

## A new Hypotrich Ciliate *Euplotes deshmukhii* n. sp. (Ciliophora: Sporadotrichida) from freshwater in Aurangabad

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### ABSTRACT

Water samples were collected from different stagnant fresh water bodies of the Aurangabad vicinity, Maharashtra, India. The study had been undertaken for the period of two years from Aug 2007-July 2009. A new hypotrich ciliate first time reported from this region. Present species compared with all previously described species of genus *Euplotes*. The size of the cell, 'J' shaped macronucleus, length of the adoral zone of membranelle (AZM) up to posterior end of the body, and shapes of the peristomal plate distinguish this species from all previously described species. Hence the present species considered new to science and described here as *Euplotes deshmukhii* n. sp.

**Keywords:** *New species, Euplotes deshmukhii* n. sp., J shape, Y shape

### INTRODUCTION

Over 70 species and varieties of *Euplotes* have been described and a number of taxonomic methods have been used for identification of the species of the genus *Euplotes* (Hill & Reilly, 1976). Pierson (1943) separated species on the basis of size, shape of macronucleus, size and shape of peristome and peristomal plate, amount and type of undercutting of the right oral surface by the peristome, shape of the line of membranelles, position of the end of the cytopharynx, with relation to the left transverse cirrus, and the presence of the aboral ridge (Hill & Reilly, 1976). Rawlinson and Gates (1986) classify the encysting species of *Euplotes* morphologically and he proposed that 1) the cirrotype and dargyrome can be used in the identification of the species of the *Euplotes*, and 2) characters of habitat and presence or absence of the endosymbiont should be considered.

### MATERIALS AND METHODS

Water samples were collected in plastic bottles and brought to the laboratory. These samples were then examined under the microscope for further study directly by taking the water drop on a slide which was covered with a coverslip to prevent the drop from drying.

Protozoa are usually swim rapidly in water and hence unable to identify. To immobilize those, 10% methyl cellulose was added to the water drop on slide. This slows the movement of organism without immediate death or bursting. Smears are then fixed in Schaudinn's fixative and stained in haematoxyline stain. Dehydration was done using various grades of alcohol such as 30, 50, 70, 90, 100 percent alcohols. After dehydration, smear is treated with clearing agent (Xylene) and mounted in DPX.

**SYSTEMATIC POSITION**

Domain	:	Eukaryota
Kingdom	:	Protozoa Goldfuss, 1818, Rown, 1858
Sub kingdom	:	Biciliata
Infra kingdom	:	Alveolata Cavalier & Smith, 1991
Phylum	:	Ciliophora Doflein, 1901, Copeland, 1956
Subphylum	:	Intramacronucleata Lynn, 1996
Class	:	Spirotrichea Butschli, 1889
Sub class	:	Hypotrichia Stein, 1859
Order	:	Euplotida Small & Lynn, 1985
Sub order	:	Euplotina Small & Lynn, 1985
Family	:	Euplotidae Ehrenberg, 1838
Genus	:	Euplotes Ehrenberg, 1830
<b>Species</b>	:	<b><i>E. deshmukhii</i> n. sp.</b>

**DESCRIPTION OF THE GENUS**

This genus was first reported by Ehrenberg, 1930. It is a member of class *Spirotrichea* Butschli, 1889. It is a major class of phylum *Ciliophora*, in which the ciliates are characterized by prominent, compound ciliary structure. *Euplotes* are generally having transparent body. The ventral surface of the body has the ciliary structure called cirri. These cirri also present at the buccal organelle which includes the undulating membrane and the AZM. Body of these ciliates is dorsoventrally flattened and contains cirri in longitudinal rows on the ventral or lateral surfaces. Cirri are relatively large in size and their infra ciliary bases may contain as many as 120 kinetosome. These cirri help the organism in both feeding and locomotion. According to their location the cirri are of many types such as frontal cirri (Frontals), frontoventral cirri (frontoventrals), midventral cirri (midventrals), marginal cirri (marginals), transverse cirri (transversals) and anal or caudal cirri (anals or caudals respectively). These ciliates are cursorial and creeping organisms and show great mobility. They move forward rapidly at a short distance and quickly change the direction using both oral and somatic ciliature. The shape of macronucleus varies from species to species. In some species it is more or less 'C' shape while some species have 'T' shaped or '3' shaped macronucleus.

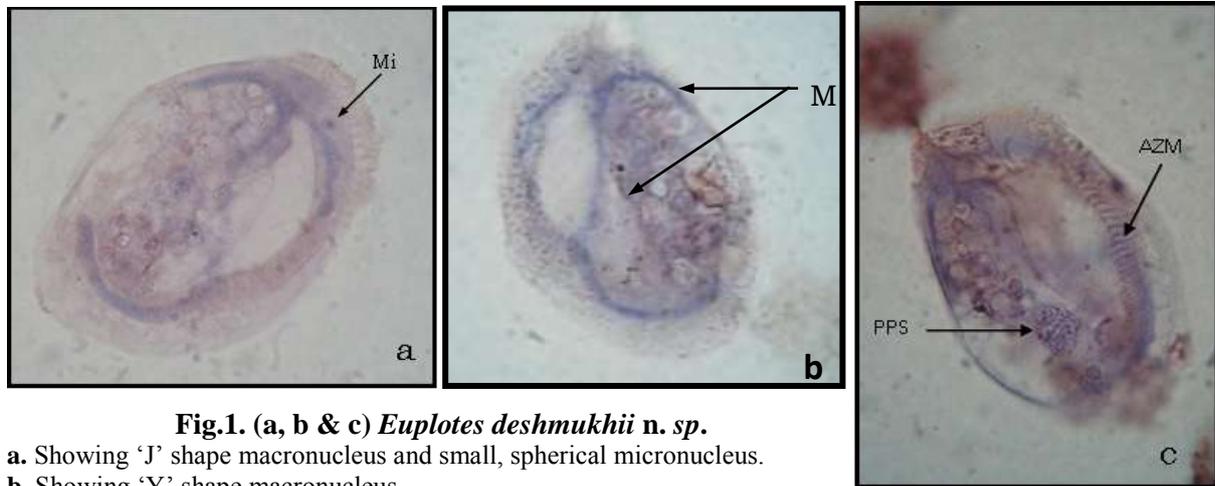
Following are the species include in the genus *Euplotes*.

- E. patella* Muller, 1986
- E. eurytomus* Wrzesnioweski, 1870
- E. woodruffi* Gaw, 1939
- E. aediculatus* Peirson 1968
- E. affinis* Dujardin, 1841
- E. moebiusi* Kahl, 1932

**DESCRIPTION OF THE SPECIES**

Body is oval shape having flattened dorsal surface and convex ventral surface. It is inflexible and measures 77.18 $\mu$  to 83.99 $\mu$  in length and 52.21 $\mu$  to 56.75 $\mu$  in width. Cirri are present at different parts of the body and named according to their location. 9 frontoventrals, 5 transverse and 4 caudal cirri. Peristome is wide with broad, long peristomal plate. AZM extends up to posterior end of the body and forms a sigmoid curve around the peristome.

Macronucleus is band like and 'J' shape or 'Y' shape. The anterior branches of macronucleus runs forward and bend towards posterior side forming a round curve at both sides. Micronucleus is spherical present on anterior of the body near macronucleus. Post-pharyngeal sac is present (Fig. 1 a, b & c).



**Fig.1. (a, b & c) *Euplotes deshmukhii* n. sp.**

- a. Showing 'J' shape macronucleus and small, spherical micronucleus.  
 b. Showing 'Y' shape macronucleus.  
 c. Showing AZM reaching up to posterior end and post pharyngeal sac(PPS).

## **RESULTS AND DISCUSSION**

This ciliate has inflexible body, ovoid in shape; ventral surface is convex and hence included in genus *Euplotes*. This genus is first reported by Ehrenberg, 1930. Later many other workers reported the same genus from water such as Sharp (1914), Yocum (1918), Taylor (1920), Klein (1926), Turner (1933), Cohen (1934), Kimball (1941), Kloetzel (1970), Bick (1972), Dini (1981), Klaus (2005), Song *et al.* (2002). The comparative study of three freshwater *Euplotes* species, *E. aediculatus*, *E. eurystomus* and *E. woodruffi* was done by Hill *et al.* (1976). Pierson (1943) studied the comparative morphology of several species of *Euplotes* closely related to *E. patella*. Song & Bradburry (1997) reported a new brackish water *Euplotes*, *E. parawoodruffi* n.sp. and redescribed the *E. woodruffi*. Shaikh (2006) reported *E. eurystomus* from fresh water and Song *et al.* (2010) found two new ciliates, *E. siniscus* and *E. parabaleatus* in marine water. Present author found this ciliate in fresh water.

In present species there are 9 frontoventral, 5 transverse and 4 caudal cirri present which are similar to *E. patella*, *E. eurystomus*, *E. woodruffi*, *E. aediculatus* and *E. affinis* which also have 9 frontoventral, 5 transverse and 4 caudal cirri (Table 1). It also matches with the *E. eurystomus* reported by Glidden, 1996 and Shaikh, 2006 while Curds (1974) reported *E. affinis* with 10 frontoventral and 3 caudal cirri and *E. parkei* n. sp. with 8 frontoventrals.

Present author reported wide peristome and resembles that of *E. eurystomus* and *E. woodruffi* which also have wide peristome while differs from *E. patella*, *E. aediculatus*, *E. affinis* and *E. moebiusi* which have narrow peristome. Peristomal plate is broadly long but not triangular and hence similar to *E. moebiusi* but differs from *E. eurystomus* which has triangular peristomal plate. It also differs from *E. patella*, *E. woodruffi*, *E. aediculatus* and *E. affinis* as they have small, triangular or narrow peristomal plate.

AZM extends up to posterior end of the body and it found longest among all the species of genus *Euplotes* and differs from all the species described by earlier workers in which AZM extends one-half to two-thirds of the body length.

Present species has 'Y' or 'J' shape macronucleus but the anterior part bends and forms round curve on both sides. This shape of macronucleus found to be different from all the species of genus *Euplotes* as *E. patella*, *E. aediculatus* and *E. affinis* have 'C' shape macronucleus, '3' shape macronucleus is present in *E. eurystomus* and *E. moebiusi*. Shaikh (2006) also reported '3' shape macronucleus in *E. eurystomus* while *E. woodruffi* has 'T' shape macronucleus.

Present author observed spherical micronucleus at the anterior right near the macronucleus and similar to *E. woodruffi* while differs from all other species of genus *Euplotes* which possess a micronucleus at the anterior left of the body, but this species differs from *E. woodruffi* in shape of the macronucleus.

Present author compared this species with all the species of genus *Euplotes*. Shape of the macronucleus and length of AZM with respect to the body length found to be different from other species and hence this species considered new to science and described here as *Euplotes deshmukhii* n. sp.

**Table 1**  
**Comparison of the present species with the species of genus *Euplotes***

Parti-culars	<i>E. affinis</i> Dujardin, 1841	<i>E. eurystomus</i> Wrzesniowski, 1870	<i>E. moebiusi</i> Kahl, 1932	<i>E. woodruffi</i> Gaw, 1939	<i>E. aediculatus</i> Peirson, 1968	<i>E. patella</i> Muller, 1986	<i>E. eurystomus</i> Shaikh, 2006	<i>Euplotesdeshm</i> <i>ukhin.</i> sp. Present author
<b>Body shape</b>	Small ovoid	Elongate or ellipsoidal	Ovoid	Oval	Elliptical	Sub-circular or elliptical	Ovoid or ellipsoidal	Ovoid
<b>Body dimension</b>	40µ-70µ long	138µ by 78µ	55.7µ-68.3µ by 33.6µ-45.3µ	140µ by 90µ	132µ by 84µ	91µ by 52µ	105µ-170µ by 80µ-110µ	77.18µ-3.99µ by 52.2µ-56.75µ
<b>Cirri</b>	9FV, 5T, 4C	9FV, 5T, 4C	10FV, 5T, 4C	9FV, 5T, 4C	9FV, 5T, 4C	9FV, 5T, 4C	9FV, 5T, 4C	9FV, 5T, 4C
<b>Peristome</b>	Narrow	Wide	Narrow	Wide	Narrow	Narrow	Wide	Wide
<b>Peristomal plate</b>	Long narrow	Broad, triangular	Broad, long	Small	Long, triangular	Small, triangular	Broadly triangular	Broad, long
<b>AZM</b>	2/3 of body length	½ of body length	2/3 of body length	2/3 of body length	2/3 of body length	½ of body length	2/3 of body length	Up to posterior of body
<b>Macro-nucleus</b>	Slight 'C' shape	'3' shape	'3' shape	'T' shape	'C' shape	C-form band	'3' shape	'J' or 'Y' shape
<b>Micro-nucleus</b>	Spherica, anterior left	Spherical, anterior left	Spherica, anterior left	Spherica, anterior right	Spherica, anterior left	Spherical, anterior left	Spherical, anterior left	Spherical, anterior right
<b>Habitat</b>	Fresh & brackish water	Fresh & brackish water	Fresh water	Fresh & brackish water	Fresh & brackish water	Fresh water	Fresh water	Fresh water

**Cirri:** FV- Frontoventrals; T- Transversals; C- Caudals

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