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A NEW SPECIES OF *Acremoniula* G. ARNAUD EX CIF. ON *Butea Monosperma* (LAM.) TAUB. – AN IMPORTANT MEDICINAL PLANT FROM FOREST FLORA OF JASHPUR (C.G.)

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KEYWORDS

Acremoniula monospermae

Butea monosperma

Parasite

New taxon

Novel species

ABSTRACT

The present study was undertaken from the month of September 2016 to December 2018 in Jashpur (C.G.), India to collect infected plant samples. The forest of Jashpur district of Chattisgarh, India possesses great diversity of plants and its pathogenic fungi because of most favourable climatic conditions. Although forest area of Jashpur is almost untouched for forest wealth being most interior part heavily inhabited by tribal people and wild animals; therefore drew less attention towards this branch of study. Hence, intensive and extensive explorations of pathogenic fungi causing disease in plants are necessary and urgent need of time also. The field survey of Jashpur (C.G.) has resulted in the collection of a novel undescribed fungal form i.e. *Acremoniula monospermae* sp. nov. causing foliar disease of *Butea monosperma* (Lam.) Taub. Only seven species of *Acremoniula* G. Arnaud ex Ciferri has been reported so far from all over world as a hyperparasites (overgrowing and parasitic on other fungal organism) or saprophytes (grow on dead and decay matter) but this novel species is reported distinctly as parasites (grow on living leaves of *Butea monosperma* plant (Lam.) Taub.) and thus another new addition in genus *Acremoniula* G. Arnaud ex Ciferri.

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1 Introduction

The plants are gem stones of the earth and play very important role in our existence. They fulfill our basic requirements (food, medicines, timber, shelter etc.) and help in balancing our ecosystem. The forest of Jashpur (C.G.), India is very dense because of prolonged moisture, most favorable temperature, rainfall and also other factors suitable for growth and development of the plants and also other numerous fungi. During the field survey of Jashpur forest foliar disease was found on medicinally important plant *Butea monosperma* (Lam.) Taub. also known as Bastard teak in English while Palash, Tesu and Dhak in Hindi. *B. monosperma* is 12 metre tall small tree of host family Fabaceae (formerly Leguminosae) and its roots, stem, leaves, flowers and seeds have great importance in traditional medicine (Vaidya & Pandita, 2017). This plant possesses anti-hepatotoxic, anti-gout, anti-diabetic, anti-leprotic, anti-convulsant, anti-microbial, anti-stress, anti-oxidant, anti-diarrheal, anti-inflammatory and many more properties (Khatak et al., 2019). Pharmacologically, aqueous extract of plant leaves have anti-filarial activity (Sahare et al., 2008) while aqueous extract of flowers possess anti-cancer activity (Choedon et al., 2010), ethanolic extract of stem have potential anti-diarrheal activity (Tiwari et al., 2019) and methanolic extract of plant seeds exhibit anti-fertility effect (Tiwari & Sahu, 2017). Different parts of this plant are utilized by tribes inhabited in Jashpur (C.G.) forest, they used this tree as food, fodder and medicine. Tribal populations make food plates from its leaves and earning little money for their bread and butter but unfortunately the plant is infected in between the month of July to December every year. The plants shed their leaves as the flowers develop in the month of January to March (Kapoor, 2005; Das et al., 2011), therefore, leaves are of use for very short duration of time. Hence there is great demand to explore untouched area and protect our forest wealth from pathogen in which the fungal biosystematics (mycotaxonomy) plays very important role because details of pathogen is primarily dependent on correct identification of organism. Therefore present study was conducted to explore the fungal pathogens causing leaf spot disease on *B. monosperma* and disease causing agent was identified with the help of mycotaxonomy and SEM image analysis.

2 Materials and Methods

The infected plant samples were collected from Jashpur (C.G.) during field survey in the month of December 2018. At the time of sample collection field notes were made regarding nature of infection, nature of colony (symptomatology), date of collection and locality of collection (Mall & Kumar, 2014; Sabeena et al., 2018). Infected leaves were collected in neat and clean polythene bags and brought to the mycological laboratory of the department after the field visit is over. Infected samples were dried and pressed carefully with the help of blotting papers (Sabeena et al., 2018). Transfer of collected materials to the fresh and dry blotters at regular intervals ensured complete dryness of the collection (Thomas et al., 2013). Dry and pressed materials are kept in adsorbent paper envelopes along with collection details (Awasthi et al., 2016). Morphological observations of superficial fungi were made after scraping and hand cut sections in lactophenol cotton blue mixture from the infected area of fresh collection (Awasthi et al., 2015). Olympus CX21i trinocular microscope was used for observations at 40x magnification. SEM images were prepared at Central Instrumentation Laboratory (CIL) of Dr. Harisingh Gour Central University, Sagar, M.P., India. Specimen were coated with gold-palladium and examined with a double beam FEI Nova nano SEM-450. MICAPS PROCMOS310CA digital camera was used for dimensions of conidiophores and conidia. The holotype is deposited in Ajrekar Mycological Herbarium (AMH) of Agharkar Research Institute (ARI) for accession number and it's isotype has been kept in Mycological Herbarium of the Department, Dr. Harisingh Gour Central University, Sagar, M.P., India.

3 Results

Based on hyaline conidiophores with monoblastic terminal conidiogenus cell and 0 septate, dark brown to black, truncate conidial base this fungus was identified as species of genus *Acremoniula* G. Arnaud ex Ciferri.

3.1 Taxonomy and Description

Acremoniula monospermae A. Dubey, S. Bhardwaj, A.K. Pandey, A.D. Khalkho, S. Jain and A.N. Rai, sp. nov. – Figures 1-3. **Mycobank no.-** MB 832735

3.1.1 Type: India, Chattisgarh, Jashpur, on living leaves of *B. monosperma* (Lam.) Taub. (Fabaceae), December 2018, leg. Anurag Dubey (Holotype AMH- 10187; Isotype BOT DR 103).

3.1.2 Etymology: New species epithet is derived from the species of host.

Description

Colonies effuse, light black, hypophyllous, hidden because of large number of trichomes on the lower surface, punctiform. Mycelium superficial, septate, hyaline, branched and smooth. Stroma, Setae and hypopodia are absent. Conidiophores micronematous, mononematous, straight or flexuous, branched, colourless, smooth, length up to 32.79µm and width 1.47- 2.95µm. Conidiogenous cells monoblastic, determinate, nearly rounded in shape, integrated and terminal. Conidia dark brown to black, may or may not be truncate, simple, acrogenous, globose, mostly rough walled and sometimes smooth walled and 0 septate, 12.78- 64.88µm long and 13.27- 55.54µm thick.

4 Discussion and conclusions

A thorough survey of literature exhibits that *A. monospermae* sp. nov. is the first species reported on the host genus *Butea* and its

Figure 1 Symptoms of *Acremoniula monospermae* sp. nov. on *Butea monosperma* (Holotype AMH-10187). (a.) Infected host plant. (b-c.) Early stage of infection. (d.) Late stage of infection. (e.) Heavy infection.

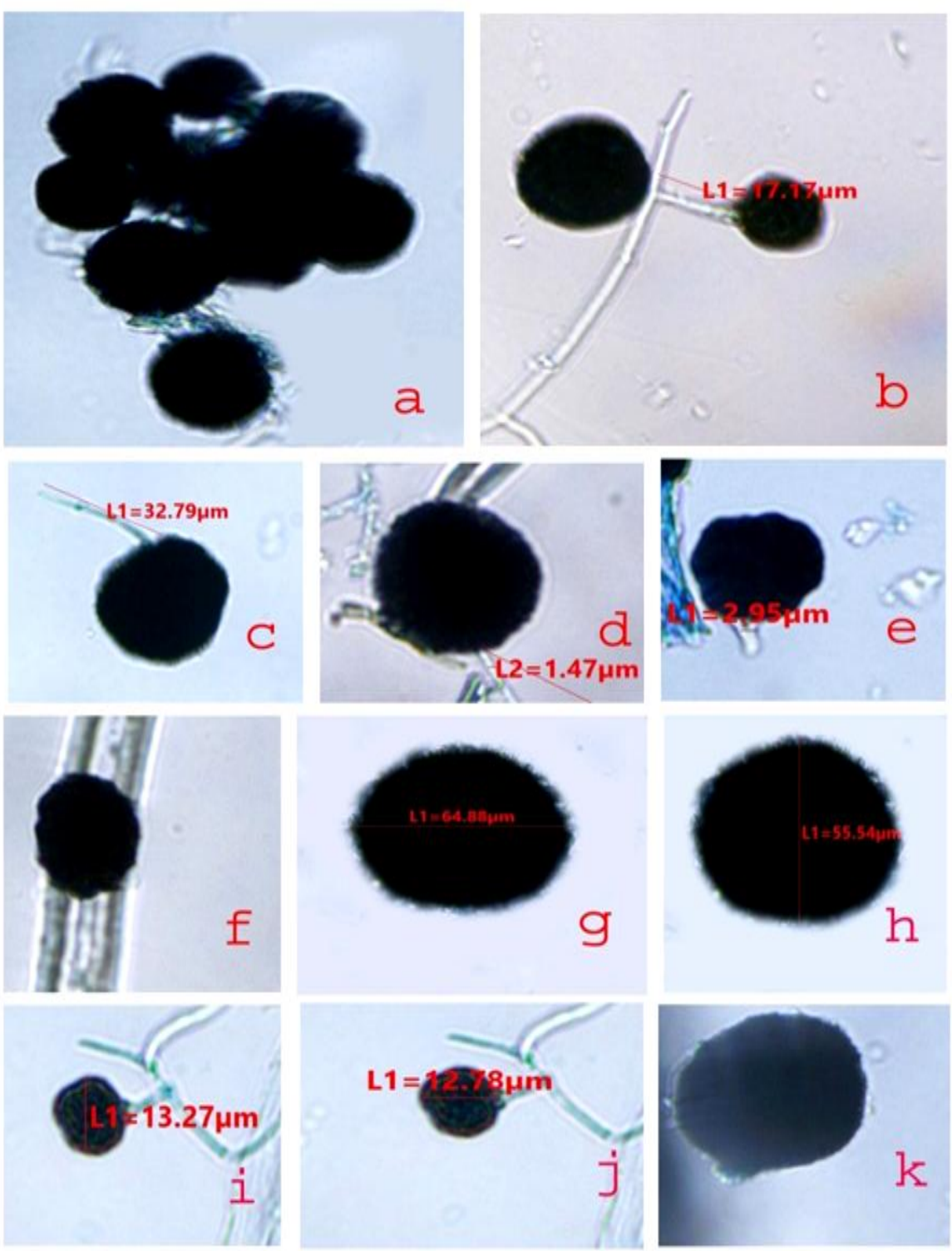

Figure 2 Microphotographs of *Acremoniula monospermae* sp. nov., (Holotype AMH-10187). (a.) Groups of conidia. (b.) Conidium attached with conidiophore (arising from mycelium). (c-e.) Range of conidiophore dimentions. (f.) Conidia in lumen of trichome. (g-j.) Range of conidial dimensions. (k.) Truncate conidia.

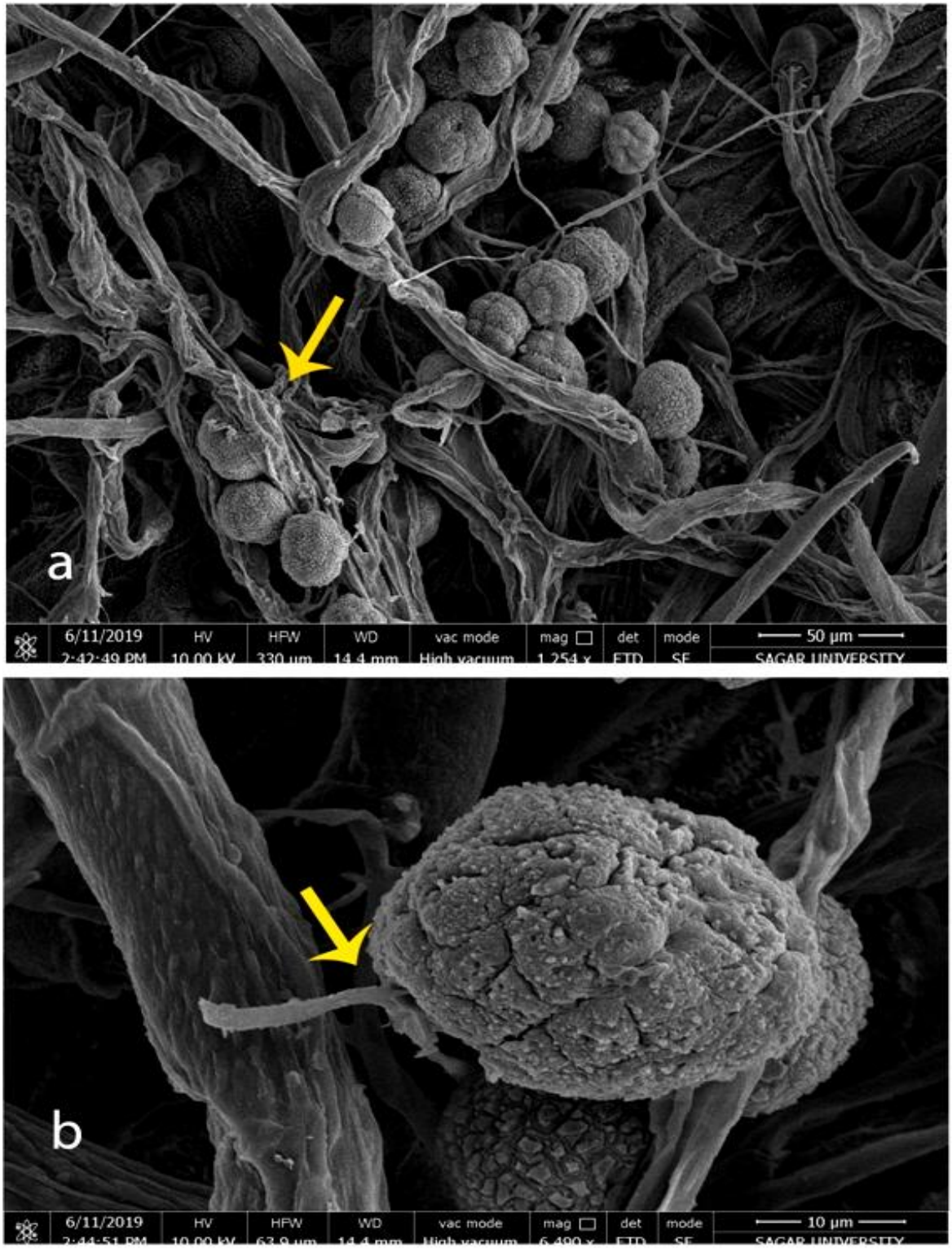

Figure 3 Scanning electron microscopic images of *Acremoniula monospermae* sp. nov. (Holotype AMH-10187) (a.) Conidia in lumen of trichome (b.) Conidium attached with conidiophore.

family. Only seven species of genus *Acremoniula* G. Arnaud ex Ciferri have been reported from all over world. Among these *A. brevis* (Hughes, 1979), *A. fagi* (Ellis, 1976), *A. rhamni* (Selcuk et al., 2015), *A. triseptata* (Mercado et al., 1995) and *A. uniseptata* (Huseyin et al., 2015) are reported as saprophytes while *A. sarcinellae* (Deighton, 1969) and *A. suprameliola* (Ellis, 1971) are reported as hyperparasites. However, proposed species of this genus has been reported as parasites for the first time. A critical study, observation, examination and comparison with associated taxa reveal that proposed species shows some similarity with *A. fagi* (Ellis, 1976) in presence of micronematous and hyaline conidiophores; 0 septate, truncate base and black colored conidia on one hand and have clear cut differences in conidiophores and conidial dimensions. Conidiophore of proposed species are 1.47-2.95µm thick while *A. fagi* (Ellis, 1976) having more thickened conidiophores (4-8µ). *A. fagi* (Ellis, 1976) having small size conidia (12-17 (14)µ long and 11-15 (12.5)µ thick) as compared to proposed species. *Acremoniula fagi* (Ellis, 1976) is reported on dead branches of *Fagus grandifolia* while *A. monospermae* sp. nov. (Holotype AMH-10187) is clearly present on living leaves of *Butea monosperma*.

The above Discussion shows that species occurring at new host appeared to be undescribed and new to science i.e. *A. monospermae* sp.nov. (Holotype AMH-10187).

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Conflict of Interest

The authors declare that they have no conflict of interest.

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