylandnesis*, (Conlkin, 1935) [2], *A. pheretimii*, (S. Raychaudhari, 1969) [9], *A. perionychis* and *A. chakrawartii*. (Lalpotu, 1979) [8]. The macronucleus is elongated and ribbon like in all above species. The irregular outline and several fine projections of macronucleus observed in *A. perionychis* and *A. marylandnesis*. In the present species macronucleus is elongated with smooth outline, anterior end is pointed and posterior end is slightly bent. In few cases the outline of macronucleus appears to be slightly irregular. The macronucleus of the present species is similar to the macronucleus of *A. chakrawartii*. Spherical shape of the micronucleus resembles with the all above species. The arrangement and number of contractile vacuoles is different than that of previous species, but it resembles with *A. chakrawartii*. Only in *A. chakrawartii* number of contractile vacuoles is 3 to 7 and in present species the number is 4. The body dimensions resemble with *A. pheretimii* but it is smaller than *A. chakrawartii*. After comparison it is concluded the species described by present author in all characters are very close to *A. chakrawartii* only it is smaller than it in size. So the present species is *A. chakrawartii* and redescribed. (Fig. 1). A comparison of the genus *Anoplophrya* species as shown in table (1).

Type of species: *Anoplophrya chakrawartii*

Host: *Perionyx excavatus*

Habitat: Intestine

Locality: Jalna (M.S.) India

Deposition: Protozoology laboratory.

Department of zoology B.A.M. University Aurangabad.

2. *Anoplophrya krishnamurthii* (n.sp.)

The body of ciliates is uniformly flattened, elongated and oval in shape, but in some cases, anterior end is slightly pointed. The ciliates measure 25.63 to 39.61 μm in length and 20.97 to 25.63 μm in width. The body covered with long cilia varied directly with the size of the parasites. Cytoplasm appears uniformly granulated and there is no distinct ectoplasm and endoplasm. The macronucleus is elongated with irregular outlines, extended through the long axis of the body with pointed ends. The length of the macronucleus is 23.3 to 38.94 μm and width is 4.66 to 6.99 μm . In some cases the width of macronucleus is more and both ends are rounded. The micronucleus is small, elongated and somewhat banana shaped, lying at the lateral side of macronucleus. There are two rows of contractile vacuoles situated at the posterior region of macronucleus. Total number of vacuoles four and arranged in two rows. Two vacuoles in each row. (Binary fission as shown in fig. 3.)

VI. DISCUSSION

The species described by author compared with the species described by previous authors, some similar characters are seen, but some are totally different.

The shape of the body is similar to *A. lumbrici*, (Shrank, 1803) [10], *A. marylandnesis* (Conlkin, 1935) [2], *A. perionychis* and *A. chakrawartii* (Lalpotu, 1980) [8] but different than that of *A. foldii* (T.T.Shaikh 2006) [13]. In *A. foldii*, it is elongated with left lateral fold. The present species is smaller as compared to the dimensions of those described earlier. In the present species there are four vacuoles arranged in two rows. Two vacuoles in each, they are situated at the lateral side of macronucleus at posterior end. In *A. lumbrici* there are only 3 vacuoles, in *A. marylandnesis* 4 vacuoles in single row. In *A. pheretimii* there are 3 to 6 vacuoles in each row. In *A. chakrawartii* there are 3 to 7 vacuoles scattered in single row. In *A. perionychis* 5, two very small. In *A. foldii* they are in two rows 7 to 18 in each row. Macronucleus is elongated, ribbon shaped in all above species but several fine projections found in *A. marylandnesis* and irregular outlines found in present species. (Fig.2). Micronucleus is spherical in most of the earlier described species where as in the present species it is elongated banana shaped, situated in midway of macronucleus and outer wall. (Fig.2). A comparative analysis of different species of *Anoplophrya* as shown in table no. (2)

In view of its distinct vacuoles, small size and slightly elongated banana like micronucleus, the species is considered new to science and designated as *Anoplophrya krishnamurthii* (n.sp.).

Type of species: *Anoplophrya krishnamurthii* n.sp.

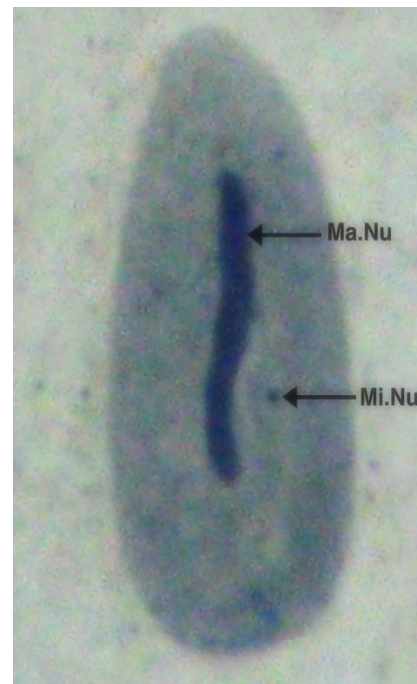
Host: *Pheretima posthuma*

Habitat: Intestine

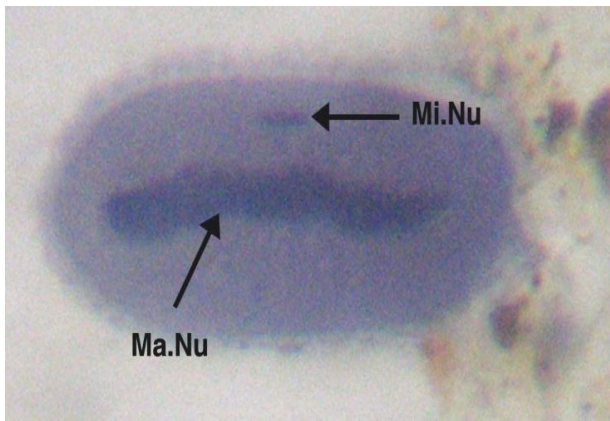
Locality: Parture, Jalna district. (M.S.) India

Deposition: Protozoology laboratory.

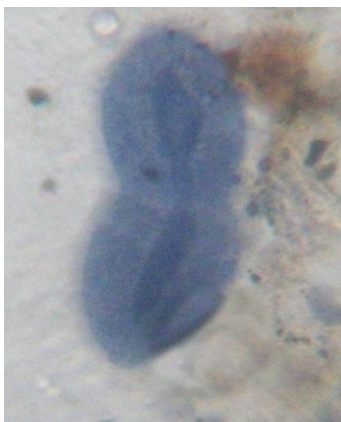
Department of zoology B.A.M. University Aurangabad.



(Fig. 1. *Anoplophrya chakrawartii*)



(Fig. 2. *Anoplophrya krishanamurthii* n.sp)



(Fig. 3. Binary fission of *A. krishanamurthii*)

ACKNOWLEDGMENT

Authors are thankful to the Head of Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S) India for their kind cooperation, encouragement and facilities extended to us.

REFERENCES

- [1] Buetschli "Die Protozoen. Bronn's Klassen u". *Ord. des Tierreichs*.1888
- [2] C.Conklin, "*Anoplophrya marylandensis* n, sp., Ciliates from the Intestine of Earthworm *Bio Bull*". 1930, 68: 176-181.
- [3] E, Clapaarede, . "Recherches sur les annelides, etc., observes dans lesHebrides". Mem. Soc. phys. d'hist. nat., Geneve, XVI, 1860.
- [4] E, G,Balbani, "Sur un Infusoire parasite du sang de l'Aselle aquatique". *Rec. zool. Suisse*, II, 1885.
- [5] J, Leidy, "Remarks upon Rhizopods and notice of a new form". *Proc. Ac. Sci. Phila.*, 1877, p. 293.
- [6] Kent, "Manual of the Infusoria". London, 1881.
- [7] O. Buetschli, "Studien ueber die ersten Entwicklungsvorg. der Eizelle, die Zelltheilung, und die Conjugation der Infusorien". *Abhand. der Senck. naturf. Ges. Freiburg*, X, 1876.
- [8] P. P. Lalpotu, "Observation on some protozoan parasites of invertebrates" *Ph. D.thesis* of Dr. B. A. M. University Aurangabad.1976.
- [9] S., Raychaudhuri, D. P, Halder and M.M., Chakravarty "Observations on new astomate ciliates, *Anoplophrya pheretimi*, from the earthworm *Pheretima posthuma*"(L. Vaill). *Arch. Protistenk.*, 1969, 111: 228-235.
- [10] Sharnk, "The neuromotor system of *Anoplophrya lumbrici*, degenerate ciliate, from the earthworm *Octolasion cyaneum*"*American Philosophical Society*, 1830, V 18, pp. 595- 614.
- [11] Shevyako, "Monograph on _Holotrichous ciliates"_ . (In Russian.) Mem. of the St. Petersburg Acad., 1996, VII.
- [12] Stain, "Ueber _Leucophrys patula_ u. ueber 2 neue Infusoriengattungen Gyrocoris u. Lophomonas. Sitz. Ber. d. K.-boehm. Ges. d. Wiss. d. Prag, 1860, p. 4.
- [13] T. T. Sheikh, (2006): Studies on some free living and parasitic ciliates *Ph. D thesis* of Dr. B. A. M. University Aurangabad. 2006.
- [14] Vejdowsk, "Monographie der Enchytraeiden". Prag, 1869.

AUTHORS

First Author – J.C. Bhandari B.Sc, (Biology) M.Sc, (Zoology) Ph. D. (Zoology), EMAIL: dr.jcbhandari@gmail.com.

Second Author – S.V. Nikam B.Sc, (Biology) M.Sc, Ph. D. (Zoology) Associate, Professor in dept of zoology, Dr. B.A.M University Aurangabad., EMAIL: svnikam@gmail.com