



# 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)

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## From the Director's Desk



Forestry research is a long-term endeavour as it involves perennials with complex relationship with other organisms in nature. It is also a delicate balance between meeting the immediate needs of the society and preserving the resources for posterity. Any progressive institution like ICFRE-IFGTB is expected to adopt a multidisciplinary approach and work in active collaboration with other organizations having similar or overlapping mandate. This issue of IFGTB News provides a glimpse of the diverse activities taken up by the institute to achieve the twin objectives of production and conservation. We had an eventful quarter of July-September 2023 with many programmes covering new research initiatives on native trees, research priority setting for effective utilization of bioresources, prioritizing tree species for taking up immediate conservation efforts and hosting the meeting of ICFRE's Variety Releasing Committee. On the training and extension part, refresher course was conducted for serving IFS Officers and Officials of KVKs were provided training on the latest tree cultivation technologies. This quarter has also seen addition of three shortfilms of cultivation technologies for important trees in IFGTB's Youtube channel. These visual outreach materials provide a direct connection between the tree growers and the Scientists through easy access of updated information. I am sure that the readers of the current issue of IFGTB News find new and useful and as before request your feedback to further improve the communication with our stakeholders.

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



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## New Projects to Study Lesser Known Indigenous Tree Species

ICFRE-IFGTB has been steadily increasing research investment in indigenous tree species of economic, livelihood and conservation importance. Usually such species pose many challenges to take up improvement and conservation efforts due to complex biological structure and ecological relationships in their natural environment. IFGTB Scientists recently started work in two important species and share their experience and thoughts about them here.

*Diospyros ebenum* J. Koenig (Ebenaceae) is a dioecious and auto hexaploid ( $2n=6x=90$ ) tree, known for its highly valued black heartwood with natural distribution in dry and wet evergreen forests of south and central India. IUCN assessed it as a data deficient species. The species has a clumped distribution due to limited dispersal of seeds from the fleshy fruits. Fertility was found low with only



10% of the 50 selected candidate trees bearing fruits (female trees). This could be due to low density of reproductively mature males and/or insufficient pollination. The dioecious nature helps the species to maintain genetic diversity through allogamy, to reduce the expression of recessive deleterious mutant individuals and survive a season of reproductive failure. However, the dioecy mechanism may also lead to an evolutionary dead end due to gender imbalance in the population since only half the reproductive adults contributing to seed production for the next filial generation. Animal-pollinated dioecious tree species with fleshy fruits are rare and information on their biology is scarce making them a priority for conservation. The new project will enhance the current understanding of the biology of the species and contribute towards formulating effective genetic improvement and conservation strategies.



Input from R. Archana\*, V. Sivakumar, S. Saravanan and M. Jayakumar ✉ [archanar@icfre.org](mailto:archanar@icfre.org)



*Balanites aegyptiaca* (L.) Delile (Zygophyllaceae) popularly known as “desert date” is an underutilized fruit-yielding tree. It grows up to 10 m tall and found in many habitat types tolerating a wide variety of soil types and moisture levels. The seed oil is used in ayurvedic medicine for treating various ailments. Through surveys conducted in

Tamil Nadu 21 populations were identified in six districts. Seed oil content of these populations ranged from 38% (Ammathur, Virudhunagar) to 63% (Kalugumalai, Thoothukudi). The local people particularly women collect an average of 10-15 kg of fruits per tree during February to April and sell locally at Rs.10 per kg. The outcome from the new project will help in cultivation of high-yielding *B. aegyptiaca* in wasteland/barren land and to support livelihood of people in semi-arid areas.

Input from N. Senthilkumar\*, R. Sumathi and T. Bharath ✉ [senthilnk@icfre.org](mailto:senthilnk@icfre.org)

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## Regional Research Conference Forest Bioresources-Scope and Challenges for Valorization

The ICFRE-IFGTB organized a Regional Research Conference on Forest Bioresources-Scope and Challenges for Valorization in association with ICFRE-Institute of Wood Science and Technology, Bengaluru on 25<sup>th</sup> August, 2023 through hybrid mode. The RRC was attended by around 140

participants including officials of ICFRE, Directors and GCRs of all ICFRE institutes, representatives of Forest Departments of Southern region, University Deans and Scientists and Technical staffs of IFGTB and IWST. Eminent resource persons presented approaches and case studies on efficient



utilization of various bioresources and strategies for their commercial and livelihood applications. The RRC made important recommendations which will be the basis for proposing new projects by different ICFRE institutes in the near future.

For further info: Dr. N. Senthilkumar

✉ [senthilnk@icfre.org](mailto:senthilnk@icfre.org)



## Meeting of Variety Releasing Committee of ICFRE

The Variety Releasing Committee (VRC) of ICFRE met in ICFRE-IFGTB on 01<sup>st</sup> September 2023. The VRC was chaired by Shri Chandra Prakash Goyal, IFS, Director General of Forests and Special Secretary, Ministry of Environment, Forest and Climate Change, Govt. of India and co-chaired by Shri Arun Singh Rawat IFS, Director General, ICFRE. Proposals for the release of two cultivars of *Corymbia* hybrids by ICFRE-Forest Research Institute, Dehradun and five clones of medicinal plants (*Picrorhiza kurroa*, *Valeriana jatamansi* and *Sinopodophyllum hexandrum*) by ICFRE-Himalayan Forest Research Institute, Shimla were presented for approval. The VRC while appreciating Dr. Ajay Thakur for his hard work on

developing *Corymbia* hybrid cultivars, recommended to carry out detailed study on the water use efficiency of the clones and place the proposal again. It approved the public release of the clones of medicinal plants.



For further info : Dr. V. Sivakumar ✉ [sivav@icfre.org](mailto:sivav@icfre.org)

## Refresher Course on FGRs to IFS Officers

ICFRE-IFGTB organized a one-week refresher course to the Indian Forest Service Officers during 11-15 September 2023 with funding support from the MoEF & CC. Twenty five Officers representing different cadres attended course. Distinguished Professors and Scientists from Universities and Research Institutions served as resource persons and handled lectures on different aspects of

utilization and conservation of FGRs. Participants also had field visits to VMG and laboratories of IFGTB, germplasm collection station near Siruvani, genetic resource plots of Teak at Anamalai and Parambikulam Tiger Reserves and TNFD Seed Centre. There was also a panel discussion on the role of state forest departments in FGR conservation.

For further info : Dr. A. Vijayaraghavn ✉ [avijay@icfre.org](mailto:avijay@icfre.org)



## Conservation Assessment, Management and Prioritization Workshop for Threatened Plants of Tamil Nadu

In partnership with the Tamil Nadu Biodiversity Conservation and Greening Project for Climate Change Response, ICFRE-IFGTB organized a Conservation Assessment, Management and Prioritization (CAMP) workshop for selected plant species of Tamil Nadu on 26th and 27<sup>th</sup> September 2023. Its aim was to prioritize taxa for initiating conservation measures by assessing the conservation status and providing information on the threats faced by the taxa and assign an IUCN Red List category to them. About 100 species were reviewed by nearly 75 invited experts in the field of

Plant Taxonomy, Ecology, Conservation Biology and Forest Officers. Through a comprehensive assessment of distribution, population trends, and threat factors, 25 species were prioritized for further conservation efforts. In addition, the prioritization process took into account the medicinal value, ecological role, economic importance and cultural significance of the plant species. The experts also stressed the need to conduct similar exercises regularly to evaluate and preserve many other threatened plant species in Tamil Nadu.

For further info : Dr. A. Rajasekaran ✉ [rajasekarana@icfre.org](mailto:rajasekarana@icfre.org)

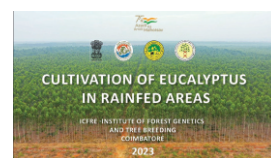


## Release of Short Films on Tree Cultivation Technologies

Three short films showcasing the latest cultivation technologies for the extensively cultivated species, Casuarina, Eucalyptus and Teak were released by Shri C.P. Goyal, IFS, Director General of Forests and Special Secretary, MoEFF&CC on 01.09.2023.

### Eucalyptus Cultivation in Dry Lands

Eucalyptus is the most widely cultivated dryland tree crop in India. This short film brings out the latest technologies involved in profitable cultivation particularly in dry areas. The film aims to establish a direct contact with the farmers of Tamil Nadu through the Scientist explaining the improved varieties and cultivation practices in Tamil.



### Holding the Sky - The Casuarina Story

Casuarina is widely grown by farmers in the Peninsular India particularly in the coastal areas. Major paper mills in south India use 18 lakh tonnes of Casuarina wood meeting 15% of total annual pulpwood requirement. This film explains in a farmer-friendly manner the best package of practices to maximize yield from the high-yielding clones released by the Institute.



### Elegance in Every Grain- Tissue Culture Teak

Clonal forestry of Teak is the latest approach to increase productivity and wood quality worldwide. IFGTB has developed protocol for mass multiplication of selected clones through tissue culture and supplied about a million plants to stakeholders. This documentary aims to raise awareness on TC teak and management practices which can yield attractive financial returns to farmers and other tree growers.



For further info: P. Chandrasekaran ✉ [chandrasekaranp@icfre.org](mailto:chandrasekaranp@icfre.org)



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## ICFRE-IFGTB Researchers Learn Advanced Bioinformatics in University of Copenhagen

ICFRE-IFGTB and the University of Copenhagen (UCPH), Denmark are undertaking a collaborative project, “Genomic selection for improved heartwood development in two commercial timber species, European oak (*Quercus robur*) and teak (*Tectona grandis*) - Fast Wood”. Dr. Ani A. Elias, a Co-PI and Ms. Maheswari Patturaj, the Senior Project Associate, visited UCPH from 3rd September to 2<sup>nd</sup> October 2023 to learn new bioinformatics tools and continue developing the prediction models as part of the project. Detailed hands-on discussions and trial analysis were conducted using teak genomic and metabolomic datasets. The bioinformatics tools discussed included Analysis of Next-Generation Sequencing Data (ANGSD), Hifiasm, Giraffe, and the use of high-performance computing (HPC) cluster.

Artificial neural network models were developed for classification and prediction of metabolomic data.



Teak trees with outstanding metabolite content both in heartwood and sapwood were discovered using the models. The models showed average prediction accuracy as high as 98% in correctly classifying a random wood sample to its group. Dr. Ani Elias and Ms. Maheswari will apply the knowledge and skills gained through the study visit to advance the progress of the ongoing collaborative project between IFGTB and UCPH.

For further info: Dr. R. Yasodha ✉ [yasodha@icfre.org](mailto:yasodha@icfre.org)

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## Training on Tree Cultivation Techniques for Higher Economic Returns



ICFRE-IFGTB organized a training programme on “Tree cultivation techniques for higher economic returns” to Subject Matter Specialists of KVKs during 20-22 September, 2023. Sponsored by the Ministry of Environment, Forest and Climate Change (MoEF&CC), this training was intended to capacity build the KVK officials so that they act as master trainers of farmers for wider dissemination of latest tree cultivation technologies. Sessions on commercial cultivation of

Sandalwood, Casuarina, Mahogany, windbreak clones, tissue culture Teak, Red Sanders, Melia, Bamboo and Ailanthus were held. The Interactive Digital Platform TreeGenie was introduced for accessing the latest information and to contact the species experts. A visit to the Forest College and Research Institute, Mettupalayam was arranged to introduce precision silviculture techniques and multi-functional agroforestry models for increasing farm income.



For further info: Dr. S. Saravanan ✉ [saravanans@icfre.org](mailto:saravanans@icfre.org)



## EVENTS: JULY - SEPTEMBER 2023

- ◆ **TRAINING** : Summer internship training (03-21 Jul); Hands on training on “HPLC & GC/MS/MS: Instrumentation, principle, function and application”(18 Jul); Hands on training on Seed Ball Technology and Seed Balls Sowing (10 & 12 July); Plus tree identification and selection procedure and seed collection, processing, seed treatment, storage, seed testing and seed certification (01 & 23 Aug); Vegetative propagation techniques of forestry tree species (04-06 Sep); Basics of molecular biology and biochemistry (07 - 08 Sep).
- ◆ **WEBINAR / MEETINGS / CONFERENCE** : Symposium on Forest Genetic Resource Conservation and Utilization (03 Jul); Artificial Intelligence (AI) tools in scientific writing and publishing (03 Jul); Pre-release stakeholders' consultation meet on forest soil health cards of Tamil Nadu (28 Aug); TreeGenie mobile App live demo (10 Aug).
- ◆ **PRAKRITI PROGRAMME** : Forest fires (11 Jul); Biodiversity and its importance (12 Jul); Urban forest (04 Aug & 29 Sep); Pollution and control measures (07 Aug); Water resource management (17 Aug); Rain water harvesting (26 Sep).
- ◆ **OTHER EVENTS** : Van Mahotsav Day (06 Jul); AGRI INTEX 2023 (14-17 Jul); International Mangrove Conservation Day (26 Jul); World Ozone Day (15 Sep); Hindi Fortnight Celebration (29 Sep).
- ◆ **APPOINTMENTS** : T. Ganesh Kumar, MTS (July)



## About ICFRE-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.

Chief Editor:

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Executive Editor:

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Editorial Assistance:

**N. Sudha, R.G. Anithaa, P. Vipin**

For further information contact

**The Director,**

ICFRE - Institute of Forest Genetics and Tree Breeding,  
(Indian Council of Forestry Research and Education)

P.B. No. 1061, R.S. Puram P.O.,

Coimbatore-641002, INDIA

Phone: +91 422 2484100

Fax: +91 422 2430549

Email: [dir\\_ifgtb@icfre.org](mailto:dir_ifgtb@icfre.org)

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