ASTERINALES OF KODAIKANAL

R. Nithyatharani[1], U.S. Kavitha[2]
[1]Assistant Professor, [2]PG Student
Department of Microbiology
Cauvery College for Women, Trichy, India- 620 018

Abstract: Kodaikanal is located on the Western Ghats at an altitude of 2,100m. It includes mainly shola forests because of the most diverse ecosystem. Foliicolous fungus provides a good platform for the fungal diversity in the tropical region. The present study involves the collection, identification and documentation of foliicolous fungi of various sholas which are called as living fossil and has resulted in recording 30 species of Asterinaceae. From the collected species, 4 are new species belonging to genera *Asterina*, namely *A. dhivaharanii*, *A. kukkalensis*, A. *polygalae* and *A. viburnii*. Species of these fungi are preferably called as Black Mildews. The chemicals produced as a result of host-parasite interaction is used for the benefit of human. The host of these fungi namely *Impatiens viscida*, *Premna* sp., *Polygala arillata*, *Viburnum cylindricum* is used as a natural calmative, to cure stomach disorders, as anti-ulcer and anti-inflammatory agents. Hence to know much about these fungi and their interaction, an organized study is essential, as the fungal wealth of this region is not fully studied.

Key Words- Black Mildew, Kodaikanal, Shola Forests, Fungal Diversity

I. INTRODUCTION

India has a crucial place among the mega bio-diversity centres. Biodiversity is the greatest wealth of a country and taxonomy forms the base of it. The bio-diversity of wild plants has a big role in terms of ecosystem component, geographical conditions and evolutionary process. Due to human activities such as over exploitation, deforestation, use of chemicals and lack of awareness, we are losing our nations credit. For the survival of human, particularly the increasing human and animal population in the developing world, our prime concern is to develop strategies and programmes for the conservation of the natural resources. The best way to conserve forest diversity is to establish protected forest areas.

There have been numerous efforts taken in safeguarding the world's biodiversity. For example, seeds of some of the most economically important trees are being conserved in seed centres and gene-banks for protecting their genetic diversity. But a large number of forest species have seeds that do not survive in storage, and many species of animals and plant life are difficult to protect once they vanish from their eco-systems. Once the habitat is lost, components and their dependents also will be lost. Hence the present attempt is to record the foliicolous fungi of the region before they completely vanish from this world.

Kodaikanal is the princess of hill station which supports a huge variety of forest types because of the favorable climatic condition. This work which involves the collection, identification and documentation of foliicolous fungi forms the first work for the present study area and contributes much to the fungal diversity of Western Ghats of peninsular India.

II. METHODOLOGY

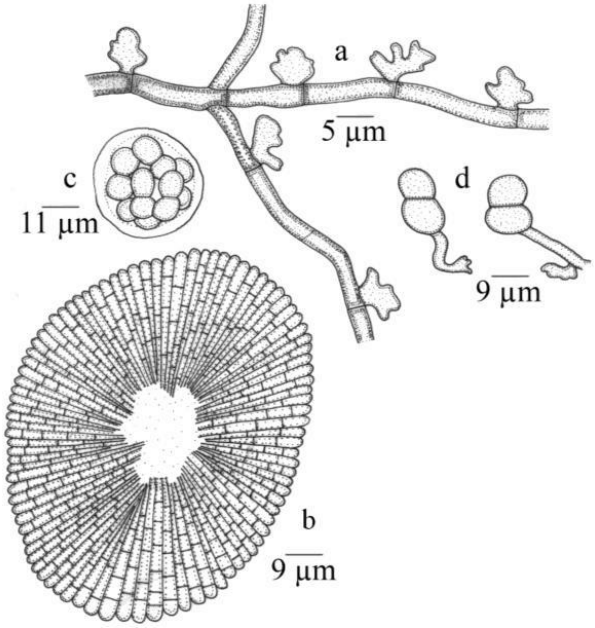
Infected leaves were carefully collected, pressed neatly and dried in-between blotting papers. The host identity was confirmed with the help of experts and also by matching the materials with the authentic herbarium materials. Then permanent slides were prepared using nail polish technique. Using the slides, description was made which was supplemented with line diagrams drawn using camera luicida. Finally the identity of the fungus was confirmed with the help of the monographs (Hansford, 1961; Hosagoudar, 1996; Hosagoudar, 2008). The individual material was incorporated in a herbarium envelope and was deposited in the HCIO, IARI, New Delhi, part of it at STET herbarium, Mannargudi.

III. DESCRIPTION TO THE SPECIES

Abbreviations used: a. Appresorium, b. Thyriothecia, c. Asci, d. Ascospores.

3.1 *Asterina dhivaharanii*

Colonies epiphyllous, thin, up to 2 mm in diameter, confluent. Hyphae substraight to flexuous, branching opposite, alternate at acute to wide angle, loosely reticulate, cells 10-12 x 8-12 µm. Appressoria alternate, unicellular, entire, pyriform, globose, cylindrical, stellately lobate, often bifid, 10-12 x 8-12 µm. Thyriothecia scattered to connate, orbicular, up to 96 µm in diameter, dehiscing stellately at the center, margin crenated; asci many, globose, eight spored, 32-35 µm in diameter; ascospores conglobate, 1-septate, slightly constricted at the septum, 16-19 x 7-9 µm, wall smooth.

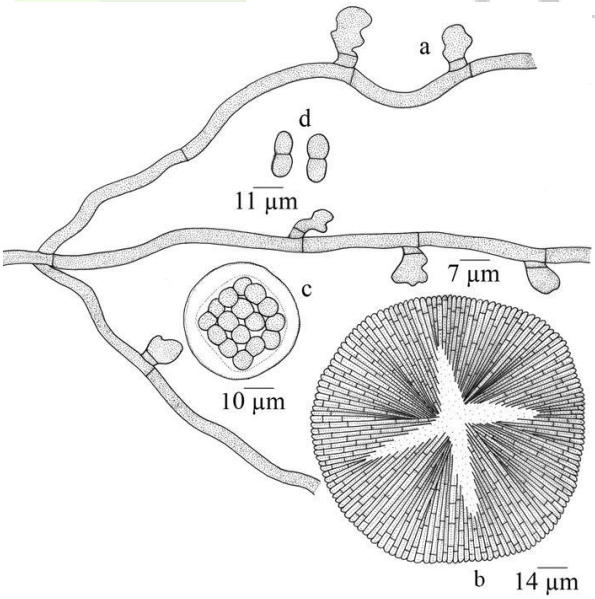


Materials examined:

On leaves of *Impatiens viscida* Wight (Balsaminaceae), Periyakanal, Kukkal shola forest, Kodaikanal, R. Nithyatharani STET 94. Kodaikanal is the type locality of this species.

3.2 *Asterina kukkalensis*

Colonies epiphyllous, subdense to dense, scattered, 2-5 mm in diameter, confluent as it covers the entire upper surface of the leaves. Hyphae substraight to flexuous, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 25-35 x 5-7 µm. Appressoria alternate, about 2% opposite, straight to curved, 12-15 µm long; stalk cells cylindrical to cuneate, 5-7 µm long; head cells ovate, elongated to cylindrical, globose, bifid, sub-lobate to deeply lobate, 7-10 x 10-12 µm. Thyriothecia scattered to grouped, orbicular, stellately dehisced at the centre, globose, margin crenate to fimbriate, fringed hyphae solitary, flexuous and devoid od appressoria, upto 137 µm in diameter; asci globose, octosporous, up to 40 µm in diameter; ascospores conglobate, 1-septate, 17-20 x 78 µm.

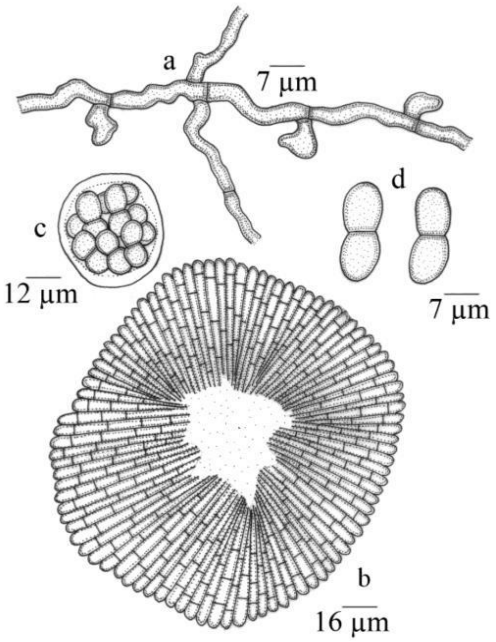


Materials examined:

On leaves of *Premna* sp. (Verbenaceae), Periyakanal, Kukkal shola forest, Kodaikanal, R. Nithyatharani STET 100. Asterina pusilla is known on this host genus from Phillipines and India (Sydow & Sydow, 1913; Hosagoudar & Abraham, 2000; Hosag & Sabeena, 2007). However, Asterina premnicola differs from it in having two celled appressoria.

3.3 *Asterina polygalae*

Colonies amphigenous, subdense, up to 2 mm in diameter, confluent. Hyphae crooked, branching opposite at wide angle, loosely reticulate, cells 17-20 x 6-7 µm. Appressoria alternate, unilateral, pyriform, globose, ovate, sublobate, angular, 7-12 x 710 µm. Thyriothecia grouped, orbicular, up to 165 µm in diameter, dehiscing stellately at the center, margin fimbriate; asci many, globose, eight spored, 30-35 µm in diameter; ascospores conglobate, 1-septate, slightly constricted at the septum, 20-22 x 710 µm, wall smooth.



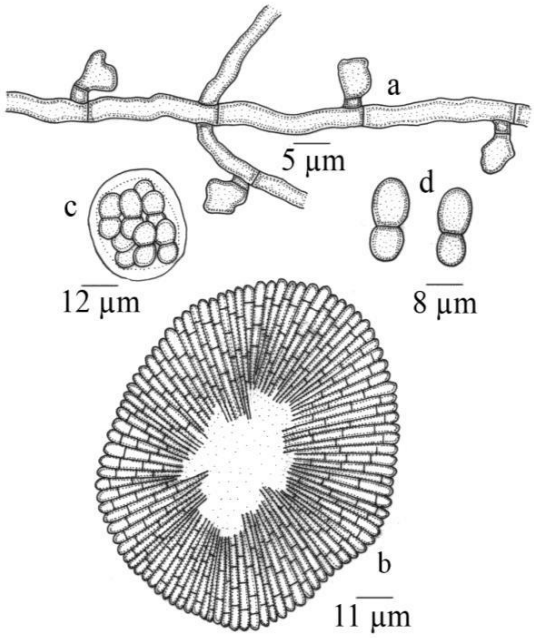
Materials examined:

On leaves of *Polygala arillata* Buch.-Ham. ex D. Don (Polygalaceae), Kuthiraiyar, Kukkal shola forest, Kodaikanal, R. Nithyatharani STET 13, R. Nithyatharani STET 58; R. Nithyatharani STET 125; Thalavakanal, Kukkal shola forest, Kodaikanal, R. Nithyatharani STET 137.

Kodaikanal is the type locality for this species.

3.4 *Asterina viburni*

Colonies amphigenous, mostly epiphyllous, dense, up to 5 mm in diameter, scattered to confluent. Hyphae flexuous, branching opposite at acute angle, loosely reticulate, cells 15-25 x 5-7 µm. Appressoria alternate, antrorse to retrorse, straight to curved, 17-20 µm long; stalk cells cylindrical to cuneate, 7-10 µm long; head cells sublobate, slightly angular, cylindrical, 7-10 x 5-10 µm. Thyriothecia grouped, orbicular, up to 95 µm in diameter, dehiscing stellately at the center, margin crenate; asci globose, eight spored, 32-35 µm in diameter; ascospores conglobate, 1septate, slightly constricted at the septum, 17-20 x 7-10 µm, wall smooth.



Materials examined:

On leaves of *Viburnum cylindricum* Buch.–Ham. Ex D. Don (Caprifoliaceae), Periyakanal, Kukkal shola forest, Kodaikanal, R. Nithyatharani STET 79, R. Nithyatharani STET 145, R. Nithyatharani STET 32, R. Nithyatharani STET 31, R. Nithyatharani STET 157. This is the type locality of the species.

IV. DISCUSSION

This work has resulted in recording a total of 30 species which have been identified and confirmed. Of these 4 are new species belonging to genera *Asterina*, namely *A. dhivaharanii*, *A. kukkalensis*, A. *polygalae* and *A. viburnii*. The hosts of these fungi are namely *Impatiens viscida*, *Premna* sp., *Polygala arillata and Viburnum cylindricum*..

REFERENCES

[1] Alexopoulos, C.J. and Mims, W.C. 1979. Introductory Mycology. 3rd edn. Wiley Estern Ltd., New Delhi.

[2] Biju, C.K., Hosagoudar, V.B. and Abraham, T.K. 2005. Meliolaceae of Kerala, India – XV. *Nova Hedwigia* 80: 465-502.

[3] Crane, J.L. and Jones, A.G. 2001. Nomenclatural and taxonomic revisions in the Meliolaceae. *Mycotaxon* 77: 145-151.

[4] Hosagoudar, V.B. and Shiburaj, S. 2003. Studies on foliicolous fungi – XIV. Two new records toIndia. Zoos´ Print *J.* 18: 1193-1194.

[5] Hosagoudar, V.B., Patil, M.S. and Balakrishnan, N.P. 1989. Taxonomic notes on Indian Meliolaceae. Mycotaxon 13: 78-82.

[6] Hosagoudar, V.B. 2009. The genus Asterina and its anamorph on Elaeocarpus species in southern Western Ghats in peninsular India. J. Appl. Nat. Sci. 1: 27-30.

[7] Hosagoudar, V.B. 2012. Asterinales of India. Mycosphere 2(5): 617-852, Doi 10.5943.

[8] Hosagoudar, V.B. and Shiburaj, S. 2003. Studies on foliicolous fungi – XIV. Two new records to India. Zoos´ Print J. 18: 1193-1194.

[9] Hosagoudar, V.B. and Abraham, T.K. 2000. A list of Asterina Lev. species based on the literature. J. Econ. Taxon. Bot. 24: 557-587.

[10] Kamat, M.N., Seshadri, V.S. and Pande, A.A. 1978. Monographic Study of Indian species of Phyllachora. UAS Monograph, Bangalore.

[11] Mitchell, N. 1972. The Indian hill station: Kodaikanal. University of Chicago, Research paper, 144: 199.