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# IFGTB NEWS

Quarterly Newsletter on societal applications of research Interventions in Forestry, Genetics and Tree Breeding from the Institute of Forest Genetics and Tree Breeding, Coimbatore.

(A national institute of the Indian Council of Forestry Research and Education, Ministry of Environment, Forest & Climate Change, GOI)



## From the Director's Desk

ICFRE-IFGTB is a national Institute under the ICFRE mandated to address issues in relation to production forestry along with the conservation of forest ecosystems. The Institute spearheads tree improvement programmes and precision silviculture technologies, applying biotechnological tools to boost wood and forest products and also addressing climate change issues. The Institute also seeks to conserve and protect the biodiversity of forests and support the livelihoods of forest-dwelling communities along with increasing consumer awareness on the need to support biodiverse forests. IFGTB News is a vehicle for the Institute to spread information on various research activities undertaken in different disciplines. The present issue highlights conservation efforts in the Agasthyamala Biosphere Reserve at landscape and species level.

**Dr. C. Kunhikannan**
Director, IFGTB

# Biodiversity assessment of Bonacaud forest area in Agasthyamala Biosphere Reserve, Kerala

*Muhammad Ali Noushad, A. Rajasekaran, B. Nagarajan, K.N. Ashrith, S.P. Subramani, R. Kuralarasan, S. Priyatharshini and C. Kunhikannan*

Around 600 specimens of 109 species across 70 genera and 38 families were collected. Six species found under critically endangered, 20 endangered, 20 vulnerable, and 39 near threatened as per IUCN status.

The Agasthyamala Biosphere Reserve is known for its species diversity and endemism. Plant diversity in Bonacaud forest area was quantified across seasons and altitudes using transect method for 18 months. The biometerological processes of all the species of the wet evergreen and semi-evergreen forests were considered. Around 600 plant specimens were collected and identified. Owing to a high degree of endemism, 109 species across 70 genera and 38 families were recorded. Six species found under critically endangered, 20 endangered, 20 vulnerable, and 39 near threatened as per IUCN status. Some of the endemic plants recorded include *Amorphophallus bonaccordensis*, *Ixora agasthyamalayana*, *Memecylon subramanii*, and *M. sivadasanii*. Apart from the threats posed by the habitat degradation, anthropogenic disturbances and changing climate, the region is also affected by invasive alien plants like *Chromolaena odorata, Mikania micrantha* and *Lantana camara.* The Bonacaud region has a relatively high diversity and endemism, necessitating conservation programmes.

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*Ixora agasthyamalayana*

*Memecylon subramanii*

Bonacaud Forest area

## Infestation of midrib folder, *Banisia myrsusalis elearalis* Walker (Thyrididae: Lepidoptera) on Mahua

*K.N. Ashrith, J.P. Jacob, D. Thangamani and C. Rajesh*

The biology of midrib folder, an emerging pest of mahua seedlings was studied for management in nursery.

*Madhuca longifolia* (honey tree; Family Sapotaceae) is a large deciduous tree distributed in India, Myanmar, Nepal and Sri Lanka. A multipurpose forest tree, provides food, fodder, fuel and medicines. The midrib folder, *Banisia myrsusalis elearalis* reported as a major pest of Sapota was observed on mahua seedlings during January 2023 at IFGTB nursery. Studies were carried out to assess infestation and management of the pest. The per cent drying of leaves due to infestation was recorded by observing the number of leaves dried to the total number of leaves in a branch. The peak incidence was during the first fortnight of January. Nearly 74 per cent of the foliage was damaged by the larvae by folding the terminal two to three leaves and feeding on the chlorophyll within the leaf fold. The infested leaves dried up and appeared burnt which was visible from a distance. The damage of foliage feeder on new grafts and planted seedlings stunted the growth at early stage. Neem oil @ 2 ml/L was found effective against leaf folder infestation. Further studies on detailed life history of midrib folder would enable the development of specific control measures for the emerging pest.

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## Evaluation of *MsPRP2* promoter for gene expression studies in *Eucalyptus*

*M.C. Sandhya, S. Sreeja, K. Shamili, R. Manoj-Kumar, A. Balasubramanian and Nambiar-Veetil, M.**

A promoter from *Medicago sativa* was shown to direct gene expression in *Eucalyptus* and has applications in engineering abiotic stress tolerance.

Promoters are used in transgenic studies for specifically directing gene expression in desired tissues and environmental conditions. *MsPRP2* promoter from *Medicago sativa* directs root-preferential and salt-inducible gene expression in *Arabidopsis* and soybean. The promoter was evaluated in *Eucalyptus*, as it could be used to engineer salt and drought tolerance. Transformation vectors were developed using *MsPRP2* promoter, and used for *Agrobacterium* mediated transformation of *Eucalyptus*. *MsPRP2* driven GFP expression was observed in callus. Desired gene edits, directed by *MsPRP2* promoter driven gene- editing constructs, were observed in roots of composite transgenics. Greater number of explants showed *MsPRP2* driven *GUS* expression in

the presence of 200 mM NaCl. These studies show that *MsPRP2* promoter could be used for expressing transgenes in *Eucalyptus*. The findings were presented in the IUFRO Tree Biotechnology Conference, 2022.The *MsPRP2* promoter is being evaluated to direct expression/ silencing of sodium transporter genes for enhancing salt tolerance in Eucalyptus.

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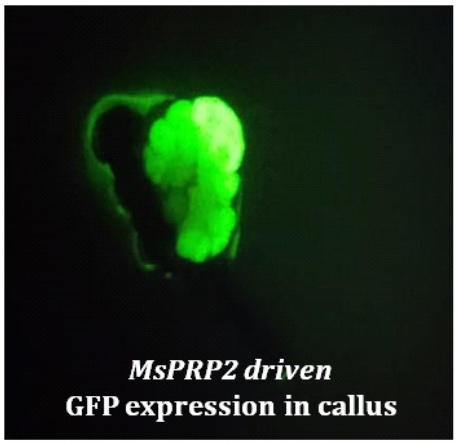


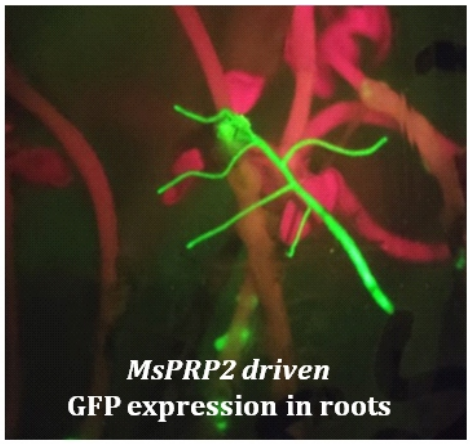



## Fungal Diversity in the Wet Evergreen Forests of Agasthyamala Biosphere Reserve, Western Ghats

*K.K. Akshaya, A. Karthikeyan and C. Kunhikannan*

Recorded 232 macrofungal species including edible, toxic, medicinal, mycorrhizal, saprophyte or wood rotting fungi

Agasthyamala Biosphere Reserve (ABR) has diverse ecosystems and constitutes an important biogeographical 'hot spot' within the Western Ghats. Although the species richness and endemism among angiosperms of this region are documented, the fungal flora has not been studied. The survey in ABR recorded 232 macrofungal species including edible, toxic, medicinal, mycorrhizal, saprophyte or wood rotting fungi. *Termitomyces microcarpus* ('Areekoonu' in Malayalam) is the most common edible mushroom used by the local people of Agasthyamala. A toxic mushroom, *Chlorophyllum molybdites* (False Parasol/ Green Spored Parasol) usually confused with the edible species *Macroplepiota procera* (True Parasol Mushroom) was also recorded. Species like *Amanita vaginata*, *Cuphophyllus pratensis*, *Leucoagaricus rubrotinctus,* reported as Ectomycorrhizal (ECM) fungi playing an important role in the recycling of nutrients and their uptake in forest system were also recorded.

The symbiotic association between fungi and higher plants (mycorrhiza) increases the survival, growth and development of plants. Mycorrhizal fungal hyphae form a wide underground network to improve the well-being of ecosystem. The ECM and the other macro fungi indicate the forest health as they have a role in nutrient supply, carbon sequestration and decomposition of litter.

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*Termitomyces microcarpus* (Berk. & Broome) R. Heim

## ICFRE-IFGTB adds more tree crops for DUS testing and varietal registration

*A. Nicodemus, V. Sivakumar, Rekha R. Warrier and D. Rajasugunasekar*

In India, the intellectual property rights (IPR) of plant varieties are safeguarded under the Protection of Plant Varieties and Farmers Rights Act, 2001. The varietal registration is facilitated by the Protection of Plant Varieties and Farmers Rights Authority (PPVFRA) functioning under the Ministry of Agriculture and Farmers Welfare, Govt. of India. The new varieties are evaluated and recognized using the test of Distinctiveness, Uniformity and Stability (DUS). Any new variety should possess at least one distinct morphological characteristic whose expression is uniformin in all individuals of that variety and stable across seasons and locations. IFGTB developed DUS guidelines for Casuarina and Eucalyptus during 2013 as a first instance in forestry followed by registration of six varieties of Casuarina and one variety of Eucalyptus. The legal protection secured through registration enabled the successful commercialization of the new varieties. Recently DUS guidelines for two timber species, Teak and Melia were approved and notified by PPVFRA. IFGTB is recognized as the DUS Centre for these crops to conduct the necessary tests for the registration process. Further DUS guidelines for the matchwood tree Ailanthus has been finalized and the notification by the Authority is awaited. IFGTB will strive to register new varieties of Ailanthus, Melia and Teak to secure their IPR and to ensure the supply of authentic planting material to the tree growers.

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## EVENTS: JANUARY – MARCH 2023

- **TRAINING :** Tree cultivation techniques of important tree species (04-06 Jan); Junior Ranger Programme – Connecting Students with Nature (23-25 Jan); Basics of molecular biology and biochemistry (16 Feb); Red sanders cultivation for tree growers (21 Feb); Biodiversity and nature walk (22 Feb); Agroforestry models (02 Mar); Technology demonstration of Casuarina windbreak clones and popularization of TreeGenie mobile App (08 Mar).
- **MEETINGS / CONFERENCE :** Pre-release stakeholder meeting on Forest Soil Health Cards for UT of Puducherry (16 Mar).
- **PRAKRITI PROGRAMME :** Conservation of soil (23 Jan.); Recycling (14 Feb.); Energy conservation (16 Feb.); Pollution and its effect (07 Mar.)

- **OTHER EVENTS :** Participation in the National Workshop on Mission LiFE at New Delhi (30 Jan.); World Wetlands Day (02 Feb); Participation in the 33rd Agri-Horti Farm Fest 2023 at Puducherry (10-12 Feb); International Women's Day (07 Mar); Hindi Workshop (14 Mar); International Day of Forests (21 Mar).
- **SUPERANNUATION :** Smt. S. Padmini, Technical Officer (Feb)

## About IFGTB

The ICFRE - Institute of Forest Genetics and Tree Breeding (ICFRE - IFGTB), Coimbatore, is a national institution of the Indian Council of Forestry Research and Education (ICFRE), an autonomous body under the Ministry of Environment, Forest and Climate Change, Government of India. ICFRE – IFGTB has a mandate to develop new varieties, management and silvicultural techniques to maximize productivity of natural and planted forests under different ecological considerations and changing environment.


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