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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

New Year greetings to all!

An eventful year with scientific and technological innovations has passed ushering in a New Year with fresh challenges for the forestry sector. The current issue of IFGTB News brings you information on an important event, the National Workshop on Tree improvement, organized by IFGTB during August 2024 where long-term breeding plans for many important tree species were discussed and finalized for implementation throughout the country. Similarly, news on gender determination using genomic information, release of special postal covers depicting the importance of mangrove conservation, mistletoe infestation on neem licensing for commercial propagation of casuarina clones and regular news on celebration of important days, PRAKRITHI-the scientist–student connect programme and other outreaching events. I hope this issue carrying all above updates on ICFRE-IFGTB research and extension activities is useful to the readers. I also sincerely look forward to receiving your comments and suggestions.

Dr. C. Kunhikannan
Director, ICFRE-IFGTB

Challenges of Neem Cultivation: Addressing Mistletoe Infestation in Southern India

G. Radha Krishnan, S. Muthupandiyan, M. Amaravel, M. Akshayasri, C. Bagathsinghand A. Mayavel*

Neem is an important multipurpose tree grown in different agro-ecosystems for supporting livelihood of rural population. Its cultivation is popular among the farming community due to high demand for neem based value added products. Neem plantations are often infested by tea mosquito bug which severely affects the growth and fruit yield. Infestation by the mistletoe plant *Dendrophthoe falcata* observed in in Dindigul, Madurai and Theni districts of Tamil Nadu is a new challenge to neem cultivation. This hemi-parasitic angiosperm grows on the branches of neem trees, extracting nutrients and water from the host. The infestation reduces the canopy of the neem trees causing reduced growth, defoliation, and decreased fruit production. The mistletoe's roots penetrate the neem tree's bark,

causing mechanical damage and disrupting vascular system. Heavy infestations that completely shade out the neem canopy can even lead to the death of the neem tree. The control measures for mistletoe infestations include manual removal of the parasite plant, pruning infected branches, and applying herbicides. Early detection and quick action are crucial for preventing the spread of *Dendrophthoe falcata* and minimizing its impact on neem tree health and productivity.

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Comparative Genomic studies provide insights into gender determination in *Calamus brandisii,* an endemic dioecious rattan

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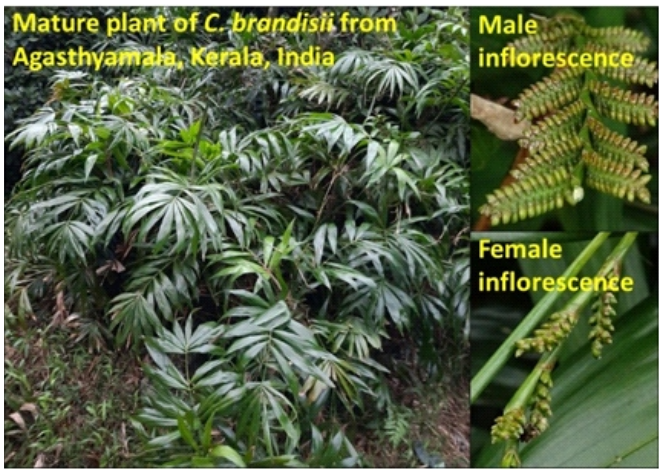
Calamus brandisii Becc. is a dioecious rattan indigenous to the Western Ghats and used in the furniture and handicraft industries. Its natural regeneration and sustainability of wild populations is declining due to various natural and human-induced factors necessitating development of strategies to conserve its genetic resources. The primary obstacle in formulating conservation strategy is its dioecious nature because ensuring gender balance in restoration programs is crucial. Early gender detection at seedling stage through markers will help in maintaining viable populations for *in-situ* and *ex-situ* conservation. The first



comprehensive comparative genomic study was conducted in the species and the estimated haploid genome size was ~691 Mb and ~884 Mb with 43,810 and 50,493 protein-coding genes in male and female genomes respectively.

Comparative analysis revealed significant genetic variation between the two genomes including 619,776 SNPs, 73,659 InDels, 212,123 Structural variants (SVs) and 305 copy number variations (CNVs). A total of 5 male-specific and 11 female-specific genes linked to the sex determining region in the species were predicted which could be potential candidates in understanding the dioecious nature of *C. brandisii*. The genomic variants identified between the two genomes could be used in development of markers for early gender identification. The probable gender-specific genes identified in this study may also provide new insights into the mechanisms of dioecy and gender differentiation in rattans.

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Special Poster Covers to Celebrate International Day for the Conservation of Mangroves

B. Nagarajan

Mangroves, the coastal intertidal tropical and subtropical forests are critical ecosystems. They are resilient and are able to grow in harsh soil and water conditions. They protect human habitations from storms, filter and recharge saline water and support innumerable life forms. IFGTB has been working in the mangrove forests located at Pitchavaram, Cuddalore District, Tamil Nadu for over a decade in collaboration with Tamil Nadu Forest Department and the State Planning Commission. The Institute initiated a species recovery programme for *Ceriopsdecandra*, a threatened red-listed mangrove. A unique plantation of hybrids between *Rhizophoramucronata* and *R. apiculata* were planted in Pitchavaram recently. To commemorate these milestone activities and to mark the celebration of International Day for the Conservation of Mangrove Ecosystem, a Philatelic Ancillary containing six special covers on the theme of "Conservation efforts in Pitchavaram Mangrove Forest' was released by Smt. NirmaladeviJaishankar, IPS, Postmaster General, Central Region, Tamil Nadu on 26th July 2024. These covers show pictures and information on the important mangrove species of *Aegiceras, Avicennia, Ceriops, Excoecaria and Rhizophora* found in Pitchavaram. It is hoped this special cover series will increase awareness on mangrove ecosystem among the general public and contribute towards their conservation.

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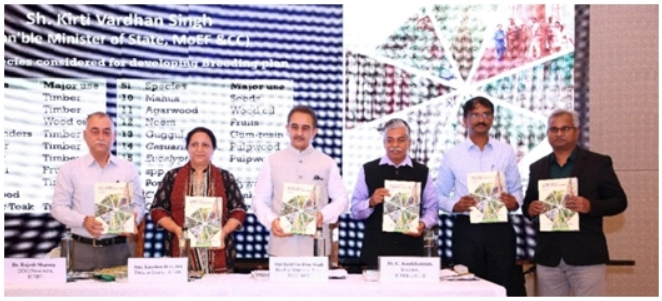
National Workshop on Tree Improvement

V. Sivakumar

A National Workshop on Tree Improvement was conducted on 20th and 21st August, 2024 to finalize breeding programmes for important tree species of the country. The workshop was organized by ICFRE-IFGTB on behalf of ICFRE with funding support from MoEF&CC, Govt. of India. It was inaugurated by Shri KirtiVardhan Singh, Hon'ble Minister of State for Environment, Forest and Climate Change, Govt. of India and presided over by Smt. Kanchan Devi, Director General, ICFRE. Around 100 delegates participated in the workshop representing CSIRO, Australia, research institutions, Universities, State Forest Departments, wood-based industries and progressive farmers. Prior to the workshop, a series of brainstorming sessions were held for developing breeding programmes by involving experts working on the selected species. The final draft breeding programmes were presented by the respective breeders during the workshop and inputs from the delegates were received to finalize the plans for Teak, Sal, Sandal, Red Sanders, Gamhar, Deodar, Chironji, Rosewood, Poplar, Gora Neem, Marwar Teak, Mahua, Agarwood, Neem, Guggul, Casuarina, Eucalyptus and Corymbia.

During the workshop, the Hon'ble Minister felicitated the breeders of ICFRE institutes who have released new varieties, progressive farmers



who achieved record wood production through new varieties and wood-based industries and private nurseries for the large-scale planting stock production of such varieties. Dr. Sandeep Saxena, IAS, Chairman and Managing Director, Tamil Nadu Newsprint and Papers Limited delivered the valedictory address underscoring the need for increasing planation productivity through partnership among research organizations, industries and farmers.

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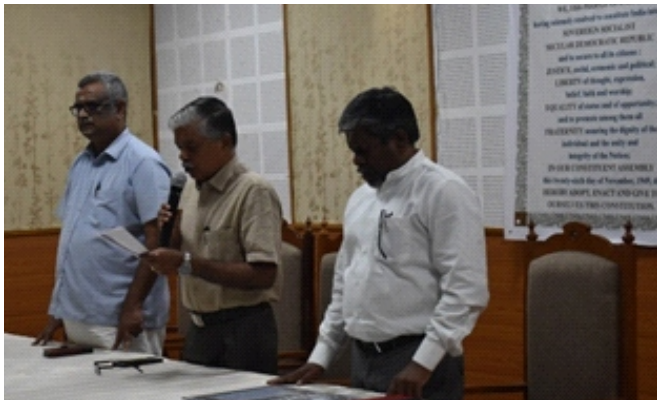
Constitution Day Celebration 2024

D. Rajasugunasekar

ICFRE-IFGTB celebrated the Constitution Day on 26th November 2024 to educate staff, research scholars, and students about various facets of the Indian Constitution. Dr. C. Kunhikannan, Director led the gathering in reading the Preamble of the Constitution in the presence of Dr. B. Nagarajan, Group Coordinator (Research). On this occasion, a special address on the values and principles enshrined in the Indian Constitution was delivered by Dr. D. Rajasugunasekar, Scientist G and Head of GTI Division. He also highlighted the significance of the Constitution in shaping the country's democratic framework and emphasized the importance of upholding its ideals. The vision and tireless efforts of the framers of Constitution, particularly Dr. B.R. Ambedkar, the principal architect of the Constitution, whose leadership and dedication were instrumental in drafting a document that ensures justice, equality, and liberty for all citizens were gratefully remembered.



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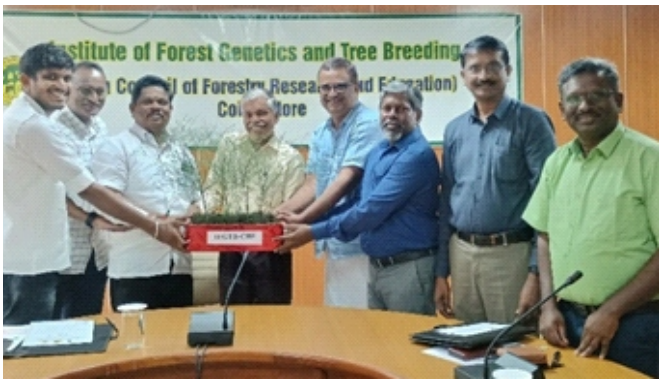
Non-exclusive License for Commercial Propagation of Casuarina Clones

A. Nicodemus and A. Mayavel*

ICFRE-IFGTB has been granting non-exclusive licenses to paper industries and private nurseries for large-scale commercial propagation and supply of high-yielding clones. The licensees having their production and supply centres in different parts of the country ensure that the new varieties are accessible and affordable to farmers in the respective regions. Considering the increased demand for planting stock of Casuarina hybrid clones in the recent years, a new non-exclusive license was granted to M/s Anand Clonal Nursery for meeting the planting material demands in Cuddalore District, Tamil Nadu. The License agreement was signed by Dr. C. Kunhikannan, Director and Shri Anandakumar, Proprietor on 23.12.2024 and will be valid for a period of five years. The Licensee has paid a one-time fee and in future will pay a royalty fee for utilizing the registered plant variety. It is hoped that the addition of a licensed nursery will benefit farmers by increasing the availability of planting stock of high-yielding varieties of Casuarina developed by the Institute.



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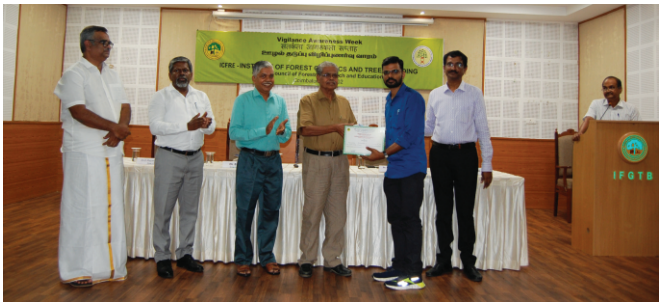
EVENTS : JULY - DECEMBER 2024

- **TRAINING :** Plantation management and *TreeGenie* App (13 Jul); Pest and diseases management and biofertilizers (24 Jul); Nursery raising and cultivation of wild edible fruit species (08 Aug & 04 Sep); Cultivation techniques of commercially important tree species (14 Aug & 04 Sep);Vegetation science and forestry (28 Aug – 04 Sep); Quality planting materials production in nursery (26 Sep). Basic techniques in plant molecular biology (25 – 29 Nov); Kanthasth 2.0 translation tool (26 Nov); Tree cultivation techniques to tree growers (06 Nov); Popularization of *TreeGenie* Mobile App (13 & 21 Nov); Seed handling techniques for important forestry species (05 Dec); Biodiversity conservation and nature education (09 – 13 Dec); Tissue culture lab establishment (09 – 13 Dec); Plant tissue culture techniques (09 -13 Dec); Forest genetic resource management and tree improvement (11 -13 Dec); HPLC: Instrumentation, principle and function (20 Dec).

- **WEBINAR / MEETINGS / CONFERENCE :** Promoting nutrient management practices (27 Aug); Research Advisory Group meeting 2024 (25 Aug); Implementation of IoT based application in forestry sector (06 Sep). New Project proposal for financial assistance from NABARD (04 Oct); Carbon sequestration potential on urban forests - Consultant from GIZ, under Indo-German support project on climate change action in India (03 Dec).

- **PRAKRITI PROGRAMME :** Bio-Prospecting and natural resources (05 Jul); Plant diversity and its importance (16 Jul); Deforestation and its impact (18 Jul); Water pollution (22 Jul); Climate change and agroforestry (01 Aug); Food chain (02 Aug); Basic technique of DNA finger printing and genetic transformation (06 Aug & 04 Dec); Tissue culture (16 Aug); Good practices of fruit collection, seed extraction. Storage and FGR conservation (05 Sep); Transpiration in plants (06 Sep); Faunal diversity (10 Sep); Marine invertebrate star fish (12 Sep). Diversity of flowering plant species of Western Ghats, Tamil Nadu (03 Oct); Glimpses of plant diversity in North West Himalayas (04 Oct); Wellness of health with traditional medicines (08 Oct); Insect pest and diseases (09 Oct); Save the ocean (13 Nov); Forest fires (18 Nov); Mangrove forest in India its management and conservation (22 Nov); Environmental protection (05 Dec); Recycling of waste materials and its benefits (06 Dec); Bioprospecting of natural resources (10 Dec).

✦ **OTHER EVENTS :** Van Mahotsav 2024 Celebration (04 Jul); Participation in agricultural trade fair "AGRI INTEX 2024 (11 – 15 Jul); ICFRE-IFGTB received 'Best Collaboration in Research Activities – 2023-24' from Tamil Nadu Biodiversity Conservation and Greening programme & Climate Change Response (30-31 Jul); PLANT4MOTHER (14 Sep); Participation in State-level farmer's mela of TNAU, Coimbatore (26 – 29 Sep); ICFRE-IFGTB EIACP Centre, Coimbatore received the Best EIACP Center of South Zone for the year 2023-2024 (07 Sep).Swatch Bharath Abhiyan (02 Oct); Observance of Vigilance Awareness Week (28 Oct– 02 Nov); Visit of Shri Sanjay Sharma, Hon'ble Minister of Environment, Forest and Climate Change & Science and Technology, Govt. of Rajasthan (27 Nov)



✦ **RETIREMENTS :** Shri K. Gireesan, CTO (Aug 2024)

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.

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