

Research Journal of Pharmaceutical, Biological and Chemical Sciences

***Asterina maeruaicola* sp. nov. A New Black Mildew From Telangana State, India.**

Mohammad Khaja Moinuddin^{1*}, Gaddam Bagyanarayana¹, and Jacob Thomas².

¹ Mycology and Plant Pathology laboratory, Department of Botany, Osmania University, Hyderabad, Telangana, India

² PG & Research Dept. of Botany, Mar Thoma College, Thiruvalla 689103, Kerala, India.

ABSTRACT

Warangal district is located at 18.0°N 79.58°E, occupies an area of 12,846 square kilometres with one-fourth of the geographical area under forests, this region is very useful for forest management and biodiversity conservation, types of forests are dry deciduous and moist deciduous mixed forests with a few evergreen species, there are two Wild Life Sanctuaries they are Pakhal Wild Life Sanctuary and Eturnagaram Wildlife Sanctuary. Eturnagaram wild life sanctuary is located near the Maharashtra, Madhya Pradesh and Andhra Pradesh border. It is one of the oldest sanctuary in Telangana state. Such kind of forest least explored for microfungi excepting the sporadic works on mycorrhizal fungi, rusts, powdery mildews and hyphomycetes. Hence, we have taken an interest in the identification and documentation of black mildews of foliicolous fungi occurring on the forests plants of Pakhal and Eturnagaram wild life sanctuaries regions of warangal district of Telangana state. The black colonies of these fungi increase the temperature of the infected parts and cause physiological imbalance in the entire leaves. They decrease the photosynthetic efficiency of the plants, affect the hormonal and phenolic compound levels. This paper includes an account of an interesting black mildew micro fungus collected from Eturnagaram wild life sanctuary Telangana state. Microscopic study of the fungus revealed it to be hitherto undescribed species. Hence, it is taxonomically described as new to science belonging to the genus *Asterina*, namely *Asterina maeruaicola* sp. nov.

Keywords: Black mildew, *Asterina*, new species, Eturnagaram wild life sanctuary.

**Corresponding author*

INTRODUCTION

Fungi are the second largest group in the world after the insects. They are cosmopolitan in distribution, found in air, water, soil, on dead organic matters, living things, etc. fungi inhabiting the leaves are known as phylloplane or foliicolous fungi. Black colony forming parasitic fungi are known as “Black or dark mildews” these are mostly obligate parasites producing black colonies on the surface of the host plants and most of these fungi are obligate or facultative parasites and having lethal effects to the host, residing on the surface of the leaves and produce special organs and opting special adaptation; they are acting as necrotrophs or biotrophs and their infection may lead to the destruction of the plant, during a survey of the foliicolous fungi of Eturnagaram wild life sanctuary, Telangana state, India. Several specimens of black mildew fungi infected host plants were collected. These black mildew fungi belong to the class Ascomycetes it has several taxonomic groups, viz. Hyphomycetes, Asterinales, Meliolales, Schiffnerula and its anamorphic forms, Meliolinaceae, etc.. Asterinaceous fungal mycelium is structurally brown superficial and it produces appressoria which in turn produce haustoria or nutritive hyphae in to the epidermal cells of the host plant for the nourishment. The fruiting body is flattened with radiating cells known as thyriothecium, which splits radially like a star, hence they are known as Asterinaceous fungi. The leaves of *Maerua oblogifolia* (Forsk) A. Rich (Capparidaceae) was found infected with black mildew fungi. This interested specimen was thoroughly critical microscopic examination the fungus revealed this as an undescribed species of *Asterina* and identified under genus *Asterina* belong to family *Asterinaceae*, is named as *Asterina maeruaicola*.

MATERIAL AND METHODS

Infected plant parts were carefully collected from Eturnagaram wild life sanctuary, field note were made regarding their pathogenicity, nature of infection, nature of colonies, etc. In the field, each infected plants were collected separately in polythene bags. These infected plant parts were pressed neatly and dried in-between blotting papers. After ensuring their dryness, they were kept in the manifold or butter paper folders. Later, these folders were placed in the thick paper envelop of convenient size with collection details. The host was identified by using the flora (Gamble, 1916). For microscopic study, in the laboratory, the standard method nail polish technique of Hosagoudar and Kapoor, (1985) used to study the entire colony in its natural condition. A drop of high quality well transparent nail polish were applied to the selected colonies and carefully thinned with the help of a fine brush without disturbing the colonies. Colonies with hyperparasites show wooly nature and were avoided. When the nail polish on the colonies dried fully, a thin, colourless film or flip formed with the colonies firmly embedded in it. A drop of DPX will be spread on a clear slide and the flip were spread properly on it. One or two more drops of DPX again added on the flip and a clean cover glass were placed over it and a gentle pressure on the cover glass brings out the excess DPX and it will be removed after drying. These slides were labeled and placed in a dust free chamber for 1-2 days for drying. These permanent slides were then used for further studies. Microscopic studies were carried with the compound microscope with Scopeimage-9 image analyzer software and microphotographs were taken by inbuilt CMOS camera of 1.3 megapixels. After the study of each collection, the materials were deposited at Jawaharlal Nehru Tropical Botanic Garden Research Institute (JNTBGRI), Palode Kerala, India.

RESULTS

Taxonomic Descriptions:

***Asterina maeruaicola* sp. nov. Mohd. Khaja Moinudddin, Bagyanarayana & Jacob Thomas (Figs. 1-8).
MYCOBANK # 816102.**

Coloniae amphigenae, plerumque epiphyllae, subdensae exilitate usque ad 11 cm in diametro, raro confluentibus. Hyphae rectae vel flexuosi, ramis oppositis, ut ex una dumtaxat parte acutus, at angeli, crassis hyphis laxae vel dense dispositae, 7-17 X 2-5 μm amet. Appressoriis plerumque alternis fere unilateralis duo cellulis, antrose subantrose ut curved, 7-15 μm . Caulis Cell cylindratis vel cuneatis, 11 ad X 2-5 μm . Caput cell curvum, lobis ovatis vel oblongis, irregulariter. 2-10 X 2-7 μm . Thyriothecia proxime raris, rotundatis, usque ad 29-68 mm in diameter, ad centrum stellately dehiscentibus, quae extendit se usque ad extremum hiatus, et dehiscens pars solvitur, et frequenter interius fulva satis exposita, nec fimbriata ad marginem, hyphae longa Thyriothecia multa radialiter, multis asci, globosis, octo, juventute μm in diametro, ascosporarum

conglobatae, altum velit, uniseptate, constrictae ad septum, 7-12 X 2-5 μm , lenis muratas. Pycnothyriospores multa dispersus, oblonga, pyriformibus, brunneis, 7-12 \times 10-15 μm .

Materia Examinatus

Warangal agro, Eturnagaram fermentum sanctitatis. Per Mohammad Khaja Moinuddin in foliis *Maerua oblogifolia* (Forsk) A. Rich in Guill and Perr. (Capparidaceae), Telangana, India. 29-12-2013, (TBGT No 6874).

***Asterina maeruaicola* sp. nov Mohd. Khaja Moinuddin, Bagyanarayana & Jacob Thomas (Figs. 1-4).**

Colonies amphigenous, mostly epiphyllous, thin to subdense, up to 2 mm in diameter, rarely confluent. Hyphae straight to flexuous, branches are opposite to unilateral at acute angles, hyphae thick walled loosely to closely arranged, cells 7-17 X 2-5 μm . Appressoria mostly unilateral rarely alternate, two celled, antrose to subantrose curved, 7-15 μm . Stalk cell cylindrical to cuneate 2-5 X up to 2 μm . Head cell curved, ovate to oblong irregularly lobed. 2-7 X 2-10 μm . Thyriothecia closely scattered, orbicular, up to 29-68 mm in diameter, dehiscing stellately at the center, dehiscence extending up to the margin, the dehiscid portion often dissolved and the inner deep yellow content exposed, margin fimbriate, thyriothecia contains many radially elongated hyphae, asci many, globose, eight spored 33-45 μm in diameter; ascospores conglobate, deep brown, uniseptate, deeply constricted at the septum, 7-12 X 2-5 μm , smooth walled. Pycnothyriospores are many scattered oblong, pyriform, brown, 10-15 \times 7-12 μm .

Holotype

On living leaves of *Maerua oblogifolia*(Forsk) A. Rich in Guill and Perr. (Capparidaceae), Mallur forest, Eturnagaram wildlife sanctuary, Warangal district, Telangana state, India. Coll. By Mohammad Khaja Moinuddin, date 29-12-2013, TBGT No-6874.

DISCUSSION

Asterina capparidis Sydow H, P.Sydow & Butler (*capparidis*) was collected on *Capparis* sp. by E. J. Butler during the year 1903 (Sydow *et al.*, 1911, Hosagoudar & Abraham, 2000) and *A. emciciana* Hosag. *et al.* on *Maerua apetala* (Hosagoudar *et al.*, 2009) and both having alternate and opposite appressoria and longer appressoria. The present species differs from them in having only unilateral and alternate appressoria and distinctly smaller ascospores.



Figure: 1



Figure: 2

Figure 1, 2: Host leaves infected with *Asterina maeruaicola*.

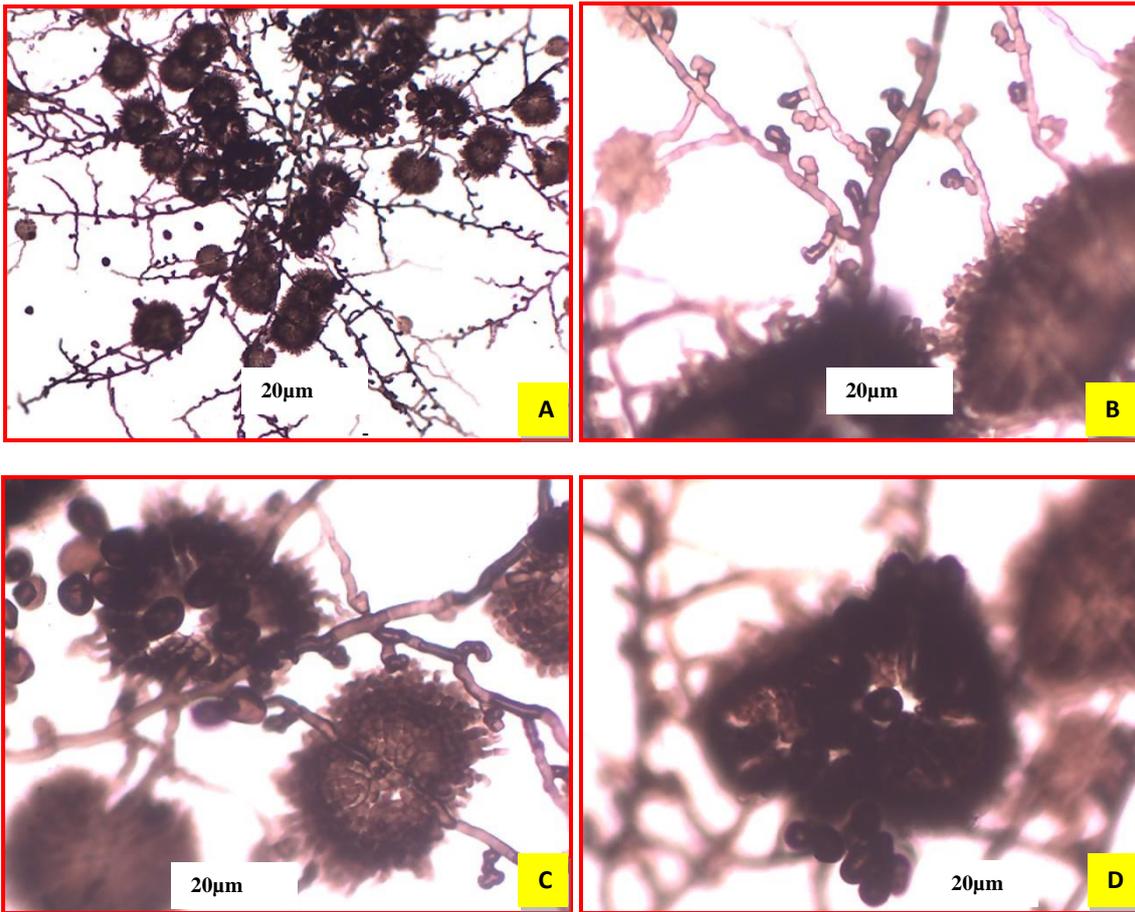


Figure:3 -A,B,C,D

A: Mycelium with Thyrothecia. **B:** Two celled, unilateral appressoria. **C:** Ascus releasing the thyriothecia. **D:** Stellately dehiscent thyriothecia and releasing of ascospores from the ascus.



Figure:4 - E,F.

E: Germinating of ascospores. **F:** Germinated ascospore forming the mycelium with appressoria, thyriothecia.

CONCLUSIONS

Asterina maeruaicola described from the forest localities of Eturnagaram wild life sanctuary, Telangana state, as new species in accordance with the (ICBN) International Code of Botanical Nomenclature. These wild life sanctuaries regions of Warangal dist. are also must be rich in black mildew fungal species but



the poor representation could be due to inadequate survey and taxonomic study of these group fungi in this area.

ACKNOWLEDGEMENTS

The authors express their thanks to Rana Kausar, The Head, Department of Botany, Osmania University for providing the physical facilities. Mr. Mohammad Khaja Moinuddin is grateful to the Osmania University authorities for the award of UGC, BSR, RFSMS Fellowship.

REFERENCES

- [1] Hosagoudar, V.B.; Robin, P.J.; Archana, G.R. 2009. New foliicolous fungi from the campus flora of Madras Christian College, India, *Sydowia*, 61(2):243-248.
- [2] Hosagoudar, V. B. and J. N. Kapoor (1985). New technique of mounting meliolaceous fungi. *Indian Phytopathol.* 38: 548-549.
- [3] Hosagoudar, V.B. (2012). Asterinales of India. *Mycosphere* 2(5): 617–852.
- [4] Hosagoudar, V.B. and Abraham, T.K. (2000). A list of *Asterina* Lev. species based on the literature. *Journal of Economic and Taxonomic Botany* 24: 557-587.
- [5] Gamble, G.S.1915. The Flora of Presidency of Madras-Vol.I &II. Adlard and Son Ltd. London.
- [6] Sydow, H., P.Sydow and E.J.Butler (1911).Fungi Indiae Orientalis – II. *Annals. Mycologici* 9:372-421.