

Tuomeya americana (Kuetzing) Papenfuss, a fresh-water red alga, new to India

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ABSTRACT

Thalli closely resembling *Tuomeya americana* (Kuetzing) Papenfuss were collected from a hill stream, in Tamil Nadu, India. Filaments are corticated and do not show differentiation into nodes and internodes. They are found to have only monosporangia and spermatangia. The vegetative and reproductive structures of this alga are described in detail.

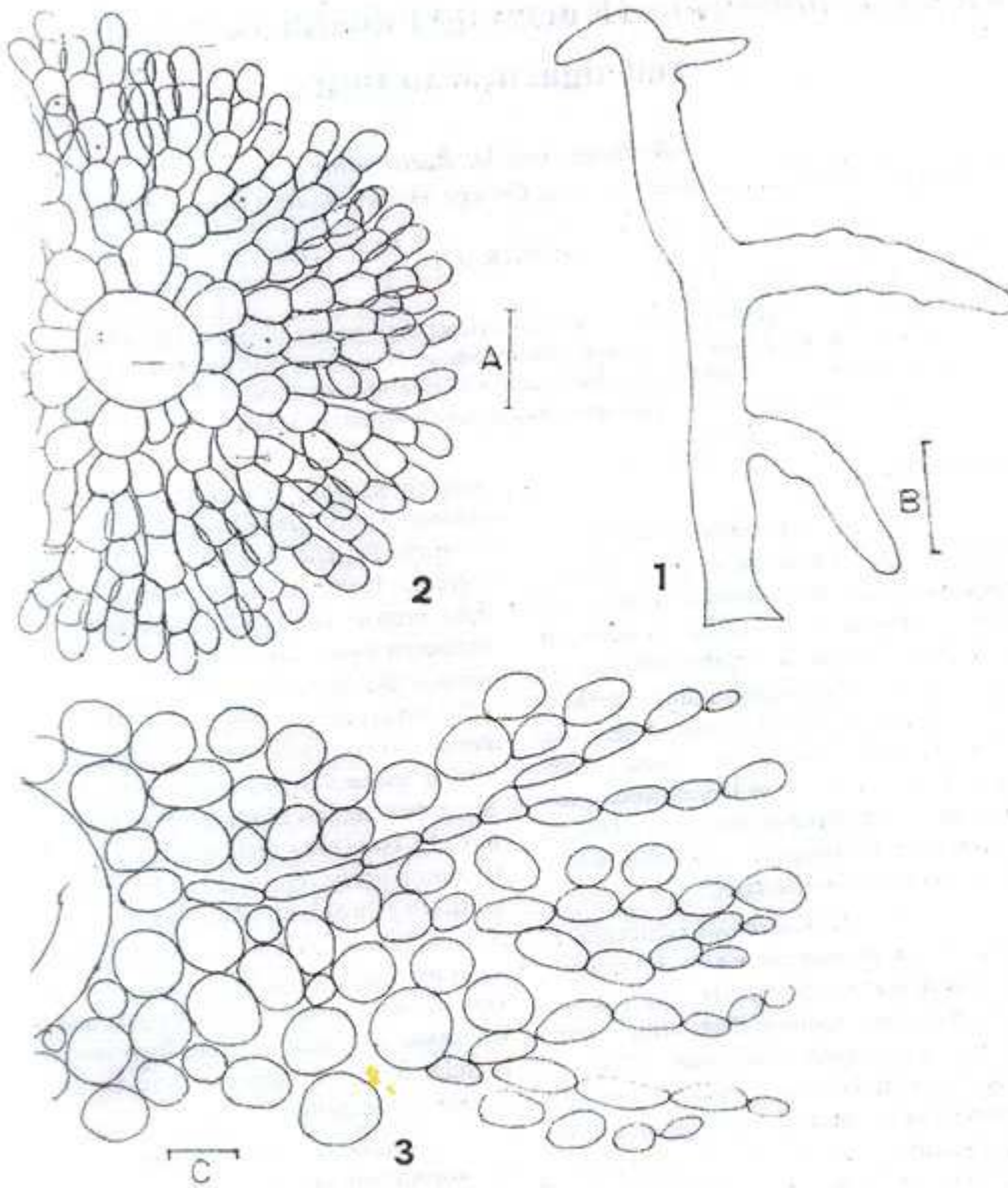
Introduction

Tuomeya (Batrachospermaceae, Rhodophyceae), a hitherto unreported genus from India, differs from the other members of the family Batrachospermaceae in having a pseudoparenchymatous thallus, oblique to perpendicular carpogonia and stalked trichogyne attached to the side. Filaments having pseudoparenchymatous structure were collected from a stream at Upper Kothaiyar, Tamil Nadu. Thalli preserved in 4% formalin were studied thoroughly. The following account is based on this study.

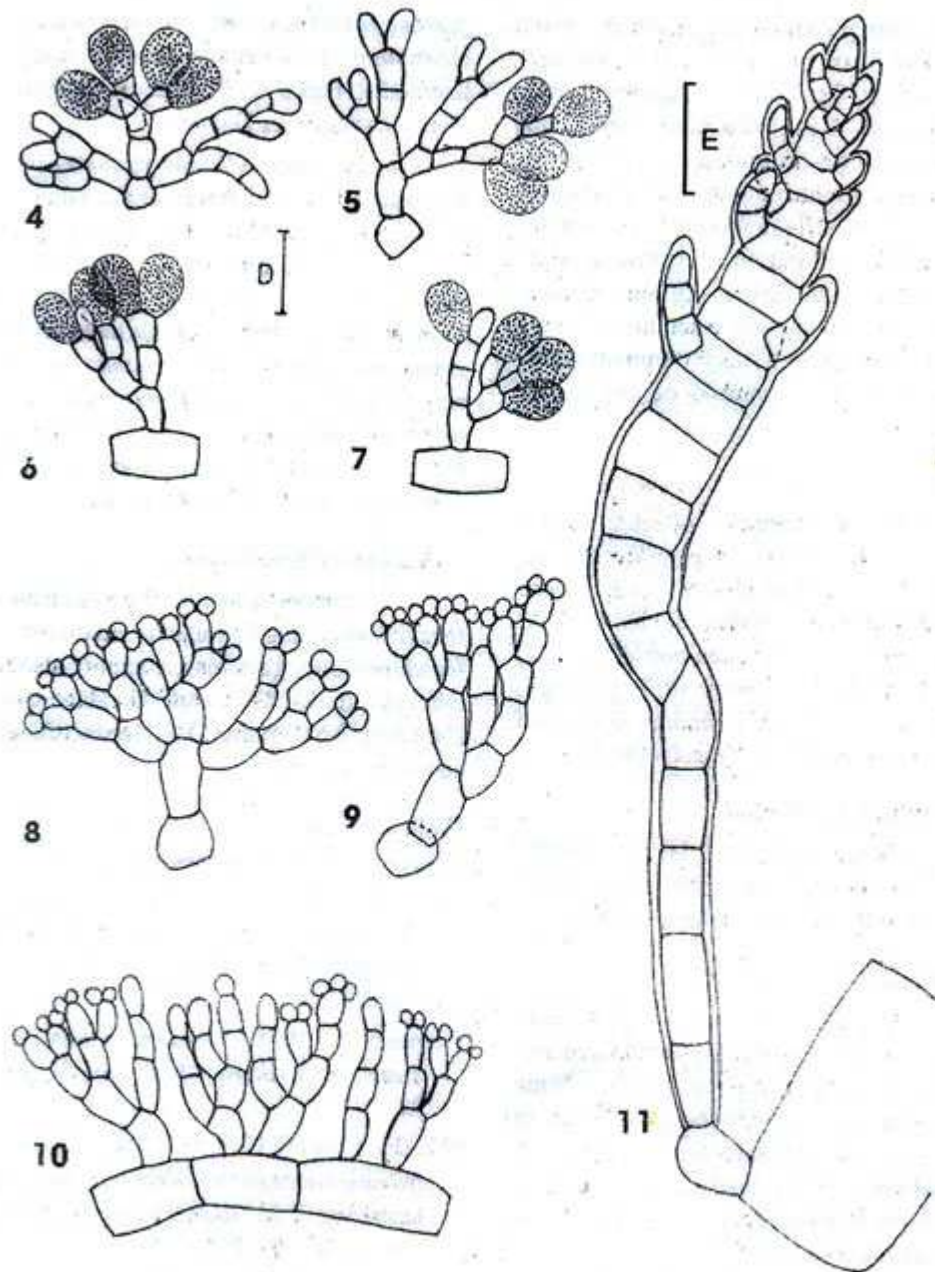
Tuomeya americana (Kuetzing) Papenfuss is lithophytic up to 3.5 cm in height and mature filaments 315 μm in diameter, mature regions dark brown and immature regions green in colour. Thallus attached to substratum by a small disc formed by interwoven filaments giving an appearance of a pseudoparenchymatous structure. Towards the base of the disc arise rhizoids. Thallus profusely branched; branching irregular; branches forming acute angles. Nodes and internodes indistinct macroscopically (Text Fig. 1). Axial filaments covered by 2 or 3 layers of corticating threads. A prominent apical cell observed only in young,

actively growing branch tips. Apical cells measure 5 μm - 9 μm in length and 7 μm - 13 μm in width. Peripheral cells 6-7, each producing 3 primary laterals of limited growth (Text fig. 2). Each primary lateral 5-7 cells in height; cells measuring 8 μm - 21 μm in length and 6 μm - 10 μm in width. Axial row of cells measure 65 μm - 210 μm in length and 36 μm - 70 μm in width. Peripheral cells produce corticating threads, which surround the axial row of cells. Secondary laterals produced from corticating threads, branching dichotomously or rarely trichotomously, up to 3rd order. Cells of corticating threads measure 9 μm - 36 μm X 8 μm - 18 μm . Cells of secondary laterals measure 9 μm - 21 μm X 4 μm - 10 μm . Development of corticating threads and the formation of secondary laterals from them give pseudoparenchymatous structure at mature regions of the thallus (Text fig. 3).

Asexual reproduction takes place by the formation of monospores formed in monosporangia, produced on primary and secondary laterals (Text figs. 4-7); monosporangia terminal or lateral, obovoid, measuring 6 μm - 21 μm X 10 μm - 16 μm . Sexual reproduction takes place by the formation of spermatangia and carpogonia. Spermatangia occur as terminal clusters of 2-4



Figs.1-3. Vegetative structures of *Tuomoeya americana* (Kuetzing) Papenfuss
1. A portion of a filament enlarged showing a cylindrical, compact, irregularly branched thallus with indistinct nodes and internodes; 2. T.S. of a young filament through nodal region showing axial cell, peripheral cells and cells of primary laterals; 3. Portion of t.s. of a filament showing the cortex and primary laterals.



Figs. 4-11. Reproductive structures of *Tuomeya americana* (Kuetzing) Papenfuss

4 & 5 : Terminal and lateral monosporangia formed on primary laterals; 6 & 7 : Terminal and lateral monosporangia formed on secondary laterals; 8 & 9 : Primary laterals with terminal and lateral spermatangia
10. Portion of a corticating thread showing secondary laterals with terminal spermatangia. 11. A young filament produced by a cell of the basal region of matured filament.

per spermatangial mother cell on the distal regions of both primary and secondary laterals (Text figs. 8-10). Spermatangia spherical, 6 μm –8 μm in diameter. Carpogonia and carposporophytes not seen. Cells of the basal regions produce young filaments (Text fig. 11). These filaments possess a dome shaped apical cell and an axial row of short cells. Towards the apical regions of these filaments develop laterals, each up to 13 cells in height. Formation of such filaments could be considered as a method of vegetative reproduction.

Habitat

Thalli lithophytic collected from a stream at Nanmukku, Upper Kothaiyar, Tirunelveli district, on 05.03.1996. Leg. B. Babu and M. Baluswami, Herbarium No. 717 A, formalin preserved specimen bottle No. 717, located in the Laboratory of Phycology, Department of Botany, Madras Christian College (Autonomous), Chennai 600059.

Geographical distribution

Canada (Sheath & Hymes, 1980); North America (in Kaczmarczyk *et al.*, 1992); East Africa (Borge, 1928 in Skuja, 1938).

Discussion

The genus *Tuomeya* differs from *Batrachospermum* in having pseudoparenchymatous thallus and carpogonia with oblique to perpendicular, stalked trichogynes, attached to one side. In addition to this, the young gametophytes of *Tuomeya* develop directly from an undifferentiated mass of basal cells (Kaczmarczyk *et al.*, 1992).

Eventhough the present filaments lack carpogonia, the general morphology,

presence of a basal disc and the pseudoparenchymatous thalli with indistinct nodes and internodes (Figs. 1 & 2) indicate that the present alga is a species of *Tuomeya*.

Two species *T. americana* (Kuetzing) Papenfuss and *T. gibberosa* Kumano have been described so far. The present specimen is slightly different from *T. americana* in having elongated or cylindrical cells in their primary and secondary laterals and also in the presence of monospores as a means of asexual reproduction. In *T. americana* these cells are somewhat spherical and no monosporangia are formed. Except these variations, the present alga looks similar to *T. americana*.

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