



## ***Trichocladium aquaticum* sp. nov. (mitosporic fungi) on submerged wood from freshwater, Maharashtra, India**

Patil SY<sup>1</sup>, Pawar NS<sup>2</sup> and Borse BD<sup>3</sup>

<sup>1</sup>SSVP Sanstha's L.K. Dr. P. R. Ghogrey Sci. college, Dhule, MS, India

<sup>2</sup>S.S.V.P. S.'s Arts, Comm. and Sci. college, Shindkheda, Dhule, MS, India

<sup>3</sup>N.S. S. Dhule's U. P. Arts and Science college, Dahiwel, Dhule, MS, India

Corresponding Author: Dr. N. S. Pawar,; nsp7109@gmail.com

### Manuscript details:

Received: 20.03.2019

Accepted: 21.05.2019

Published: 25.06.2019

**Editor: Dr. Arvind Chavhan**

### Cite this article as:

Patil SY, Pawar NS and Borse BD (2019) *Trichocladium aquaticum* sp. nov. (mitosporic fungi) on submerged wood from freshwater, Maharashtra, India, *Int. J. of Life Science*, Volume 7(2): 329-332.

**Copyright:** © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

Available online on  
<http://www.ijlsci.in>  
ISSN: 2320-964X (Online)  
ISSN: 2320-7817 (Print)

### ABSTRACT

A new species of *Trichocladium*, *T. aquaticum*, was collected from northern parts of Western Ghats on submerged decaying woody debris from freshwater streams and reservoirs in Maharashtra and is described. The new submerged-aquatic hyphomycetous fungus is differed from the related species of the genus in size and characteristics of colony and conidia.

**Key words:** Freshwater, mitosporic fungi, submerged wood, taxonomy

### INTRODUCTION

The submerged-aquatic hyphomycetes were first addressed by Ingold (1975) represent a heterogenous assemblage of fungi growing on submerged decaying plant materials. Most of the species are found on woody litter blocked in fast-flowing streams and reservoirs. These fungi are nearly all dematiaceous and produced relatively thick-walled conidiophores and/or conidia. Although some species may sporulate under submerged conditions, a vast number sporulate when the substrate are no longer under water. Incubation of such woody substrates in moist chambers yields a great number of different species. The conidia are capable of air dispersal or dispersed by some other mechanisms (Goh & Hyde 1996). The submerged-aquatic hyphomycetes can be classified into two main types based on Park (1972), namely indwellers and immigrants. Species in several genera e. g *Aquaphila*, *Camposporidium*, *Canalisporium* etc. can be classified as indwellers because they have been reported only from freshwater habitats. Whereas, species that belong to genera such as *Acrodictys*, *Bactrodesmium*, *Vanakripa*, *Xylomyces* etc. can be classified as immigrants because they are reported from terrestrial as well as freshwater habitats. Goh & Tsui (2003) provide a key to some common genera of dematiaceous mitosporic fungi that have been reported from freshwater habitats worldwide.

## MATERIALS AND METHODS

Samples of submerged decomposed decaying woody debris were collected from rivers and reservoirs. The samples were returned to the laboratory keeping in plastic bags in the field and immediately examined with a dissecting microscope to locate fungal fruiting bodies. After the first observation, samples were incubated for three months on a moist paper towels in sterile plastic boxes at ambient temp. of 25° -30° C to stimulate fungal development. Incubated samples were examined on day 15 and then over three months under a dissecting microscope for fungal fruiting bodies. Colonies were observed on the surface of the substrate with the naked eye and under a stereo-zoom microscope. Colonies and conidia were mounted in lactic acid with cotton blue and measured using an ocular micrometer with 15 observations per structure. The holotype specimen (slides) is deposited in the Herbarium Cryptogamie Indiae Orientalis (H.C.I.O.), Division of mycology and plant Pathology, I.A.R.I. Pusa Campus, New Delhi, India (Holotype: HCIO No. 52066).

## TAXONOMY

*Trichocladium aquaticum* Pawar, N.S. & B.D. Borse, sp. nov. Figs. 1-2

Mycobank No.: MB 830212

TYPE: India, Maharashtra, Aner dam on Aner river (Shirpur, Dhule, Maharashtra, India), 26 June 2002, Leg. B.D. Borse, together with *Trichocladium constrictum* I. Schmidt (= *Trichocladium angelicum* Roldon & Honrubia). (Holotype: HCIO No. 52066)

ETYMOLOGY: Referring from the Latin *aquaticus* meaning 'growing in water'

*Description:* Colonies: on submerged woody debris, effuse, scattered, grey to black or conidia scattered on hyphae. Mycelium: mostly immersed, composed of branched, septate, smooth, brown hyphae. Conidiophores: micronematous, mononematous, scattered, unbranched, pale brown, smooth. Conidiogenous cells: monoblastic, intercalary, determinate. Conidia: 17-30 µm high, 10-17 µm diam, solitary, dry, simple, curved or straight, smooth, rounded at the apex, clavate-pyriform, 2-3-septate, not constricted at the septa, devoid of brown to black band at the septa, thick-walled, lacking germ pores, apical cell larger, subglobose, brown, distinctly darker than rest of the cells, 13-21.5 µm high, 8.5-17 µm in diam.; middle cell obconical, frequently curved and subhyaline; basal cell cylindrical and hyaline; wall unequal in height, hence the base of the conidia become curved.

TELOMORPH: not observed.

**Table- Comparison of aquatic *Trichocladium* spp. with the present fungus:**

Species	Conidia								Habitat
	Size (µm)	Overall shape	Curved or straight	No. of cell	Septal constrictio n	Wall	Shape of distal cell	Apex	
<i>T. alopallonellum</i>	10-16 X 15-20	Clavate, pyriform	straight	(2-) 3	Moderate	smooth	Sub-globose	rounded	marine, on wood
<i>T. englandense</i>	20-30 X 9-15	Clavate, pyriform	curved	(2-) 3	slight	Smooth	oblong	rounded	Freshwater, submerged wood
<i>T. medullare</i>	17-26 X 7-10	Clavate	curved	2-3	moderate	smooth	ellipsoid	Sub-obtuse	marine, on <i>Juncus</i> culm
<i>T. melhae</i>	7-14 X 4-9	Clavate, pyriform	straight	3	moderate	smooth	ellipsoid	rounded	marine, on wood
<i>T. nypae</i>	15-20 X 10-15	pyriform	straight	2-3	slight	smooth	Sub-globose	rounded	marine, on palm
Present fungus	17-30 X 10-17	Clavate, pyriform	curved, straight	3-4	slight	smooth	Sub-globose	rounded	Freshwater, submerged wood

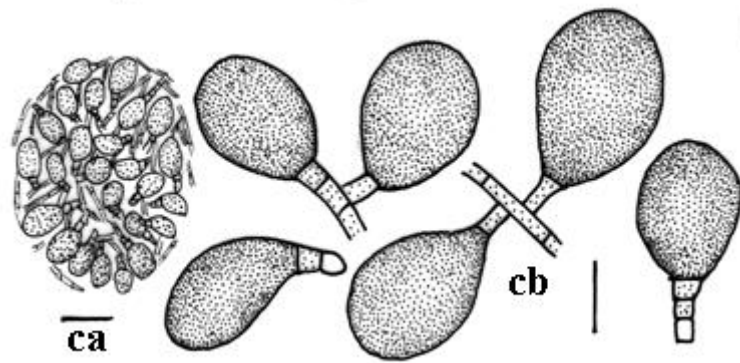


Fig. 1. *Trichocladium aquaticum*, a- Colony, b- conidia (scale bars = 10  $\mu$ m)

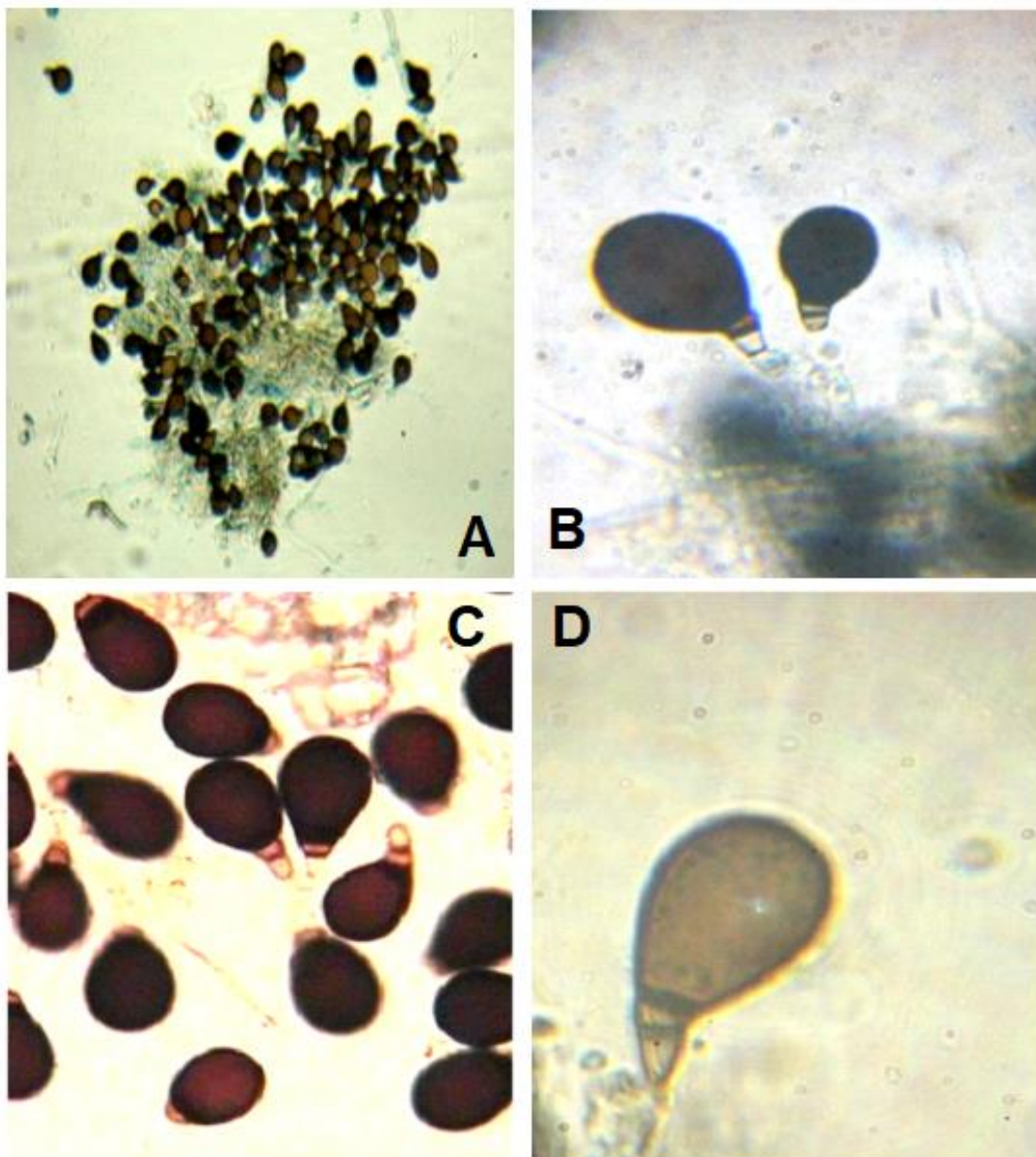


Fig.2. *Trichocladium aquaticum*, A- colony, B- conidia, C- conidia, D- conidium

## DISCUSIÓN

According to Jones et al. (2014), there are 531 species of mitosporic fungi that had been recorded from freshwater habitats all over the world. In India, studies on freshwater mitosporic fungi (375 sp.) were compiled by Patil et al. (2015) and Borse et al. (2016, 2017). In this paper, we describe and illustrate a new submerged-aquatic mitosporic fungus *Trichocladium aquaticum* (Fungi, Ascomycota, Pezizomycotina, Sordariomycete, Sordariomycetidae, Sordariales, Chatomiaceae) which was found on submerged dead decaying woody debris from a freshwater rivers and reservoirs (dams, lakes) in India.

The general characteristics of the present collection fit within the concept of the genus *Trichocladium* Harz (1871). Colonies were observed on the surface of the substrate with the naked eye and it is a very common fungus on submerged dead decaying woody debris in this part of the country. The present fungus is closely related to freshwater species *T. englandense*, however conidia are shorter and wider in the present fungus. The characteristic features of the present fungus are compared with aquatic (freshwater and marine) species of the genus in following Table-1. Microphotographs, line drawings and description of the present fungus were sent to Prof. K. A. Seifert (Research Scientist, Biodiversity (Mycology and Microbiology), Agriculture and Agri-Food, 960 Carling Avenue, Ottawa, Ontario, K1A 0C6, Canada) for identification. He wrote: "Perhaps described in *Trichocladium*".

### Acknowledgements

We wish to acknowledge the generous cooperation of H'ble authorities of management and Principals of our respective colleges for providing the numerous facilities to enable us to continue the research. We thank to Prof. K. A. Seifert (Biodiversity (Mycology and Microbiology), Agriculture and Agri-Food, Canada) for his comments on microphotographs, line drawing and description of the present fungus. Thank are due to the authorities of Smithsonian Tropical Research Institute, Washington DC, USA for providing pdf files of research articles / papers on freshwater fungi.

## REFERENCES

- Harz CO (1871) Einige neue Hyphomyceten. *Bulletin de la Societe Imperiale de Naturaliste de Moscou*, **44**: 88-147.
- Ingold CT (1975) An illustrated guide to Aquatic and Water-borne Hyphomycetes (Fungi Imperfect) with notes on their Biology. Freshwater Biol. Asso. Sci, Publications, No. 30, p. 1-96.
- Park D (1972) On the ecology of heterotrophic Microorganisms in freshwater. *Trans. Br. Mycol. Soc.* **58**: 291-299.
- Goh TK, Hyde KD (1996) Biodiversity of freshwater fungi. *J. Industrial Microbiology* **17**: 328-345.
- Patil VR, Borse BD. (2015) Checklist of freshwater Mitosporic fungi of India. *International J. Bioassays* **4**: 4090-4099.
- Goh TK, Tsui CKM (2003) Key to common dematiaceous hyphomycetes from freshwater. In: Freshwater Mycology (eds. Tsui, C.K.M. Hyde, K.D.), Fungal Diversity Res. Ser., 10, The Fungal Diversity Press, Hong Kong, China, p. 325-343.
- Jones EBG, Hyde KD, Pang KL (eds.). (2014) Introduction. In: Freshwater Mycology and Fungal-Like Organisms, Walter de Gruyter, GmbH, Berlin, Germany. p. 1-22.
- Borse BD, Borse KN, Patil SY, Pawara CM, Nemade LC, Patil VR (2016) Freshwater Higher Fungi of India. Lulu Pub., USA. 420 p.
- Borse BD, Borse KN, Chaudhary SA, Patil VR, Patil SY, Gosavi SA, Borade DS (2017) Freshwater and Marine Fungi of India. LAP Lambert Academic Publishing, Germany. 162 p.