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Asteridiella micheliifolia var. *macrospora* var. nov. from Vagamon hills, Kerala, India

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ABSTRACT

During fungal exploration of Vagamon hills of Western Ghats in Kerala state, India, *Michelia champaka* L. (*Magnoliaceae*) was found infected with a black mildew fungus. Critical microscopic examination of the fungus revealed that it is a new variety of *Asteridiella micheliifolia* Hosag. *et al*., which has larger ascospores when compared to the type. The new variety *A. micheliifolia* var. *macrospora* is described in this paper.

Keywords : Black mildew, foliicolous fungi, *Michelia*, new variety, Western Ghats, *Asteridiella*

INTRODUCTION

Black mildew fungi infect many plant species of different families and form black colonies on the leaf surface of host plants. They are widely distributed in the tropics and subtropics (Hansford,1961; Hosagoudar, 2008). They are strictly obligate biotrophs, superficial, usually host specific at least at the family level or have a very narrow host range, mostly infect leaves and rarely petioles, young and soft stem of flowering plants ranging from herbs to trees (Hofmann, 2009).

Vagamon, located on the western outskirts of Idukki district, falls within Western Ghats, and has been identified as a biodiversity 'hotspot'. It is a relatively remote area in a sparsely inhabited region comprising natural landscape rich in endemic flora and fauna. This area, unique for grasslands, has an extent of 27.19 square kilometers and comprises lateritic soil type. Vagamon was a virgin, pristine forest ecosystem till recently. There were encroachments in the region from as early as in the year 1950 and thus started the deterioration of the ecosystem of this area.

A survey of the foliicolous fungal flora of Vagamon hills in Kerala state resulted in unearthing several foliicolous fungi. Of these, a new variety of *Asteridiella micheliifolia* var. *Macrospora* var. nov. is described with photomicrographs in detail.

MATERIALS AND METHODS

Infected plant parts, noticed in the field, were collected and labeled from the study area. Prior to collection, photographs were taken. The infection pattern such as pathogenicity, nature of colonies, nature of infection, etc. and geographical data such as locality and altitude were recorded in the field. Collected samples were transferred separately into clean non-contaminated polythene bags along with host twigs, preferably with reproductive parts, to facilitate the identity of host plant. Further processing of the sample was carried out in the laboratory. The samples were pressed neatly and placed in between blotting papers until dryness is attained. To study the entire colony in its natural condition, Nail polish technique was adopted (Hosagoudar and Kapoor, 1985). To avoid the colonies with hyperparasites, the infected leaves were examined under stereo microscope (Magnus). A drop of high quality well transparent nail polish was applied on the selected colonies and infected regions, so that the colonies will get firmly embedded in it and can be easily peeled out from the leaf when it dries. Embedded colonies were peeled off from the leaves and mounted on to a clean slide (Blue Star) by using a drop of DPX (Dibutylphthalate Polysterene Xylene) and a cover slip. These slides were labeled and placed in a dust free chamber for one to two days for drying. Further microscopic studies and analysis were carried out with the help of Olympus Digital Binocular Compound microscope (CX21iLED). Photomicrographs were captured by Magcam DC10 CMOS camera of 10 megapixels and measurements were taken with the help of MagVision image analyzer software. Finally, the infected plant specimens were deposited in the Mar Thoma College Herbarium, Tiruvalla (MTCHT) (regional herbarium), Kerala, India.

RESULTS

Asteridiella micheliifolia Hosag., Archana. & Agarwal var. ***macrospora*** Jacob Thomas and Hina Mohamed var. nov.

Plate 1 (A-D)

MycoBank number: MB 833615.

Diagnosis: The diagnostic features of present variety are hypophyllous colonies, undulate mycelial hyphae, longer and broader hyphal cells (20–34 x 5–9µm), longer appressoria(18–27µm), larger head cells (12–17 x 11–16µm), larger phialides (15–22 x 6–9µm) and larger ascospores (41–47 x 16–20µm, Beeli formula 3101.4220.

Entymology: New variety *Asteridiella micheliifolia* var. *macrospora* var. nov. is named after the larger size of ascospores.

Colonies amphigenous mostly hypophyllous, subdense, up to 9 mm in diameter. Hyphae undulate, branching alternate to opposite at wide angles, loosely to closely reticulate, cells 20–34 x 5–9µm. Appressoria alternate, straight to slightly curved, antrorse, 18–27µm long, stalk cells cylindrical to cuneate, 4–11µm long, head cells ovate, oblong, angular to sublobate, 12–17 x11–16µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 15–22 x 6–9µm. Perithecia scattered, globose, up to 120µm in diam. Perithecial wall cells mammiform to conoid, obtuse at the tip. Ascospores obovoidal, four septate, constricted at the septa, 41–47 x 16–20µm (**Plate - 1**).

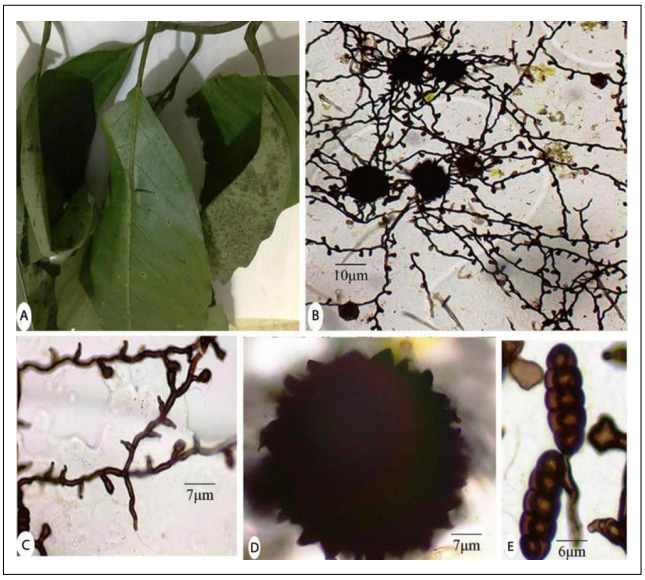

Plate-1. *Asteridiella micheliifolia* var. *macrospora* var. nov.
A. Infected leaves of *Michelia champaca*.
B. Colony with perithecia
C. Appresoriate mycelium with phialides
D. Mature Perithecium
E. Ascospores

Material examined: India, Kerala, Vagamon Hills, Elappara, N 9°38.844, E 76°57.066, 1039m on the leaves of *Michelia champaka*, 12 December, 2018, Hina Mohamed, MTCHT147 (**Holotype**), MTCHT 148 (**Isotype**).

DISCUSSION

The taxonomic details of the present fungal specimen are closely related to *Asteridiella micheliifolia* Hosag. *et al.* in having alternate to opposite branching mycelia with alternate appresoria mixed with phialides, globose perithecia and mammiform perithecial wall cells. *A. micheliifolia* is reported on this host genus from JNTBGRI, Palode, Thiruvananthapuram (Hosagoudar, 2013). However, the presently examined collection differs from the details of the type species, in having hypophyllous colonies, undulate mycelial hyphae, longer and broader hyphal cells (20–34 x 5–9 µm), longer appressoria (18–27 µm), larger head cells (12–17 x 11–16 µm), larger phialides (15–22 x 6–9 µm) and larger ascospores (41–47 x 16–20 µm in comparison to 20–29x10–12 µm in the type species). The Beeli formula of current specimen (3101.4220) is also quite different from the Beeli formula of *A. micheliifolia* (3101.2220).

Meliolaceous fungi are predominantly foliicolous and rarely infect the soft stems and tender shoots. Members of *Meliolales* are generally shade and moisture loving, prefer 19–25°C temperature, 50–65% relative humidity, 40–200 mm rainfall and an altitude of 100–1868 m. Hence, they occur luxuriantly in the present study area. However, the present specimen does not have any severe and harmful pathogenic effects on the host, but it may adversely affect the photosynthetic efficiency and aesthetic beauty of the plant.

CONCLUSIONS

A new variety of foliicolous fungus, *Asteridiella micheliifolia* var. *macrospora* var. nov. which is closely related to *A. micheliifolia* Hosag. *et al*. was found infecting the foliage of *Michelia champaka*, from Vagamon hills, Kerala. Based upon the larger ascospore size and variable Beeli formula in comparison to *Asteridiella micheliifolia*, a new variety has been proposed to accommodate the presently examined collection.

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