



A NOTE ON THE OCCURRENCE OF A NEW SPECIES OF *FISCHERELLA* (CYANOBACTERIA) FROM RANCHI, JHARAKHAND (INDIA)

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One taxon of *Fischerella* with variation in the morphological features of the known species of this genus has been found in vegetative and reproductive stages. On the basis of distinguishable morphological characters an attempt has been made to establish a new species of genus *Fischerella* i.e. *F. ranchiensis* sp. nov. belonging to order stigonematales of cyanophyceae. The specimens of *F. ranchiensis* were collected from terrestrial habitat (earthen pot, bricks) and aerial (tree-bark) at Morabadi, Ratu and proper Ranchi during the year 2005-2007. The gelatinous material secreted by the cells form a cylinder investing the entire trichome and violet or deep brown in colour. This species identified is a new report from India.

Key words: Akinete, Heterotrichous, Pit connection, Terrestrial. *Fischerella*

Thallus is true branched heterotrichous filamentous form of indeterminate growth (Geitler 1932, Desikachary 1959, Singh 1961, Lee 2008). The cells are depressed spherical or cylindrical and are arranged in single or many rows (trichome). The erect filaments are uniseriate and the prostrate filaments are multiseriate (Kumar 1999). The akinetes are present with two wall layers. *Fischerella* are widely distributed in terrestrial and subaerial habitat. The genus *Fischerella* known to have three species at global level out of which two species are reported from India. They are *F. muscicola* and *F. ambigua*. Previously reported by Banerji (1935), Faridpur (Bengal); Gupta (1953) Allahabad and Schmidle (1900b) Cumballa hill, India.

MATERIALS AND METHODS

The specimen *F. ranchiensis* collected from the terrestrial, aerial habitat in vegetative and reproductive stages. The material was thoroughly washed with tap water and finally with distilled water. Some specimens were preserved in formalin for future reference. The gelatinous envelop and sheath were rendered conspicuous by staining with very dilute aqueous solution of methylene blue. Temporary slides were prepared and observed under the

standard research microscope. Detailed morphological characters of vegetative and reproductive structures of the alga were observed from natural as well as in vitro condition. Taxonomical studies were undertaken with the help of standard monographs, key to the identification and available literatures. These morphotaxonomical findings further substantiated by microphotographs and Camera Lucida drawings.

Cultural studies - The specimen was transferred to BG 11 medium and incubated at 20-25°C under alternate 12/12, light/dark cycle from fluorescent tube light at an intensity of 100 Lux.

Composition of media : BG11 medium (g/l) at pH value 7.1

NaNO ₃	1.5
K ₂ HPO ₄	0.04
MgSO ₄ .7H ₂ O	0.075
CaCl ₂ .2H ₂ O	0.036
Citric acid	0.006
Ferric ammonium citrate	0.006
EDTA	0.001
Na ₂ CO ₃	0.02
Trace metal	1 ml

Table-1. The comparison between the allied taxa and the taxon under investigation.

Sl No.	Name of species	Main axis or primary branch	Erect or lateral branch	Hormogonia	Heterocyst	Akinete
01	<i>F. epiphytica</i> (Ghose, 1927c)	Filaments 15-20 μ thick	Filaments 11-14 μ in diameter.	2-6 celled	-	-
02	<i>F. muscicola</i> (Thuret) Gom., Banerji, 1935	Filaments 10 μ broad, Cells 7.5 μ in diameter	Filaments 6 μ broad	100 μ long 4 μ broad	-	-
03	<i>F. ambigua</i> (Näg.) Gom., Schmidle, 1900b	Filaments 6-9 μ broad, cells 3-4 μ broad	Filaments 6-9 μ broad, cells 2-3 μ broad	Very long	-	-
04	<i>F. ranchiensis</i> sp. nov. Sahu & Thakur, 2009	Filaments 3.3-6.6 μ broad, cells 3.4-9.9 μ long, 3.3-4.7 μ broad and spherical cells 3.3-7.3 μ in diameter	Filament 2-5 μ broad, cells 3.3-13.2 μ long and 3.3-4.7 μ broad	13.2-19.8 μ long and 6.6-7 μ broad	3 μ in diameter	3.3-9.9 μ in diameter

RESULTS

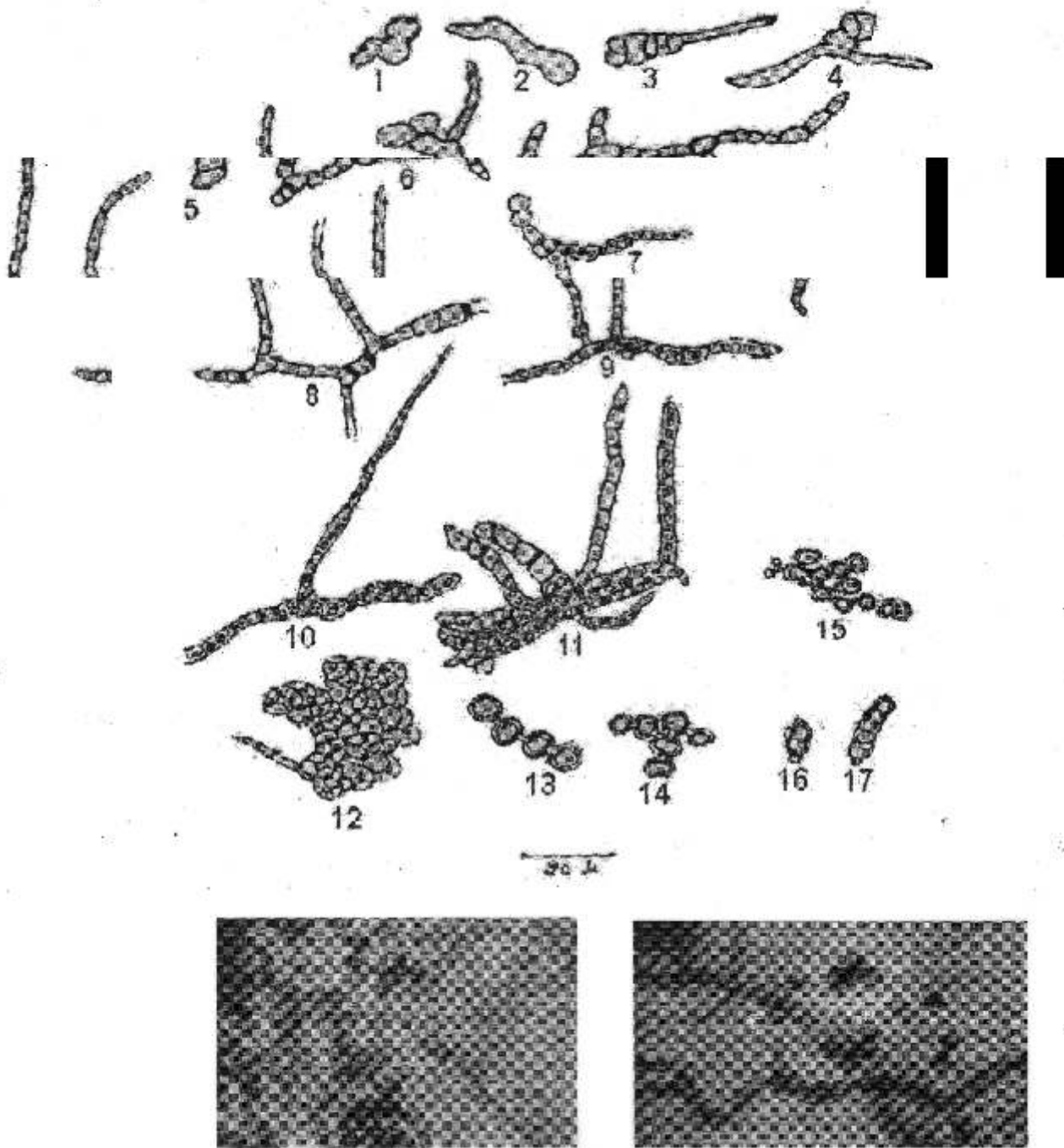
Description of the species *Fischerella ranchiensis* sp. nov

Heterotrichous filamentous form showing true branching with intercalary heterocyst. The primary or prostrate filaments are multiserial with spherical to cylindrical cells. Spherical cells are 3.3-7.3 μ in diameter while cylindrical cells are 3.4-9.9 μ long and 3.3-4.7 μ broad. The cells of erect or lateral branches are 3.3-13.2 μ long and 3.3-4.7 μ broad and are uniseriate.

Multiplication by thick walled akinetes with two distinct wall layers and deep violet in colour. Akinetes are 3.3 – 9.9 μ in diameter. They are present in chain and the pit connections between adjacent cells are very clearly seen and germinate to form a multicellular aggregate (Fig.-12) by divisions occurring in several planes and subsequent division only in one plane lead to hormogonia

(Fig.-16) or to the development of lateral branches. Type C.T. and R.S. -5 kept in Algal Bio-Technology Laboratory, University Department of Botany, Ranchi University, Ranchi, Jharkhand. Habitat terrestrial over sand soil of earthen pot and damp soil at morabadi, Ranchi, October 2005.

Latin diagnosis: *Fischerella ranchiensis*, sp. nov. Heterotrichous filamentous volturis ostendo verus stips per intercalary carbasus. Primary vel prostrate filaments es multiserial per spherical ut cylindrical cells. Spherical cells es 3.3-7.3 μ in diameter dulcitudinis cylindrical cells es porro qui prolixus. Cells of moliar vel laxis stips es porro qui prolixus qui es uniseriate. Multiplication per creber parietis akinetes per duos testimonium parietis layers qui prefunds vis in colour. Akinetes es 3.3-9.9 μ in diameter. They es tendo in chain qui vorago iunctio penitus adjacent cell es valde videlicet



Figures 1-19: *Fischerella ranchiensis* sp. nov. : Life cycle as observed in natural habitat.

1 -5 Germination of hormogonia. 6-10 Different stages of development of trichome. Fig. Multiserial trichome.
 12-15 Akinete formation and germination. 16-17 Hormogonia 18-19 Microphotographs of *F. ranchiensis* sp. nov.

seen qui germinate effingo a multicellular aggregate (Fig. 12) per divortium res in plures locus qui subsequent divortium in novus plagiaries crista ut homogonia (Fig. 16) vel ut development of laxus stips. Typus C.T. qui kept Algal Biotechnology Laboratory Universitas Department of Botany, Ranchi Universitas, Ranchi, Jharkhand. Solitus vestio terrestrial eximius sandy atrox scaphium qui damp atrox procul Morabadi Ranchi, October, 2005.

Source

<http://www.tranexp.com:2000/intertran.url>

DISCUSSION

The taxon under investigation has been compared to the known species of *Fischerella* from India (cf Desikachary 1959 pp. 599-602) and found to exhibit some similarity with *F.ambigua* (Näg. Gom.). The earlier species have been reported from paddy field, tree-bark and soil culture (Schmidle1900, Ghose1927, Banerji 1935, Mitra 1951) while the taxon under investigation had been recorded from flower pot, bricks, moist soil, concrete surface, tree bark etc. The thickness of all allied taxa have more broad filaments of primary and secondary branch than the taxon under investigation. However the species under investigation is characterized by the presence of akinetes in chain with two distinct wall layers and deep violet in colour. Presence of pit connections with adjacent cell are very clearly seen. They germinate to form a multicellular aggregate by divisions in several planes (Fig.12-13,15). This unique feature of the species differentiate it from the species recorded so far. A perusal of the table-1 provides a comparative account of morphological characters of allied taxa and the taxon under investigation. The above table clearly reveals that the taxon under investigation differ sharply. Further all allied taxa show false branching with long hormogones, however the alga under investigation has less diameter of vegetative cells show true branching with short hormogones. The whole life-cycle has been

observed from specimens from the natural habitat. The description of the present species does not fit to the any species of the known *Fischerella*. The present authors feel therefore, the alga is a new to science and named as *Fischerella ranchiensis* sp.nov.

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