# NEW RECORD OF POWDERY MILDEW ON *ACACIA MANGIUM* WILLD. IN INDIA

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**Abstract:** *Acacia mangium* Willd. is one of the major tree species used in plantation forestry programs throughout Asia and the Pacific. The tree legume is prone to various seedling and foliage diseases found in nurseries and while in nurseries. This paper reports the incidence of powdery mildew caused by *Oidium* sp. on seedlings of *A. mangium*, maintained in root trainers and nursery seed beds of the Rain Forest Research Institute situated in Jorhat, Assam (India). This is the first report of powdery mildew on *A. mangium* from India.

**Key words**: *Acacia mangium*, powdery mildew, India

## INTRODUCTION

*Acacia mangium* Willd. commonly known as Australian teak belongs to the family Fabaceae. Although, *A. mangium* is native to Australia, Indonesia and Papua New Guinea, due to its rapid growth and tolerance to very poor soils, it is one of the major tree species used in plantation forestry programs throughout Asia and the Pacific. Its evergreen nature and thick leaves make it useful as a shade tree in roadside or other urban forestry uses. The foliage of the tree can be used as fodder and its bark yields tannin and gum. It is a popular wood for furniture, agricultural implements, crates, particle board and wood chips because the wood is easy to drill and turn. *A. mangium* is also suitable for manufacturing charcoal briquettes and activated carbon. In addition, it is a common pulp and paper crop in some South East Asian countries. Thus, *A. mangium* plays an increasingly important role in efforts to maintain a commercial supply of tree products while reducing pressure on natural forest ecosystems.

However, the productive potential of *A. mangium* is found to be affected by various biotic factors including pests and diseases. *A. mangium* was once considered the most promising forest plantation species in many South East Asian countries. The long-term success of *A. mangium*, however, may be threatened because the tree is vulnerable to many diseases. Among the seedling and foliage diseases, powdery mildew is the main one causing considerable losses in nurseries. Powdery mildew caused by *Oidium* sp., severely affected *A. mangium* in Hawaii (NAS 1983) and caused up to 75% mortality of seedlings in nurseries in Thailand (Chalermpongse 1990). Ryan and Bell (1989), also reported moderately severe infection of powdery mildew on *A. auriculiformis and A. mangium* in Australia. Although, the powdery mildew of *A. auriculiformis* was reported earlier from Peechi, Kerela (Sharma and Maria Florence 1996), so far, no literature is available regarding the incidence of powdery mildew on *A. mangium* from anywhere in India. During an investigation, the nursery seedlings of *A. mangium* in the Rain Forest Research Institute (RFRI), Jorhat, Assam were found to be infected by powdery white mycelium, which was further investigated.

Despite the economic and ecological importance of plant pathogenic fungi, much remains to be learned about their biology, particularly their host and geographic ranges. Even for common, easily found pathogens such as powdery mildews, it appears that the pathogens are much more diverse, and their host relationships more complex than commonly assumed (Glawe 2008). A first report often provides important information for increasing our knowledge and understanding about these emerging plant pathogens. Hence, we felt it was imperative to study the incidence of powdery mildew on *A. mangium* raised in RFRI nursery.

## MATERIALS AND METHODS

The study site i.e. nursery of RFRI, Jorhat, Assam, India is situated between 26° 46′ N latitude and 94° 17′ E longitude where seedlings of *A. mangium* were maintained in root trainers and seed beds. During the months of February and March 2010, the seedlings were found to be infected by powder like fungal masses on the leaves. The disease symptoms were observed periodically with an interval of 3 days and then recorded. Infected leaves of *A. mangium* were collected in sterilized polythene bags. Fungal masses were separated from the collected samples with the help of a pointed needle. Slides were prepared

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and examined under a microscope. Microscopic observations were recorded and microphotographs taken.

To perform the pathogenecity tests, fungal spores were collected from infected plants using a wet brush, and artificially inoculated on healthy pinnate leaves of twenty plants. The plants were grown in pots and they were kept in a humid chamber. Another twenty plants which were only wiped with a wet brush, were used as the control.

## RESULTS AND DISCUSSION

In root trainer seedlings, early symptoms appeared as discrete, cobweb-like to powdery white patches of hyphae and spore on the primary, juvenile and pinnate leaves. As the infection progressed, these patches increase in size and coalesce to form bigger patches, spreading to newly developed phyllodes. Both surfaces of leaflets and phyllodes were coated with a mat of superficial hyphae and spores and looked like they had been dusted with powder (Fig. 1, 2). Prolonged infection also resulted in premature death and defoliation of leaves. In the case of seedlings raised in nursery beds, disease symptoms similar to that of root trainers appeared on seedlings. The difference was that the infection occurred on the upper surface of phyllodes which were located up to 1.25 m from ground. However, infection was not seen on phyllodes that were located more than 1.25 m from the ground. In the later stage of infection, light yellow blotches were observed after removal of powdery fungal heaps. Heavy infection resulted in premature defoliation of phyllodes and retarding successive growth of the stem.

Microscopic observations revealed hyaline pseudoseptate mycelium. Conidiophores were erect, with 2–5 cells (majority of 3 cells), and a length of 50.0–112.5 μm, and breadth of 6.25–8.75 μm, respectively. Conidia hyaline was barrel shaped with blunt or round apices, unicellular and measured 25.0–41.25x15.0–20.0 μm (Fig. 3, 4). The microscopic features of the fungus were similar to *Oidium sp*. as reported earlier on *Acacia auriculiformis* (Tanaka and Chalermpongse 1990), *A. aulacocarpa* (Boa and Lenne 1994) and *A. crassicarpa* (Old *et al.* 1997). In the pathogenecity test, signs were observed in inoculated plants after 14 days, whereas the plants treated as the controls remained healthy. Disease specimens from artificially inoculated plants also yielded *Oidium* sp.

The disease was not severe in the studied area but leaflets were affected to a great extent in shade house conditions. As a result of infection, the surface of leaflets and phyllodes were completely covered with spores and mycelium which might affect physiological functions such as photosynthesis and transpiration leading to slow

Fig. 1. Powdery mildew symptoms on *A. mangium* leaves

Fig. 2. Powdery mildew symptoms on *A. mangium* leaves

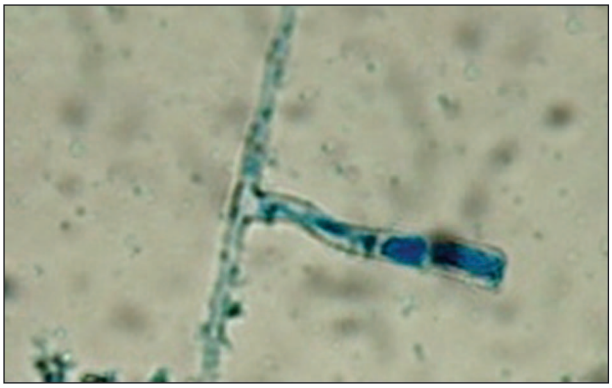

Fig. 3. Conidiophore

Fig. 4. Conidiophores and conidia

seedling growth. From the symptomatology and causal organism, disease was confirmed as powdery mildew. As it was not reported earlier on *A. mangium* from India, this was a new record for the country.

This pathogen is usually of minor impact. Under some environmental conditions, however, it can severely affect *A. mangium* and the *Acacia* spp. But it can particularly affect *A. auriculiformis*, a major species raised in this region under the social forestry program. In addition to documenting the geographic range of the fungus, or giving warnings of new disease, reporting new host records of *Oidium* sp. can significantly enhance the understanding of pathogen biology.

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