

***Trentepohlia dialepta* (Nylander) Hariot: A terrestrial alga from Southern Western Ghat region, Kerala, India**

Binoy T Thomas^{*}, Bhagya M V & Thomas V P

Department of Botany, Phycotechnology Lab, Catholicate College, Pathanamthitta, Kerala, India
Corresponding author email: btkrija@gmail.com.

Abstract

Certain algae adapt to live in a wide variety of unusual environments. All the species of *Trentepohlia* prefer unusual terrestrial environments for their growth. The green trentepohlian alga, *Trentepohlia dialepta* (Nylander) Hariot profusely grows epiphytically on different trees, particularly *Madhuca neriifolia* (Moon) H.J. Lam at Pathanamthitta district, Kerala, India. Generally *Trentepohlia* spp. is considered as corticolous, but in the present study, it was mainly examined from the phyllosphere of the tree. The species is unique due to its variation in cell size, length, nature of sporangia, stalk cells etc. The habitat, morphology and distribution of the species are discussed in the present communication. This is the first report of *T. dialepta* from Southern Western Ghats region, Kerala, India.

Key words: *Trentepohlia*, *Madhuca neriifolia*, *Trentepohlia dialepta*, sub-aerial green algae, Phyllosphere.

Introduction

Algae are known from wide variety of terrestrial environments (Hoffmann, 1989). Most of the aerophytic algae complete their life cycle with the absence of water (Lewis and McCourt, 2004). Light, humidity and temperature are the important ecological factors that stimulate the growth of aerophytic algal floras (Fritsch, 1907; Islam, 1960; Neustupa and Skaloud, 2008). *Trentepohlia* species are more adapted to non shaded unusual habitats. *Trentepohlia* are belongs to the class of Trentepohliaceae under the division Chlorophyta.

Trentepohlia spp. occur on bark of trees, leaves, rocks and on many substrata (Printz, 1939; Saxena, 1961; Chapman, 1984; Sarma, 1986; Lopez *et al.*, 2002; Kumar *et al.*, 2013). They are distinguished from other group by β -carotene, haematochrome and its unique flagellar apparatus (Christiaan *et al.*, 1995; Lopez *et al.*, 2002; Kumar *et al.*, 2013). They are distributed in tropical and subtropical areas (Printz, 1939; Cribb, 1958; Krishnamurthy, 2000; Kumar *et al.*, 2013). They may form lichenic associations in exposed habitats, often forming conspicuous masses and are usually yellow to orange in colour (Lopez-Bautista *et al.*, 2002). The plant body is thalloid, composed of branched uniseriate filaments. Filaments are arranged in erect tufts or laterally adhere to form a prostrate disc with single or many layers of cells. In mature conditions cells become multinucleate. Sporangia arising from the vegetative cells are distinguishable due to its large swollen structure and are stalked (Krishnamurthy, 2000).

Trentepohlia is widespread in tropical, subtropical and also in temperate regions. A wide examination on *Trentepohlia* spp. in India have been made (Saxena, 1961; Bruhl and Biswas, 1923; Randhawa *et al.*, 1962; Jose *et al.*, 1980; Krishnamurthy, 2000). Four species of *Trentepohlia* such as *T. thevalliensis*, *T. abietina*, *T. torulosa* and *T. Sunderbanensis* were reported at Indian Sundarbans Biosphere Reserve (Satpati *et al.*, 2013, 2015). *Trentepohlia rigidula* was also reported from West Bengal, India (Satpati *et al.*, 2015). But the studies on Trentepohliales are still limited in Kerala (Panikkar *et al.*, 1993).

Materials and Methods

Samples of leaves from different trees were collected from the highlands of Pathanamthitta District (9.2345206°N, 76.9326087°E) Kerala. Epiphyllous alga was collected between August to December 2016 of southwest and northeast monsoon season of Kerala. Field visit and collections of specimens were done by random method. A bunch of leaves samples from the upper part of each trees were picked out for the study. Leaves were cut and placed in sterile polythene bags and immediately stored in portable icebox to prevent drying. Epiphyllous alga was isolated by using forceps, brush & scalpel. The specimens were examined alive in the field as well as in the

laboratory using a binocular dissecting and light microscopes. Microscopic features were also observed by using the Olympus LX 400 Trinocular microscope and photographs were taken by using BioLinkz Cmos Cam (3.0m pixels) attached to the microscope. Illustrations were also made to understand the variation in cell size, length, nature of sporangia, stalk cells etc.

Voucher specimens of epiphyllous alga containing plant twigs of *Trentepohlia dialepta* species were deposited in the Catholicate College Herbarium (CATH) and its permanent slides were kept in Phycotechnology Herbarium (CAPH) Pathanamthitta, Kerala, India with accession number.

Results and Discussion

The epiphyllous *Trentepohlia dialepta* was examined from the phyllosphere of many trees and obviously seen on the leaves of *Madhuca neriifolia* (Moon) H.J.Lam (Family-Sapotaceae, CATH-12051; Fig.1a) from the high lands of Pathanamthitta District, Kerala. *Trentepohlia* sp. belongs to the order Trentepohliales with in the Ulvophyceae algae in the Chlorophyceae lineage. The species appeared as yellowish green tufts of filaments (Fig. 1 b-e). Filaments have distinct prostrate and erect branches tapering towards end. Cell is mostly cylindrical, 13-15µm wide and 29.6-50.8 µm long. Gametangia are spherical, lateral, solitary and 18-24 µm in diameter (Fig.1 g). Sporangia are more or less ovoid, not more than 19 µm wide and 16.7-19.4 µm long (Fig.1 f). Cells supporting stalk cells of single sporangia not distinct from other vegetative cells. Stalk cells are bottled shaped, often bent at neck, not more than 26 µm wide and 13.8-14.9 µm long. Illustrations of the thallii (Fig.2 a-d), sporangia (Fig. 2 f) and gametangia (Fig. 2 e) were also made and confirmed the nature of species.

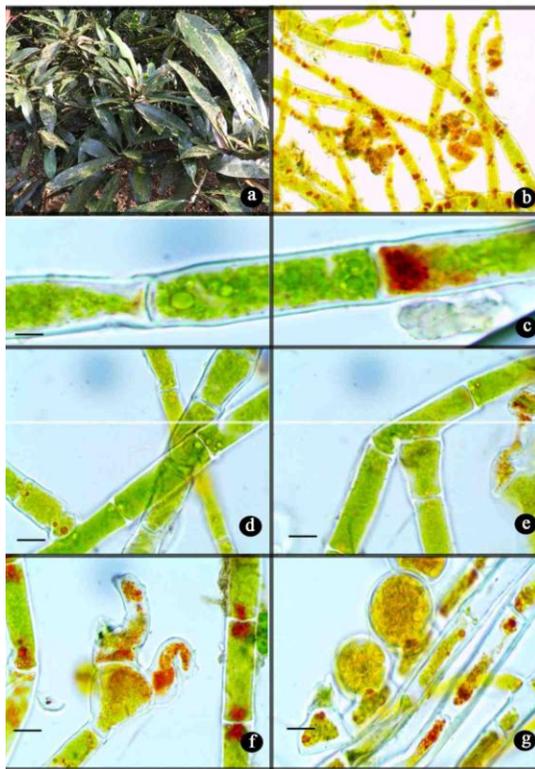


Fig .1.The Host plant and Microphotographs of *Trentepohlia dialepta*. a *Madhuca neriifolia* (Host Plant); b-e. Thallus of *T. dialepta* ; f. Sporangia of *T. dialepta* ; g- Gametangia of *T. dialepta*

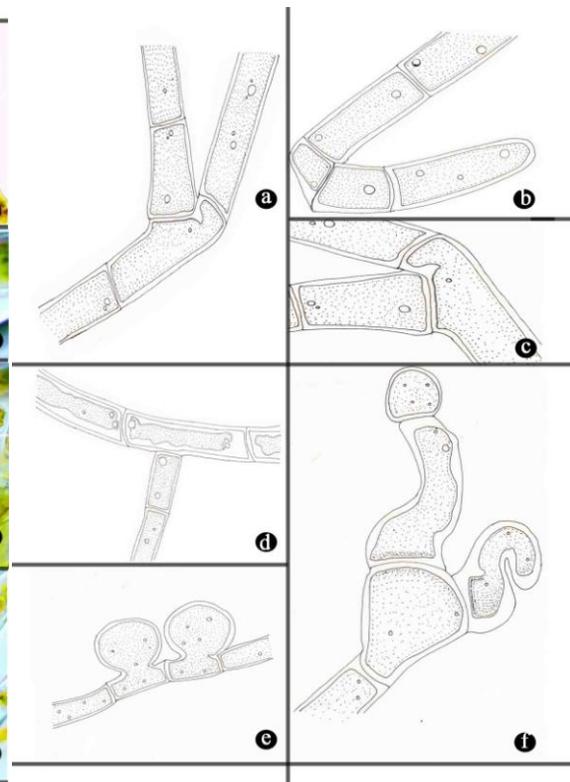


Fig.2. Illustrations of thalli a-d. Thalli of *T. dialepta* ; e-Gametangia of *T. dialepta* ; f-Sporangia of *T. dialepta*

The present report is in accordance with the following investigators. According to Printz (1939) and Wildeman (1900), *T. dialepta* was 6-10 µm wide, 18-50 µm long, gametangia were described as spherical, lateral or terminal and 12-28 µm in diameter. But Printz and Wildeman did not clearly described sporangia of *T. dialepta*. But the present study

confirmed the nature of sporangia. According to Salleh *et al.*, 1999, cells were cylindrical or barrel shaped and 4.8-12.6 μm wide and 4.8-69.3 μm long. The present observation is in conformity. There was no early report of this species from Kerala, India. The cells of *Trentepohlia dialepta* are rich in carotenoids, which helps the algal cells to offer resistance to ultra violet radiations and in oils. Th

Conclusion

The present study confirmed that Pathanamthitta District is a major repository for unexplored terrestrial algae. This kind of studies is of great importance in discovering algal taxa before they become extinct.

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