



New record of a subaerial green alga *Trentepohlia rigidula* (J. Müller) Hariot from West Bengal, India

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Abstract

Subaerial green alga *Trentepohlia rigidula* (J. Müller) Hariot was recorded from two distinct habitats of West Bengal, India for the first time during a survey conducted in 2015-2016. The alga was grown both in epiphytic and epilithic form on tree bark and on a concrete cement tank wall respectively. The species is unique due to its variation in cell shape and size. The cell morphology has shown remarkable variation in relation to habitat and environmental conditions. The habitat, morphology and distribution of the species are discussed in the present communication.

Key words: Epiphytic, Epilithic, Green alga, New record, Subaerial, *Trentepohlia rigidula*

Introduction

Trentepohlia belongs to the group of subaerial green algae and is widespread in tropical, subtropical and temperate climates. They diversely grow on tree bark, wood, rock, concrete wall, leaves and several other types of substrata. The genus is most abundant to the tropical climatic region; however, it is also present in temperate regions (Liu *et al.*, 2012). The main plant body is thalloid, composed of branched uniseriate filaments. Filaments are arranged in erect tufts or laterally adhered to form a prostate disc with single or many layers of cells. In mature condition cells become multinucleate. The colour of the thallus varied from yellow, yellowish-green, orange or red due to the presence of haematochrome and carotenoid pigments. Sporangia arising from the vegetative cells are distinguishable due to its large swollen structure and are stalked (Krishnamurthy, 2000).

The morphotaxonomic study of *Trentepohlia* has been intensively investigated from different parts of the World. Fresh water Chaetophorales from New Zealand was studied by Sarma (1986). Some species of *Trentepohlia* including a new variety was reported from Glacier Valley of China (Liu *et al.*, 2012). Presence of *Trentepohlia lagenifera* in the sori of the leaves of the indigenous fern *Polypodium vulgare* from the Southern Finland was reported by Harmaja (2011). Salleh and Milow gave a taxonomic note on *T. monilia* from Malaysia (1993). Allali *et al.* (2013) reported fourteen species of *Trentepohlia* and *Printzina* from Gabon, Central Africa. Some new and interesting records of *Trentepohlia* were reported from French Guiana including two new species (Rindi and Lôpez-Bautista, 2007, 2008). Rindi and Guiry investigated diversity, life history and ecological survey of some species of *Printzina* and *Trentepohlia* from Urban Habitats of Western Ireland (2002). Rindi *et al.* (2006b) reported some new records of Trentepohliales from Africa and their distributional records were checked in detail in several regions of Europe and Asia. Another investigation of Trentepohliales from Panama was done by Rindi and his research group (2008). Rindi (2011) reported some freshwater algae from British Isles including *Trentepohlia*. An extensive survey of *Trentepohlia* species was also done from India (Bruhl and Biswas, 1923; Saxena, 1961; Randhawa and Venkataraman, 1962; Jose and Chowdary, 1980; Panikkar and Sindhu, 1993; Krishnamurthy, 2000). In a recent survey, four species of *Trentepohlia* viz., *T. thevalliensis*, *T. abietina*, *T. torulosa* and *T. sundarbanensis* sp. nov. were reported from Indian Sundarbans Biosphere Reserve (Satpati *et al.*, 2013; Satpati and Pal, 2015). In the present investigation we described a new record of *Trentepohlia rigidula* from diverse habitats of West Bengal, India.

Materials and methods

The specimen was collected from two fresh water zones of West Bengal, India. The first one was collected from the surface of the cement tank placed in the Institute of Genetic Engineering campus of Badu (Madhyamgram,

North-24-Parganas) (22°693.683' N and 88°487.071' E). Whereas, the second specimen was collected from *Aegle marmelos* (Rutaceae; commonly known as Indian Bael) tree bark in the village Kushtora (or Kushtore) of Bankura district (23°247.180' N and 87°110.422' E). Specimens were scrapped out from the cement tank surface and tree bark with the help of scalpel and collected in zipper pouches. A set of sample was also preserved in 4% formalin (v/v) for detail taxonomic investigation. The slides were prepared with 20 % glycerin (v/v) and digital photographs were taken in Carl Zeiss Axiostar plus Microscope by Cannon Power Shot 500D Camera. The identification of taxa was done by well-known published research articles (Hariot, 1890; Printz, 1920; Bruhl and Biswas, 1923; Cribb, 1958; Randhawa and Venkataraman, 1962; Samad and Adhikary, 2008; Allali *et al.*, 2013) and confirmed from AlgaeBase (<http://www.algaebase.org>). The voucher specimens were prepared and deposited in Calcutta University Herbarium with accession numbers (CUH/AI/FWB/IND-1 and CUH/AI/FWB/IND-2).

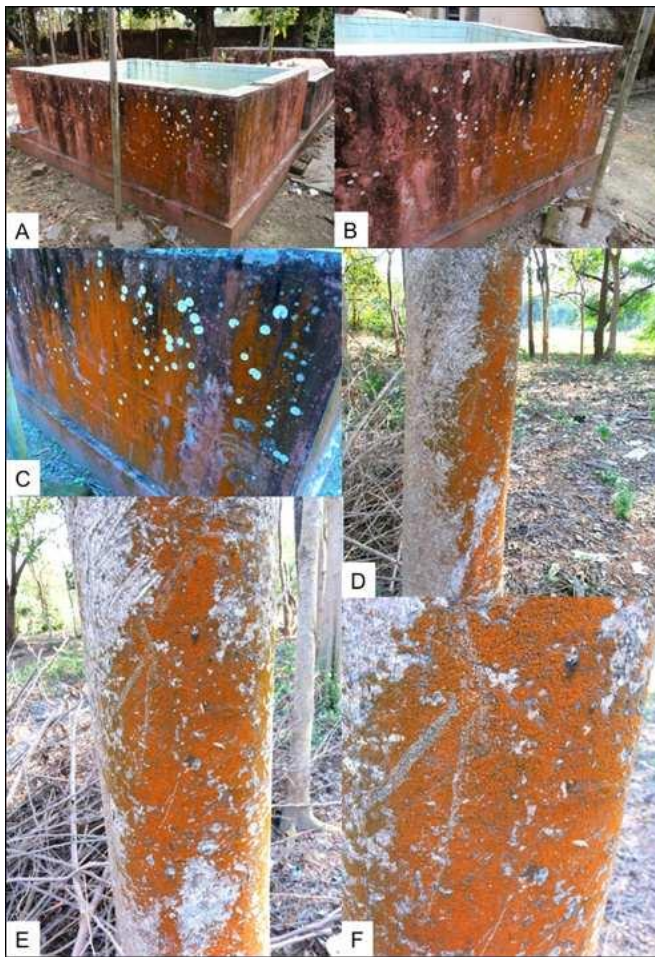


Fig. 1. Habitat of *Trentepohlia rigidula*; A-C. On cement tank surface (epilithic); D-F. On tree bark of *Aegle marmelos* (Indian Bael).

Results and Discussion

Taxonomic note

Trentepohlia rigidula (J. Müller) Hariot is a subaerial green alga belonging to the class Ulvophyceae and division Chlorophyta. Thallus forms compact crusts of filaments on tree bark and concrete cement walls and varied from orange to yellowish-red in colour. Uniseriate filaments showed prostrate and an erect portion. Vegetative cells are arranged in uniseriate chain and sporangia borne on the stalk or superimposed on the vegetative cells. Vegetative cells are elliptical, barrel shaped, 10-20 μm wide and 12-25 μm in lengths. Two cells are divided by a strong constriction or septum. Cell wall thick and sometimes rough. Sporangium varied from globular, orbicular or dome shaped, with 15-30 μm diameter. Sporangia generally formed on the filament in apical, intercalary or in lateral position. Sporangia of *T. rigidula* are globose, sometimes oval and larger than the vegetative cells.

Taxonomic status

Heterotypic Synonym: *Trentepohlia torulosa* De Wildeman; *T. monilia* De Wildeman; *T. moniformis* Karsten; *Physolinum monila* (De Wildeman) Printz; *P. Monila* var. *subsphaerica* Islam

Homotypic synonym: *Coenogonium rigidulum* J. Müller

Basionym: *Coenogonium rigidulum* J. Müller

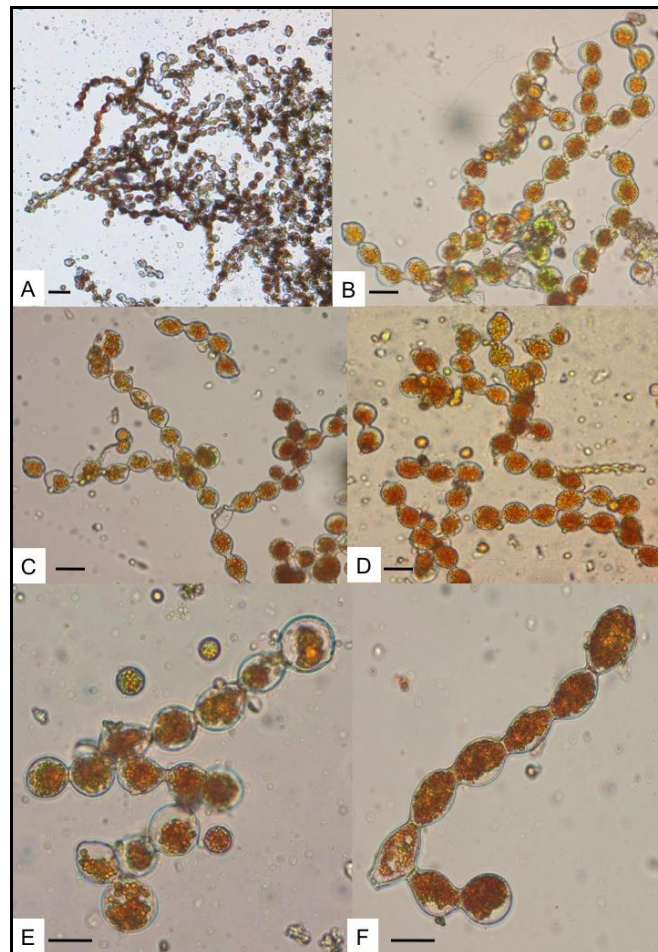


Fig. 2. Microphotographs of epilithic *Trentepohlia rigidula*; A-D. Cells on uniseriate filaments; E-F. Cells enlarged to form sporangium of different shapes. Scale bar: A-100 μ m, B-D-20 μ m, E-F-30 μ m.

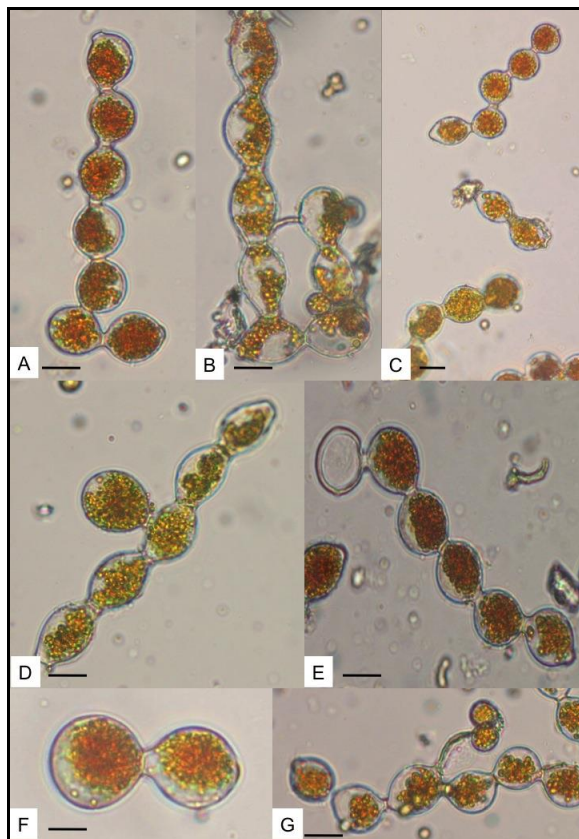


Fig. 3. Microphotographs of epilithic *Trentepohlia rigidula*; A-B. Prostrate and erect system; C. Chains of vegetative cells; D. Uniseriate filament with stalked sporangium; E. Filament with empty sporangium; F. Dumbbell shaped sporangia; G. Filament with long stalked sporangia. Scale bar: A-B- 20 μ m, C-10 μ m, D-E-20 μ m, F-10 μ m, G-20 μ m.

Species distribution

This species is widely distributed in Central Africa, South Eastern Queensland of Australia, South Africa, Ukraine, Netherlands and few parts of India. Printz (1920) reported it from South Africa whereas; Cribb (1958, 1970) investigated this species from Southeastern part of Queensland. Allali *et al.* (2013) performed most recent study from Gabon, Central Africa. In India, this species was mainly reported from Bhubaneswar, Orissa (Samad and Adhikary, 2008). Krishnamurthy (2000) reported this species as *Trentepohlia monilia* from Indian subcontinent. However, in the present study it is reported from West Bengal (India) for the first time. In a very preliminary survey, Bruhl and Biswas (1923) reported a *Trentepohlia* species of Indian origin, which was placed intermediate between *T. rigidula* and *T. monile* (later *T. monilia* De Wildeman) with distinct characters. The cell wall of *T. rigidula* is much thicker with rougher surface than *T. monile*. Species of *T. rigidula* found was mixed with *Printzina* cf. *lagenifera* on metal post in the rain forest of Barro Colorado (Rindi *et al.*, 2008). Burova and his co-workers (2011) were studied the detail diversity, ecology and taxonomy of this species from Ukraine. But there was no earlier report from West Bengal, India.

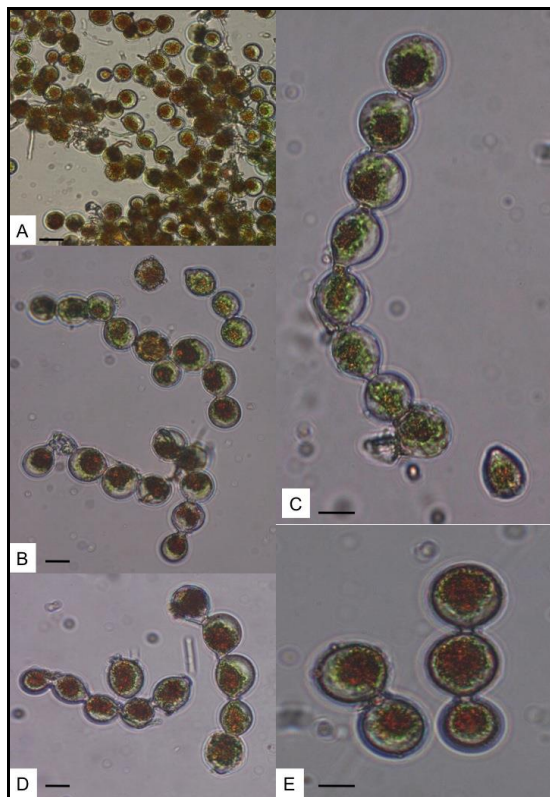


Fig. 4. Microphotographs of epiphytic *Trentepohlia rigidula*; A-D. Different forms of uniseriate filaments; E. Cells forming sporangia. Scale bar: A-50 μ m, B-20 μ m, C-15 μ m, D-20 μ m, E-10 μ m.

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