



## New Parasitic Micro Fungi from Andaman Islands in the Bay of Bengal

Sabeena A, Biju H, Biju CK, Sam P Mathew<sup>✉</sup>

Jawaharlal Nehru Tropical Botanic Garden and Research Institute, Palode 695 562, Thiruvananthapuram, Kerala, India

**✉Corresponding author:**

Sam P. Mathew,  
Jawaharlal Nehru Tropical Botanic Garden and Research Institute,  
Palode 695 562, Thiruvananthapuram,  
Kerala,  
India.  
E-mail:sampmatthew@gmail.com

**Article History**

Received: 11 May 2018  
Accepted: 20 June 2018  
Published: June 2018

**Citation**

Sabeena A, Biju H, Biju CK, SP Mathew. New Parasitic Micro Fungi from Andaman Islands in the Bay of Bengal. *Species*, 2018, 19, 48-54

**Publication License**



© The Author(s) 2018. Open Access. This article is licensed under a [Creative Commons Attribution License 4.0 \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).

**General Note**

Article is recommended to print as color digital version in recycled paper.

### ABSTRACT

Two new foliicolous fungal taxa, viz. *Asterostomella celasteri* and *Asterina combreti* var. *andamanica* from Andaman Islands in the Bay of Bengal have been described with illustrations.

**Key Words:** Andaman Islands, Parasitic micro fungi, New taxa

## 1. INTRODUCTION

The Andaman-Nicobar Archipelago located between the latitudes 6° to 14° North and the longitudes 92° to 94° East in the Bay of Bengal, around 647 nautical miles away from the Coromandel Coast of the Peninsular India, are mostly uninhabited and with dense coverage of virgin low land tropical rainforests. This biogeographical zone, in terms of plant diversity, has a unique status in phytogeography as it represents the insular transitional zone vegetation between the South and Southeast Asia. As regards to insular floristic studies of Andaman-Nicobar Islands, floristic enumerations are mostly concentrated with higher group of plants until recently. Interestingly, it is found that this insular region is highly rich in species diversity of higher plant groups; while, rather lesser known about the lower groups such as Algae, Fungi etc owing to dearth of information. According to one of the recent accounts by the Botanical Survey of India, the Andaman-Nicobar Islands encompass a sum of 2649 plant taxa, comprising 2508 species, 32 subspecies, 103 varieties and 6 forma beneath 1109 genera within 238 families belonging different plant groups such as Angiosperms, Gymnosperms, Pteridophytes and the Bryophytes (Mosses), (Murugan *et al*, 2016). Evidently, it is found that remarkable floristic evaluation has mostly been carried out by the Botanical Survey of India, merely with the insular Angiosperms and Pteridophytes rather than the lower groups. The insular Angiosperms comprise around 2314 species, 31 subspecies, 89 varieties and 6 forma under 1011 genera in 181 families (Murugan *et al*, 2016). Nevertheless, enumeration on insular micro-fungal flora predominantly co-existing with the Angiosperms still remains meagre. Detailed enumeration and identification on insular micro-fungal flora associated with higher groups of plants has been initiated relatively contemporary during the earlier part of the millennium (Mishra, 1986; Hosagoudar & Mathew, 2000; Hosagoudar *et al*, 2014; Sabeena *et al*, 2017; Mathew *et al* 2017). In this context, it would certainly be significant to denote that Misra (1986) had isolated 20 micro-fungal taxa belonging to 12 genera from the mangrove mud samples of the Andaman Islands and recorded *Achlya diffusa* and *Dictyuchus sterile* for the first time from the Indian mangrove mud's. According to current information, there are 22,000 fungal taxa has been reported from the Indian Sub-continent (Hosagoudar & Mathew, 2000) and approximately 14,400 species including fungal analogues under 45 classes, 120 orders, 345 families and 2660 genera have been recorded from India (ENVIS Centre on Floral Diversity - BSI - [http://www.bsienvic.nic.in/Database/Fungi\\_in\\_India\\_26113.aspx](http://www.bsienvic.nic.in/Database/Fungi_in_India_26113.aspx) - accessed on 01/06/2018). Nevertheless, the insular habitats of Andaman-Nicobar Islands are still known to host only 446 fungal species beneath 216 genera belonging to 96 families (Niranjan & Sarma, 2018). Obviously, the tropical humid climatological features of the insular region always provide ideal ecological niches for the luxuriant survival of foliicolous fungi among the islands. However, studies on insular fungal flora still remain at its preliminary phase. The progressing explorations and investigation on insular fungal flora by the authors has been added two more new foliicolous fungal taxa to the lesser known Cryptogamic flora of the Andaman-Nicobar Islands.

## 2. MATERIALS AND METHODS

Extensive and intensive explorations have been conducted during the months of December to February among various islands of the archipelago and infected plant parts such as leaves and stems were collected along with flowering and fruiting twigs of the host plant species for confirming the host identity. All infected samples were given separate field numbers. Primary field data on infection pattern, locality, altitude, type of vegetation, date of collection, place of collection, plant association and other special information regarding host plant were also being recorded in the field book during each plant explorations. All plant materials were processed by using standard protocol of dry method with herbarium press and blotting papers for a period of 15 days. The laboratory research and analysis were carried out with nail polish technique (Hosagoudar and Kapoor, 1985) for ectophytic fungi to accomplish *in situ* studies and also with micro sections for innate fungi. All herbarium specimens have been deposited at JNTBGRI Herbarium (TBGT), Thiruvananthapuram, Kerala. One duplicate set of all specimens were also been deposited at BSI Herbarium (PBL), Andaman-Nicobar Circle, Port Blair.

## TAXONOMY

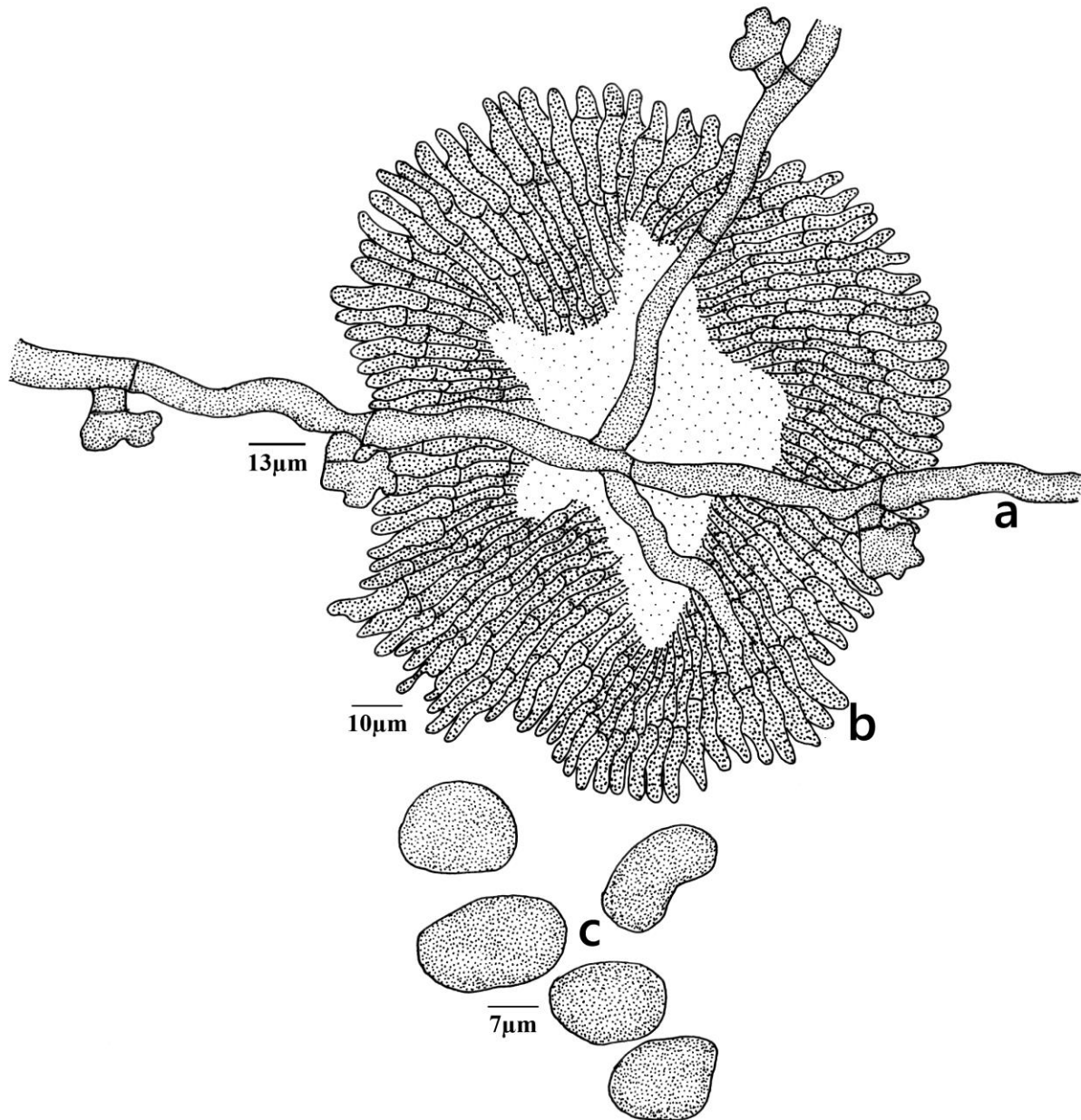
**1. *Asterostomella celasteri*** sp. nov. – Myco Bank No.: **MB 825544** (Fig. 1 & 2)

Colonies amphigenous, thin, up to 2mm in diameter, confluent, Hyphae substraight to flexuous, branching opposite to alternate at acute to wide angles, loosely reticulate, cells 23-28 x 3-4µm. Appressoria alternate to unilateral, antrorse to subantrorse, two celled, 8-13µmlong; stalk cells cylindrical to cuneate 1.4- 4 µm; head cells sublobate to lobate, 4-8 x 7-8.4 µm. Pycnothyria scattered, orbicular up to 120 µm in diameter, margin crenate, dissolved and widely opened at the centre; Pycnothyriospores round, ovate, pyriform, 13-17 x 10-13µm, wall smooth.

**Materials examined:** On leaves of *Celastrus sp.* (Celastraceae), Kalatang, S. Andaman, February 8, 2014, C.K. Biju & al TBGT 6858.

This is an anamorph of the genus *Asterina*. *Asterina dissiliens* (Syd. & P. Syd.) Doidge; *A. euonymi* Hosag. & Goos; *A. gymnosporiae* Castellani; *A. glyptopetali* Hosag. & C.K. Biju; *A. microtropidicola* Hosag. and *A. microtropidis* Hosag., Balakr. & Goos (Castellani, 1942; Doidge, 1942; Hosagoudar, 2005; Hosagoudar, 2012; Hosagoudar *et al.* 1994; Hosagoudar *et al.* 1996; Hosagoudar *et al.* 2002) are known on this host family. However the present species differs from all these in having only pycnothyrial state and alternate to unilateral, two celled appressoria.

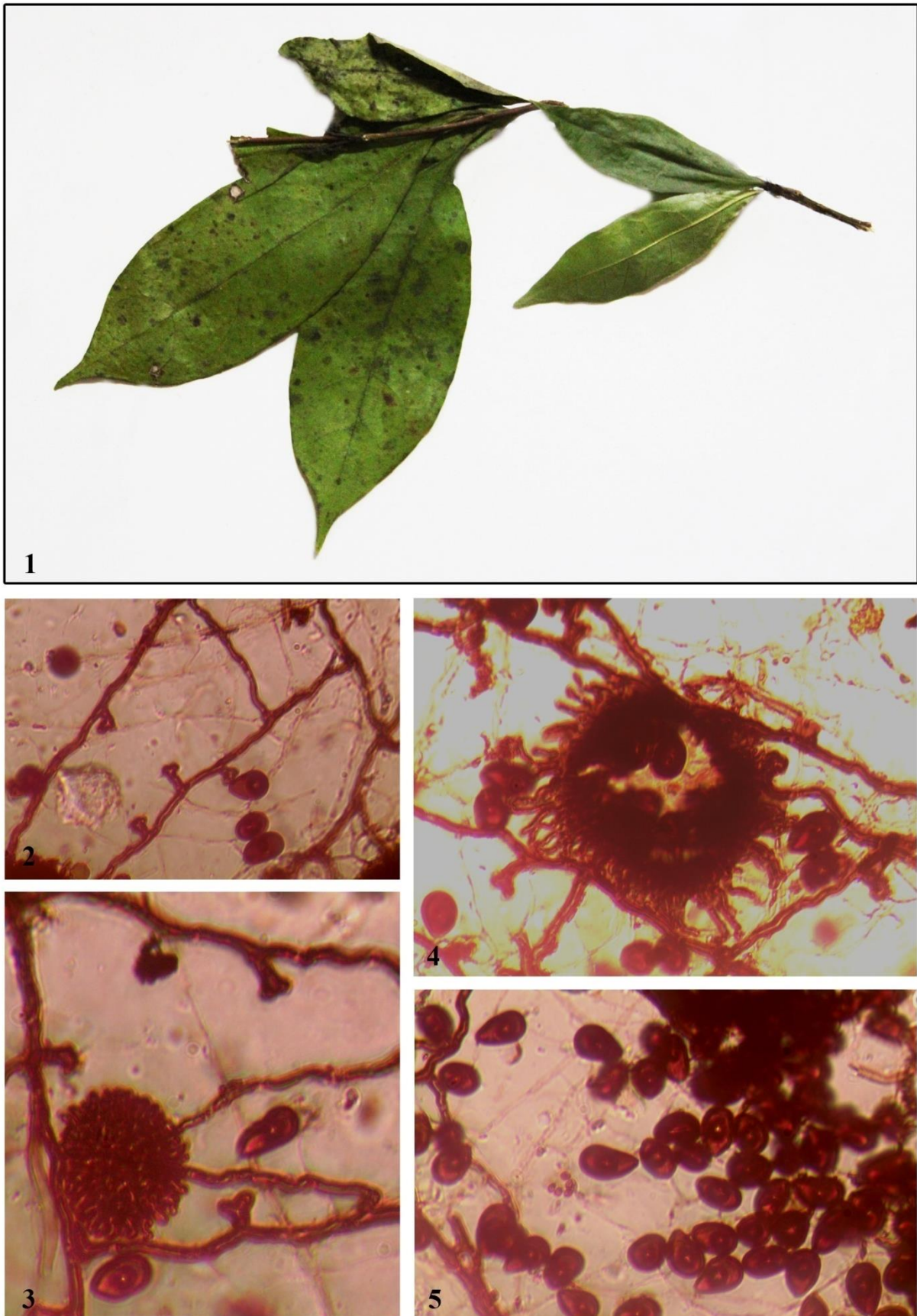
Etymology: The new taxon is named after its host genus.



**Figure 1.** *Asterostomella celasteri* sp. nov.

a - Appressoriolate mycelium; b - Thyriothecium; c - Pycnothyriospores





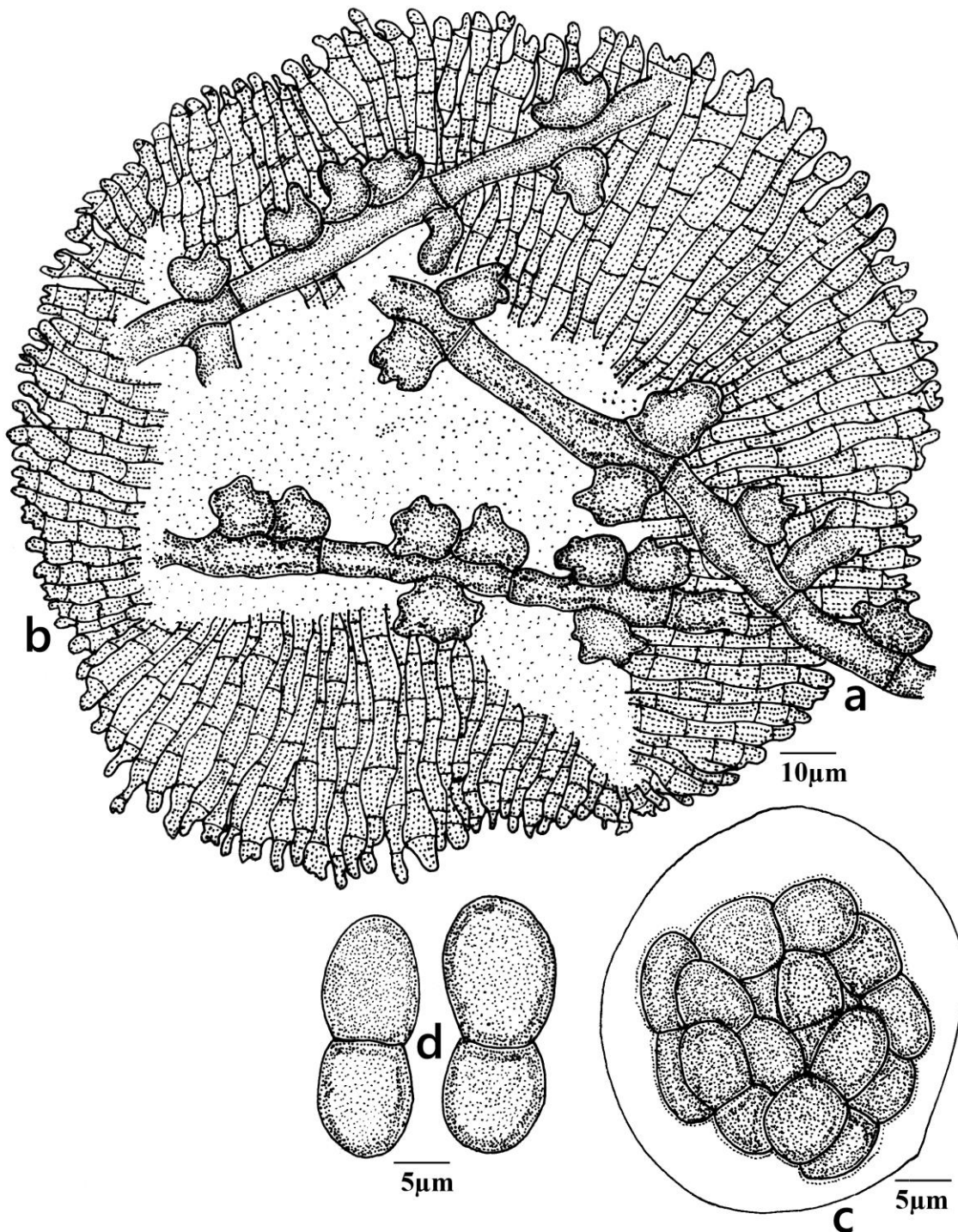
**Figure 2** *Asterostomella celasteri* sp. nov.

1. *Asterostomella celasteri* sp. nov. On *Celastrus* sp. 2. Appressoriate mycelium 3. Developing pycnothyria 4. Matured pycnothyria 5. Pycnothyriospores



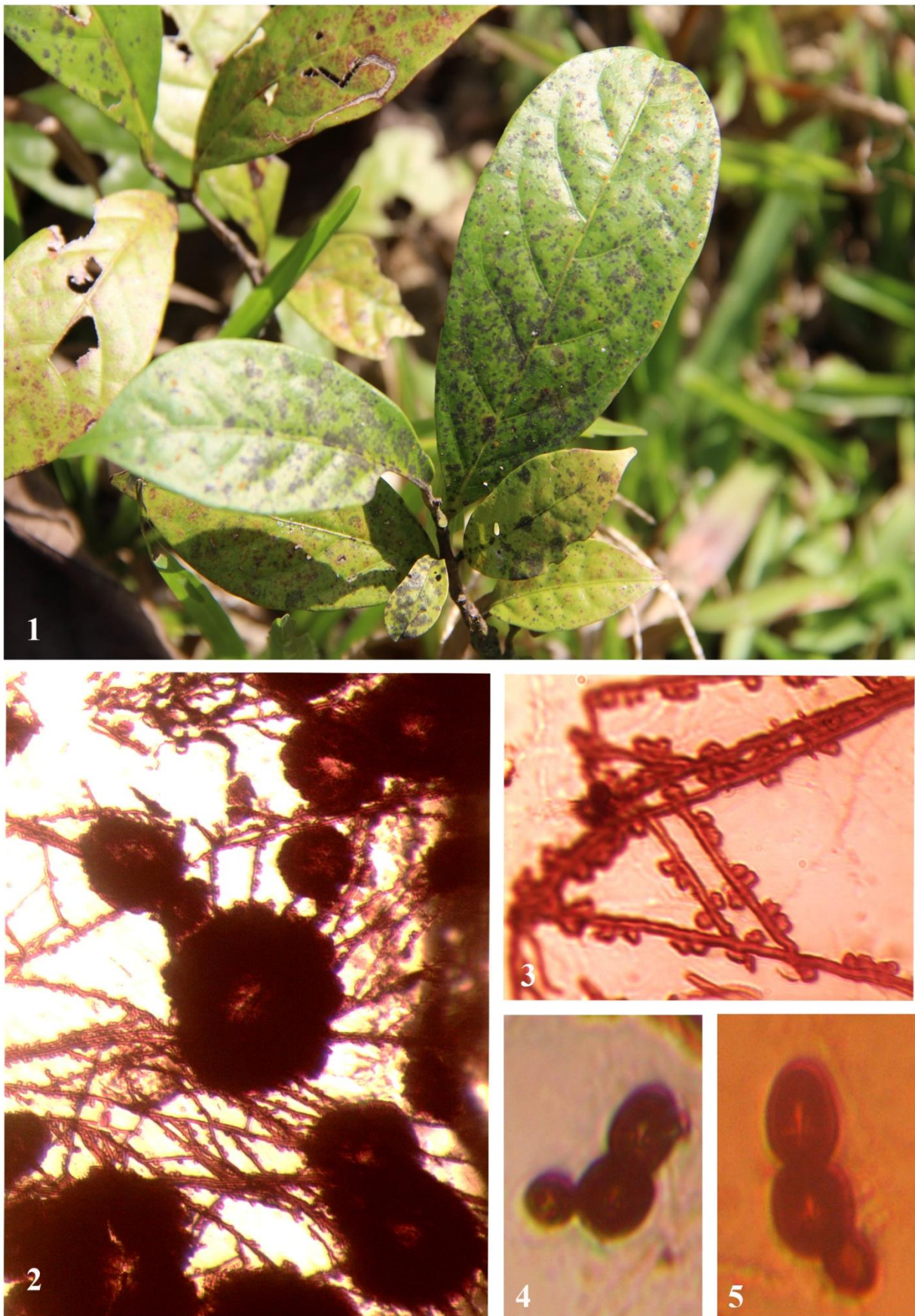
2. *Asterina combreti* Syd. & P. Syd. var. *andamanica* var. nov. – Myco Bank No.: MB 825545 (Fig. 3 & 4)

Colonies epiphyllous, dense, up to 4mm in diameter confluent. Hyphae straight to substraight, branching alternate to irregular at acute angles, loosely to closely reticulate, cells 18-21 x 2-4  $\mu$ m. Appressoria in clusters of two to three at each septum, opposite, sub opposite, alternate to unilateral, oblong, entire to sublobate, 5-8 x 5-8  $\mu$ m. Thyriothechia scattered to grouped, orbicular, upto 280  $\mu$ m in diameter, crenate to slightly fimbriate at the margin, stellately dehiscent at the centre, asci globose, octosporous, upto 38  $\mu$ m in diameter. Ascospores brown, conglobate, 1- septate, constricted at the septum, 17-22 x 7-10 $\mu$ m, wall smooth.



**Figure 3** *Asterina combreti* Syd. & P. Syd. var. *andamanica* var. nov.  
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores





**Figure 4** *Asterina combreti* Syd. & P. Syd. var. *andamanica* var. nov.

1. *Asterina combreti* Syd. & P. Syd. var. *andamanica* var. nov. On *Combretum punctatum* 2. Colony with thyriothecia 3. Appressorium mycelium 4 & 5. Germinating ascospores

**Materials examined:** On leaves of *Combretum punctatum* Blume (Combretaceae), Dhankari, S. Andaman, December 7, 2012, V.B. Hosagoudar & al. TBGT 6856.

This variety shows similarity with *Asterina combreti* Syd. & P. Syd. var. *cylindrica* Kar & Gosh. (1986) but differs from it in having smaller appressoria. It also differs from the former in having entire to sublobate appressoria seen in clusters of two to three at each septum.

**Etymology:** The new taxon is named after the type locality.

## ACKNOWLEDGEMENTS

We gratefully acknowledge Dr. A. G. Pandurangan, Director, JNTBGRI, Dr. Paramjit Singh, Director, Botanical Survey of India, Kolkata; Dr. C. Murugan, Head, Dr. T.A.M. Jagadeesh Ram and Dr. Lalji Singh, Senior Scientists, Botanical Survey of India, Andaman and Nicobar Circle, Port Blair and all forest officials, Andaman Forest Department for encouragements and facilities rendered for field explorations. We also acknowledge Department of Science and Technology, Government of India, New Delhi for financial assistance.

**Funding:** This research was funded by Department of Science and Technology, Government of India, New Delhi.

**Conflicts of Interest:** The authors declare no conflict of interest.

## REFERENCE

- Castellani E. Micromiceti dell' Africaorientale Italiana Nuovo Giornale botanico Italiano 1942: 49: 1-31.
- Doidge EM. A revision of the South African Microthyriaceae. Bothalia 1942: 4: 273-344.
- Hosagoudar VB. Studies on foliicolous fungi–XIX. Indian Phytopathology 2005:58: 194-204.
- Hosagoudar VB. Asterinales of India. Mycosphere 2012: 2(5): 617-852.
- Hosagoudar VB, Goos RD. Some *Asterina*, *Asterostomella* and *Lembosia* species from Southern India. Mycotaxon 1994: 52: 467-473.
- Hosagoudar VB, Kapoor JN. New technique of mounting meliolaceous fungi. Indian Phytopathol. 1985:38: 548-549.
- Hosagoudar VB, Mathew SP. A Preliminary report on the Mycoflora of the Andaman Islands, India. J. Econ. Taxon. Bot. 2000: 24: 631-640.
- Hosagoudar VB, Balakrishnan NP, Goos RD. Some *Asterina* species from Southern India. Mycotaxon 1996: 59: 167-187.
- Hosagoudar VB, Mathew SP, Divya B. Foliicolous fungi of Andaman Islands, India. Journal of Threatened Taxa 2014: 6: 5447–5463.
- Hosagoudar VB, Biju CK, Abraham TK, Agarwal DK. Studies on foliicolous fungi – III. Indian Phytopathology 2002: 55, 497-502.
- Mishra JK. Fungi from mangrove muds of Andaman-Nicobar Islands. Indian journal of Marine Science 1986:185-186.
- Kar AK, Ghosh SN. New *Asterina* species from West Bengal. Indian Phytopathol. 1986: 39: 204-220.
- Mathew SP, Biju CK, Sabeena A, Biju H. Fungal Infections on Plantation Crops of the Andaman Islands. Bio Bulletin 2017: 3: 1-7.
- Murugan C, Prabhu S, Sathiyaseelan R, Pandey RP. A checklist of plants of Andaman and Nicobar Islands 2016: (eds. Paramjit Singh & W. Arisdason). [http://www.bsienvi.nic.in/Database/Checklist-of-Andaman-Nicobar-Islands\\_24427.aspx](http://www.bsienvi.nic.in/Database/Checklist-of-Andaman-Nicobar-Islands_24427.aspx) [07-10-2016 12:05:27: accessed on 01.02.2018.
- Niranjan M, Sarma VV. A check-list of fungi from Andaman and Nicobar Islands, India. Phytotaxa 2018: 347: 101 -126.
- Sabeena A, Biju H, Jacob T, Biju CK, Mathew SP. Three new Foliicolous Ascomycetes from Andaman Islands, India. 2017: Bio Bulletin 3: 74-79.