

## Leaf infecting fungal parasites on *Maesa indica* (Roxb.) A. DC., - an endemic medicinal plant in Shola forests in Western Ghats of Kerala State

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### ABSTRACT

*Maesa indica* is an endemic small tree seen in Western Ghats. Ethnobotanical studies revealed that the plant is widely used for curing various diseases. The plant has potential glycemic activity, which is used for the treatment of diabetes mellitus; hepatoprotective, antihelminthic and antihypertensive activities are used by local people and tribal communities. From the present study, it is observed that five species of foliicolous fungi are seen parasitizing on *Maesa indica*. Of these *Asterina moozhiyarensis* sp. nov. Jacob Thomas & Nisha Mathew is new to science, while *Meliola groteana* var. *maesae* and *Amazonia peregrina* are common species. *Spiropes japonica* and *Trichothyrium asterophorum* were found as hyperparasites.

**Key words:** Ascomycetes, Black Mildew fungi, Dothideomycetes, *Maesa indica*, Host specificity

### INTRODUCTION

Traditional systems of medicine are still used to cure various diseases among people. Tribal communities and people in rural areas depend on medicinal plants to promote their health and life longevity. *Maesa indica* is an endemic small tree seen in Western Ghats. Ethnobotanical studies revealed that the plant is widely used for curing various diseases. The plant has potential glycemic activity, which is used for the treatment of diabetes mellitus; hepatoprotective, antihelminthic and antihypertensive activities are used by local people and tribal communities. Leaves are given for ejecting pus from boils, to purify blood and its roots are used against syphilis.

### STUDY AREA

Across the world 25 hotspots have been identified based on species endemism and the degree of threat through habitat loss (Myer et al., 2000). Out of these, two are confined to the Indian sub-continent (Western Ghats and Eastern Ghats). The present study area, the Shola forests in Goodrical reserve of Ranni forest division in Idukki district of Kerala State, falls

within the Western Ghats. The altitude ranges from 900-1036m, temperature ranges from 17-25°C and the rainfall is 2,086mm. The place is rich in flora and fauna with hills and valleys, tropical evergreen rain forest and semi-evergreen rain forest, sprawling grasslands and sholas.

### MATERIALS AND METHODS

Extensive field collection trips were conducted to study area from January 2016- 2019, and the infected plant parts were collected along with their twigs, preferably with flowers and fruits, to facilitate the identity of the host plant. Infection pattern, date of collection, altitude, type of forest, additional information regarding host plant, etc. are recorded in the field. Collections were pressed in between the blotters, changed to fresh blotters every day, so as to ensure their dryness. In the laboratory, nail polish technique (Hosagoudar & Kapoor 1985) was used for ectophytic fungi to study them *in situ*, while sections were made for innate fungi.

### RESULTS

#### Taxonomy

*Amazonia peregrina* Sydow & Sydow, Ann. Mycol. 15: 238, 1917; Hansf., Sydowia Beih. 2: 507, 1961; Hosag. & Goos, Mycotaxon 36: 236, 1989; 42:126, 1991; Hosag., Meliolales of India 74, 1996.

(Figure 1:b-d)

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*Meliola peregrina* Sydow & Sydow, Philippine J. Sci. 8: 479, 1913; Hosag., Meliolales of India, p.74, 1996.

Colonies epiphyllous, dense, crustose, up to 2 mm in diameter, rarely confluent. Hyphae straight to substraight, branching alternate at acute angles, closely reticulate, forming solid mycelial mat and imparting a thalloid appearance, cells 8-13 x 6-9 µm. Appressoria alternate, very closely arranged and appressed to the hyphae, antrorse, straight to curved, 8-15 µm long; stalk cells cuneate, 2-5 µm long; head cells ovate, globose, entire, 6-11 x 8-11 µm. Phialides mixed with appressoria, alternate, ampulliform, 13-18 x 6-9 µm. Perithecia mostly aggregated, flattened-globose, glabrous, black, up to 400 µm in diameter; ascospores cylindrical to ellipsoidal, 4-septate, constricted, 33-37 x 13-15 µm.

*Asterina moozhiyarensis* sp. nov. Jacob Thomas and Nisha Mathew (Figure 1: i-n)  
Mycobank: 862963

Colonies hypophyllous, subdense, up to 3 mm in diameter. Hyphae substraight to crooked, branching opposite, irregular, loosely to closely reticulate, cells 13 -16 x 1 - 1.7 µm. Appressoria unicellular, distantly placed, alternate to unilateral, ovate to clavate to variously shaped, shallowly lobate, 2 - 2.3 x 1.9 - 2 µm. Thyrothecia scattered, numerous, orbicular, 2-3 fused, margin fimbriate, fringed hyphae non appressoriolate, 37 - 42 µm in diam., stellately dehisced at the centre; asci globose, ovate, ascospore brown, conglobate, ovate, uniseptate, wall smooth, slightly constricted at the septa, 16 - 17 x 11 - 14 µm. Picnidiospores numerous, ovate to triangular, and brown in colour.

**Material examined:** Epiphytic on lower surfaces of leaves of *Maesa indica* (Roxb.) DC. (Primulaceae). Moozhiyar, Goodrical Reserve, Pathanamthitta, Kerala on 23 August 2017, Nisha Mathew, MTCHT: 420 (Holotype), MTCHT 421 (Isotype).

*Meliola groteana* Sydow var. *maesae* Hosag., C.K. Biju & Abraham, Nova Hedwigia 80: 486, 2005. (Figure 1: e-h)

Colonies mostly hypophyllous, dense, velvety, up to 5 mm diam., confluent. Hyphae straight to flexuous, branching mostly opposite at acute angles, loosely to closely reticulate, cells 10-15 x 4-6 µm. Appressoria alternate, about 25% opposite, antrorse to subantrorse, 11-14 µm long; stalk cells cylindrical to cuneate, 3-5 µm long; head cells predominantly globose, rarely ovate, entire, 8-12 x 7-11 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 14-17 x 8-10 µm. Mycelial setae scattered, simple, straight to flexuous, obtuse to acute at the tip, up to 300 µm long. Perithecia scattered, up to 175 µm diam.; ascospores obovoidal to cylindrical, 4-septate, slightly constricted at the septa, 32-40 x 12-16 µm.

**Material examined:** Epiphytic mostly on the lower surface of the living leaves of *Maesa indica* Roxb.

(Myrsinaceae), Katadikunnu, Nirangampara, Upper Moozhiyar, Goodrical Reserve, Pathanamthitta, Kerala on 22 December, 2017, Nisha Mathew, MTCHT 652.

*Spiropes japonicus* (P. Henn.) M.B. Ellis, Mycol. Pap. 114: 22, 1968; Dematiaceous Hyphomycetes p. 256, 1971; Katumoto, Trans. Mycol. Soc. Japan 24: 251, 1983; Hosag., Abraham, and Biju, C.K. New Botanist 23: 213, 1996. (Figure 1: p)

Colonies amphigenous, dense, velvety, up to 3 mm in diam., confluent. Conidiophores synnematos, compact, erect, cylindrical, 230-500 X 15-30 µm; conidiophores spread out in the apical and upper half of the synnemata, brown to dark brown, paler towards the apex, septate, smooth, 3-4 µm wide; Conidiogenous cells polyblastic, terminal and intercalary, sympodial cylindrical cicatrized, scars numerous and conspicuous; conidia solitary, dry, acropleurogenous, simple, fusiform to obclavate, pale brown to brown, 4-6 pseudoseptate, 60-70 µm long, 8-9 µm wide at the broadest portion, 2-4 µm wide at the apex and 3-6 µm broad at the base, wall smooth.

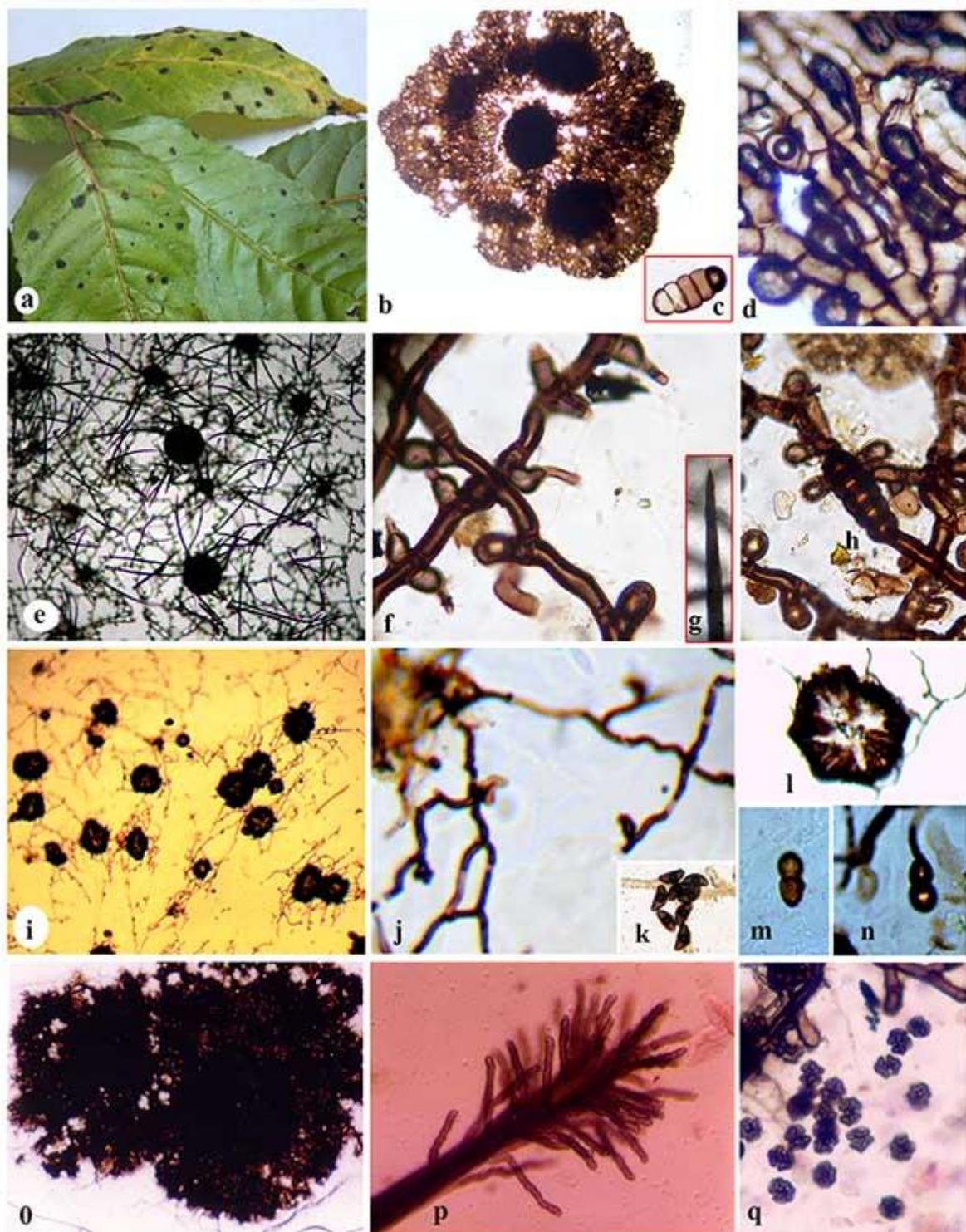
*Trichothyrium asterophorum* (Berk. & Broome) Hohn., *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften*, Mathematisch-Naturwissenschaftliche Klasse, Abt. 1 117: 1482 (1908). (Figure 1: q)

*Isthmospora* state of *Trichothyrium asterophorum* (Berk. & Br.) Hoehnel.

Mycelium superficial. Conidiophores micronematous, mononematous, branched, freely branched, pale to dark brown, smooth. Conidiogenous cells fragmenting to liberate specialized arthroconidia, isthmospores, integrated, intercalary, determinate; initially narrow hyphae, they later become lageniform or subulate and finally parallel and paired, one on each side of the conidium. Conidia solitary, dry, brown, smooth to echinulate, sarciniform, lobed, 15-21 X 12-17 µm.

## DISCUSSION

The black colonies of these fungi increase the temperature in the infected parts and cause a physiological imbalance. An increase in the proline content in the infected leaves indicates that this fungal infection causes stress to the plants. The decrease in the peroxidase enzyme activity in the infected leaves may be due to the impaired synthesis of chlorophyll. Fungal infection on leaves directly reduces photosynthetic activity and productivity of plants. Schmiedeknecht (1970) showed that black colonies absorb more light and there will be an increase in the temperature by 1°C to 1.5°C. Probably this would be compensated for by the plants by transpiring more water. Since black colonies prevent the entry of light to the leaf surface, there is a reduction in the chlorophyll content (Thomas and Mathew 2014).



**Figure 1. Foliicolous fungi on *Maesa indica***; a. Infected leaves of *Maesa indica* (Roxb.) DC. (Myrsinaceae), b - d. *Amazonia peregrina* Sydow & Sydow, b. Colony with perithecia, c. Ascospore, d. Appressoriolate mycelium, e-h. *Meliola groteana* Sydow van *maesae* Hosag. *el ai*, e. Colony with perithecia, f. Appressoriolate mycelium with phialides, g. Mycelial seta, h. Germinating Ascospore, i-n. *Asterina moozhiyarensis* sp. nov. Jacob Thomas and Nisha Mathew, i. Colony with thyriothecia, j. Appressoriolate mycelium, k. Pycnidiospores, l. Dehiscent thyriothecium, m. Ascospore, n. Germinating ascospores. o. Fungal colonies with hyperparasites, p. *Spiropes japonicus* (P. Henn.) M.B. Ellis, q. *Trichothyrium asterophorum* (Berk. & Broome) Holm. (*Isthmospora* state of *Trichothyrium asterophorum*)

Some infections change the quality of medicinally important active compounds and secondary metabolites extracted from leaves (Pati et al. 2008; Shivanna & Mallikarjunaswamy 2009). In the present study, five foliicolous fungal species were observed parasitizing *Maesa indica*. Of these *Asterina moozhiyarensis* sp. nov. Jacob Thomas & Nisha Mathew is (in press) new to science (Stevens & Ryan 1939), while *Meliola groteana* var. *maesae*, *Amazonia peregrina* are common species. *Spiropes japonica* and *Trichothyrium asterophorum* were found as hyperparasites.

Most foliicolous fungi are obligate biotrophs and have well-balanced relationships with their hosts. Hence, they are termed as ‘biotrophic symbionts’ or ‘parasitic symbionts’. However, *Amazonia peregrina*, *Meliola groteana* var. *maesae* are found to produce pathogenic effects on their host plants. It was noticed that the infection was mostly restricted to the young growing leaves. Many such adjacent infected spots join together and result in crumpling of the leaves which gives a peculiar appearance to the growing apical portion of the host plant (Plate – 1).

*Amazonia peregrina* Sydow and Sydow, found on leaves of *Maesa ind0ica* (Myrsinaceae) mostly occurs on leaves infected with *Meliola groteana* Sydow but can be easily distinguished by its crustose colonies. In India, it was recorded on leaves of *Embelia basaal* (Myrsinaceae), from Gaganabawada in Maharashtra; on *Maesa indica* (Myrsinaceae) from Idukki, Kerala and near Sholayar dam, Valparai, Coimbatore in Tamil Nadu (Hosagoudar 1996, 2008).

*Meliola groteana* Sydow and Sydow var. *maesae* Hosag., C.K. Biju and Abraham was also found infected on the host and differs from the var. *groteana* in having straight to arcuate mycelial setae and smaller ascospores. The variety *maesae* also reported from Wyanad, Idukki, Kottayam, Pathanamathitta and Silent Valley, Palghat in Kerala. It is endemic to Kerala State. (Hosagoudar 1996, 2008).

## CONCLUSION

Medicinal plants should be free of microbial infection in general and fungal infection in particular because most cases of fungi infecting the leaves of medicinal plants directly affect photosynthesis by reducing the productivity and formation of secondary metabolites. In addition, the fungal infection also sometimes degrades the quality of medicinally important active principles (D’Aulerio et al. 1995; Chutia et al. 2006; Pati et al. 2008; Shivanna & Mallikarjunaswamy 2009). Thus, the foliicolous fungi on host plants diminish and deteriorate the quality and quantity of the plant life.

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## REFERENCES

- Chutia M, Mahant JJ, Saikia RC, Baruah AK, Sharma TC 2006 – Influence of Leaf Blight disease on yield of oil and its constituents of Java Citronella and in-vitro control of pathogen using essential oils. *World Journal of Agricultural Sciences*, 2: 319–321.
- D’Aulerio AZ, Zambonelli A, Bianchi A, Albasini A 1995 – Micro Morphological and Chemical Investigation into the Effects of Fungal Diseases on *Melissa officinalis* L., *Mentha piperita* L. and *Salvia officinalis* L. *Journal of Phytopathology* 143:179–183.
- Hosagoudar VB. 1996 – *Meliolales of India*. Botanical Survey of India, Calcutta pp. 366.
- Hosagoudar V B. 2008. *Meliolales of India*. vol. II. Botanical Survey of India, Calcutta, pp 390.
- Hosagoudar VB, Kapoor JN 1985. New technique of mounting meliolaceous fungi. *Indian Phytopathology* 38: 548–549.
- Myer N, Russell A, Mittermelert C, Mittermelert G, Gustavo AB, Da Fonseca, Kents J 2000 – Biodiversity hotspots for conservation priorities. *Nature* 24: 838–858.
- Pati K, Sharma M, Salar RK, Sharma A, Gupta AP, Singh B 2008 – Studies on leaf spot disease of *Withania somnifera* and its impact on secondary metabolites. *Indian Journal of Microbiology*, 48: 432–437.
- Schmiedekhencht M. 1970. Temperature rhohungenbei Mcliola ceenepiphytosen. *Zentrulb. Bakteriol.Hyd.Abt.*124: 556–559.
- Shivanna MB, Mallikarjunaswamy GE 2009 – Fungal disease and their effect on phytochemical constituents of medicinally important *Terminalia* species in Bhadra wild life sanctuary, Karnataka, India. *Indian Phytopathology* 62:37–43.
- Stevens FL, Ryan MH 1939 – The *Microthyriaceae*. *Illinois Biological Monographs*.17: 1 – 138.
- Thomas J, Mathew Lini, K. 2014 – Biochemical changes in the *Lawsonia inermis* infected with *Asterina lawsoniae* Henn. & nyn. *Current Research in Environmental & Applied Mycology* 4(2): 217–220, Doi 10.5943/cream/4/2/9