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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–Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore, has been designated as the nodal centre for the Forest Genetic Resources Management Network (FGRMN), with the responsibility of coordinating all FGR-related activities in the southern region of the country. As part of this initiative, a Database Management System (DBMS) titled *"Van Vistara"* has been developed. This digital platform serves as a vital long-term repository for documenting prioritized tree species and to maintain comprehensive information on forest genetic resources. A brief overview of Van Vistara is presented in this issue of IFGTB News. This edition includes details on the Forest Soil Health Card Portal, which hosts Forest Soil Health Cards for Tamil Nadu, Kerala, Puducherry, the Andaman & Nicobar Islands, and Lakshadweep.

Research findings on the Nutrient Use Efficiency of Casuarina Hybrids has been featured as well. These insights will contribute to developing effective nutrient management strategies for CH clonal plantations, which have expanded considerably in recent years. Additionally, this issue also explores and showcases the potential of Red Sanders as a natural wood dye.

I hope that the information presented in this issue of IFGTB News will be useful to all the stakeholders.

T. Rabi Kumar, IFS
Director, ICFRE - IFGTB

Intra-specific variation in Nutrient Use Efficiency among Casuarina Hybrid (CH) Clones

C. Buvaneswaran*, A. Nicodemus, A. Mayavel and R. Kalaiselvi

Screening clones for high productivity and desirable pulpwood traits must be complemented by assessing their nutrient use efficiency (NUE) to ensure high yields with minimal resource use. However, limited studies exist on clone-level NUE, especially in Casuarina. To address this gap, a study was conducted under the AICRP on Casuarina to evaluate the NUE of ICFRE-IFGTB released clones. NUE reflects a genotype's ability to produce biomass under given nutrient conditions and depends on factors such as root system efficiency, nutrient uptake and solubilization, internal redistribution, and cellular utilization. It is expressed as the ratio of standing biomass to above-ground nutrient content. Since nutrient availability strongly influences plantation growth in tropical regions, understanding NUE is vital for site-specific management and sustainable productivity. Rapid growth often entails high nutrient demand, making the evaluation of resource use efficiency critical for maintaining long-term ecological and production sustainability.

This study on the Nutrient Use Efficiency (NUE) of Casuarina hybrid clones was conducted in a spacing trial established at Chityala, Gopalpuram, West Godavari District, Andhra Pradesh. The trial included three clones — CH1, CH2, and CH5 — planted under six different spacing treatments: (a) 1 × 1 m, (b) 2 × 1 m, (c) 1.5 × 1 m, (d) 1.5 × 1.5 m, (e) 1.5 × 1.5 m (Quincunx), and (f) 2 × 2 m (Quincunx).

A biomass assessment was carried out by felling three representative trees per spacing treatment for each of the clone (n=54).

Fresh weights of stem and canopy biomass (needles + branches) were recorded, while root biomass was estimated from one representative tree per spacing using the dry excavation method. Wood discs collected from the three clones across all spacing treatments (n=54) were processed for nutrient analysis. Samples were oven-dried, powdered, and digested using di-acid and tri-acid methods. Nutrient analyses were completed for macronutrients - N, P and K.

Biomass sampling & collection of wood discs for nutrient analysis

Nutrient concentration data were used to estimate Nutrient Use Efficiency (NUE) for the major nutrients — Nitrogen (N), Phosphorus (P), and Potassium (K). Results showed that clone CH1 exhibited the highest NUE for all three nutrients: N (42.5 g wood g^{-1} N), P (1154 g wood g^{-1} P), and K (116 g wood g^{-1} K), followed by CH2.

Mean nutrient concentration (%) of NPK of CH clones (Age – 4 years)

	N (%)			P (%)			K (%)		
	CH1	CH2	CH5	CH1	CH2	CH5	CH1	CH2	CH5
Mean	2.41	2.62	2.72	0.09	0.12	0.13	0.88	1.07	1.23

The lowest efficiencies were recorded for CH5 - N (37.5 g wood g^{-1} N), P (822 g wood g^{-1} P), and K (82 g wood g^{-1} K). In conclusion, Casuarina hybrid clone CH1 demonstrated superior nutrient use efficiency and is therefore recommended for plantations where optimizing nutrient utilization is a key consideration.

Nutrient Use Efficiency in CH clones for NPK - Age of 4 years (g of wood per g of Nutrients)			
Nutrient	CH1	CH2	CH5
Nitrogen	42.5	38.6	37.5
Phosphorus	1154	831	822
Potassium	116	96	82

*For more info ✉ buvanesc@icfre.org

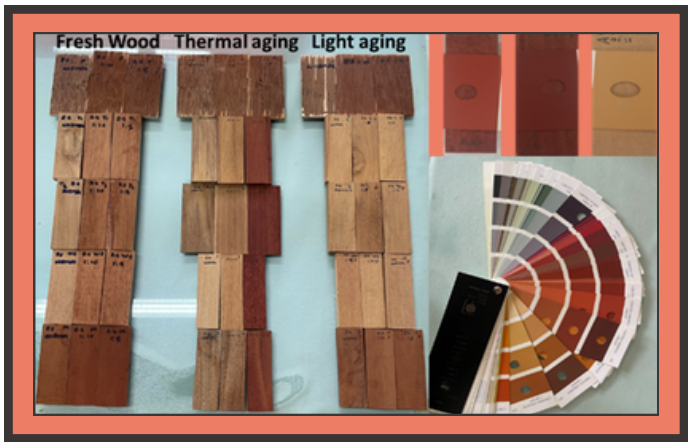
Assessing Red Sanders as a Viable and Sustainable Source for Natural Wood Dye

P. S. Naveen, N. Ashanath Fowmitha, R. Sumathi, P. Vipin, and N. Senthilkumar*

Red Sanders (*Pterocarpus santalinus* L.f.), a highly valued tree, endemic to India, is famous for its red heartwood, which has been used traditionally for medicinal, artistic, and dyeing applications. The natural dye is extracted from the Red Sanders heartwood, enhancing the wood's natural grain while offering a decorative finish. A key factor in assessing natural dyes for use in wood products is to measure the color stability with time, under varied environmental conditions. The experiments on light and thermal aging of woods viz., *Shorea robusta, Tectona grandis, Swietenia macrophylla* and plywood dyed with Red Sanders, demonstrate slight color loss under UV exposure, which can be minimized with protective coatings. In contrast, thermal aging enhances color retention, maximum darkening of the red hue instead of fading. This suggests that heat improves the dye's interaction with wood fibers, making Red Sanders dye suitable for indoor applications where warmth and controlled humidity enhance its durability.

To provide uniformity and standardization to the application of Red Sanders dye, Royal Horticultural Society (RHS) Color Chart was used for classifying the colors produced using various treatments.

Freshly Dyed Wood color changes from deep red to reddish-brown shades (165C-165A). Thermally aged wood, indicates darker red color with increased dye stability (165A-199C).Light-aged wood, exhibits a shift toward lighter brownish-red shades, varying with exposure intensity (164A-164B).



Application of natural dye with RHS standardization provides reproducibility in heritage wood restoration work, furniture making and traditional handcrafting. Future research on Red Sanders dye will focus on enhancing its UV resistance for improved light stability and exploring eco-friendly fixatives to further extend its durability in wood applications. Integrating advanced protective coatings can make it a sustainable alternative to synthetic dyes in the wood industry.

*For more info ✉ senthilnk@icfre.org

Digital Forest Soil Health Card Portal for Tamil Nadu, Kerala, Puducherry, Andaman & Nicobar Islands, and Lakshadweep launched

A.C. Surya Prabha*, S. Pragadeesh, K. Parameshwaran, M. Gopalakrishnan, A. Rajkamal and K. Poornima

Soil Health Card-based management is important to ensure the sustainability of planted forests and balanced management of soil resources. The initiative to prepare the country's Forest Soil Health Cards (FSHC) was led by the Indian Council of Forestry Research and Education, Dehradun. Under the All India Coordinated Research Project (AICRP-22 SFRSE) on *"Preparation of Forest Soil Health Cards under different Forest Vegetation in all the Forest Divisions of India"*, ICFRE-Institute of Forest Genetics and Tree Breeding, Coimbatore, has prepared the Forest Soil Health Cards for the states of Tamil Nadu, Kerala and UTs Puducherry, Lakshadweep and Andaman and Nicobar Islands. ICFRE-IFGTB's successful completion of the task marked a milestone in regional forest soil assessment.

The Soil samples (3102 Nos.) collected from 1,034 sampling points covering major forest types and vegetation classes following due collection protocols at three different depths i.e., 0-30, 30-60, 60-90 cm were analyzed for 12 soil parameters. The Forest Soil Health Card provides tailored recommendations for organic (FYM, vermicompost) and inorganic fertilizers based on soil test results for each division. It helps identify soil-related constraints and prescribes management practices. Further, a Forest Soil Health Card (FSHC) Portal was officially launched by Hon'ble Minister of Environment, Forest and Climate Change Shri Bhupender Yadav during the 31st Annual General Meeting of the Indian Council of Forestry Research and Education (ICFRE) held at the ICFRE-Forest Research Institute, Dehradun, on October 6, 2025.

Hon'ble Environment Minister Shri Bhupender Yadav launched the Forest Soil Health Card web portal

*For more info ✉ acsuryaprabha@icfre.org

VAN VISTARA - A Database Management System for Forest Genetic Resources of India

S. Lalitha, K. Keerthana, P. Devamanikandan and R. Anandalakshmi*

India's diverse forests hold a treasure trove of Forest Genetic Resources (FGRs). To effectively manage this valuable resource, VAN VISTARA, a Database Management System (DBMS), was developed. The Van Vistara portal is digitally accessible. http://portal-ifgtb-fgr.kultivate.cloud. It is a part of the National Program for the Conservation and Development of FGRs. The Institute of Forest Genetics and Tree Breeding (ICFRE-IFGTB) serves as the nodal center, coordinating FGR activities with other ICFRE institutes.

At present, information on 200 prioritized species has been documented in this platform. It includes both a mobile application and a web portal, which enables effective data collection. It offers powerful features like detailed and efficient queries, data import/export and automated report generation. The database is also designed to effectively collect data from remote locations and integrate with relevant external systems such as image analyzers, GPS devices and GIS. It also catalogs seed bank information and allows continuous data updates. To ensure data integrity and security, the system incorporates features for backup management, user management, and access rights, with all FGR data securely stored on a server and are accessible via the web portal.

This helps safeguard the valuable information for the long term. Van Vistara serves as a vital long-term repository for forest genetic resource data, strengthening conservation efforts to benefit both present and future generations.

*For more info ✉ lakshmir@icfre.org

EVENTS: JULY - SEPTEMBER 2025

- **TRAINING:** Quality Planting Material Producer (4th July); Restoring salt affected soils using indigenous green manure trees (15th July); Multifunctional Agroforestry Systems: Balancing Food-Wood Security and Environmental Sustainability (17 – 19 July); Tree Cultivation Techniques (29th August); Rashtriya Karmayogi – Large Scale Jan Seva Program (20, 25, 26, 28 & 29 August); Tree Cultivation Techniques (9th September); Micropropagation of Bamboo and Teak (19th September); Environment and Nature Conservation (2nd September).

- **MEETINGS / CONFERENCE / WORKSHOP:** Increasing Wood Production in Casuarina Plantations (3rd July); All India Coordinated Research Projects and Forest Genetic Resource Management (24 – 25 July); Regional Research Conference – Trees 2025 – Tree Improvement: Realizing Enhanced Productivity and Enhanced Sustenance (22nd August); MoU with Sri Ramakrishna College of Arts and Science, Coimbatore (1st August); Research Advisory Group (26th September); MoU with Perunthalaivar Kamarajar Krishi Vigyan Kendra (PKKVK), Puducherry (30th September).

- **PRAKRITI PROGRAMME:** National Parks and their significance for our health (2nd July); Alpine Forests (4th July); The Vital role of Forests in Maintaining a healthy planet (8th July); Floral diversity (14th July); Migration in birds (17th July); Urban Ecology (18th July); Lungs of the Earth-The crucial role of forests (25th July); Importance of Forest (7th August); Importance of Forest and Tissue Culture (11th August); Communal benefits of Trees (25th August); Importance of Wildlife (28th August); Environmental conservation and establishment of nurseries in govt. School premises (26th September).

OTHER EVENTS: Agri Intex (10 – 14 July); Independence Day (15th August); Ek Bharat Shreshtha Bharat (26th August); Tree Growers Mela (20th September); Special Campaign 5.0 (September); 12th edition of Dr. S. Kedarnath Memorial Lecture (8th September); Ek Bharat Shreshtha Bharat (29th September); Hindi Day (29th September).

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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Editorial Assistance:
N. Sudha, R.G. Anithaa, S. Pragadeesh

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