

Institute of Forest Genetics and Tree Breeding (IFGTB)



Institute of Forest Genetics and Tree Breeding
(Indian Council of Forestry Research and Education)
PB No.1061, RS Puram, Coimbatore - 641 002,
Tamil Nadu, India.

The Institute of Forest Genetics and Tree Breeding (IFGTB) was formed in April 1988 by amalgamation of the Forest Research Centre, Coimbatore and other research units of the then FRI and Colleges situated in different parts of southern India. It functions under the Indian Council of Forestry Research and Education (ICFRE), an autonomous body of the Ministry of Environment and Forests, Government of India. ICFRE's mission is "To generate, preserve, disseminate and advance knowledge, technologies and solutions for addressing issues related to forests and promote linkages arising out of interactions between people, forests and environment on a sustained basis through research, education and extension".

Mandate

Assess the genetic variability, identify varieties within the forests of Western and Eastern ghats and the Island forests, and work on the indigenous species available in the forests for productivity enhancement, biodiversity conservation besides working on selected exotic species of high economic importance and contribute to livelihood enhancement and the development of tree based enterprises and activities in the mandated states. Besides IFGTB will also work on the problems faced by the forest departments, industries and other stakeholders of the mandated states.

Jurisdiction States

Tamil Nadu, Kerala, Puducherry, Andaman & Nicobar Islands and Lakshadweep.

Infrastructure

Laboratories

- Genetic Transformation
- DNA Fingerprinting
- Genomics
- Tissue Culture
- Cell Culture
- Entomology
- Entomopathology
- Pathology
- Phytochemistry
- Phytosanitary
- Seed Testing
- Soil and Water

Facilities

- Field Stations
- Nurseries
- Vegetative Propagation Complex
- Glass House & Mist Chambers
- Open Top Chamber
- Seed Bank & Seed Processing Unit
- Herbarium
- Botanical Garden
- Library
- Computer Lab
- Microscopy & Image Analysis
- PCR Lab



RESEARCH ACHIEVEMENTS

Genetic Improvement

Genetically improved seeds which ensure 17% increase in wood production for Eucalypts and 28% in Casuarina are being supplied to forest departments, forest development corporations, wood-based industries, farmers and other end users. Second generation breeding is in progress for further improvement of productivity.

Seed orchards have been developed for *Casuarina equisetifolia*, *C. junghuhniana*, *Eucalyptus tereticornis*, *E. camaldulensis*, *Acacia auriculiformis*, *A. mangium* and *Tectona grandis*. Intra and inter specific hybrids have been produced by combining the best clones across provenances and species to achieve fast track improvement in Eucalypts and Casuarina and better fruit



yield and pulp traits in Tamarind. Hybrids are being tested in different agroclimatic zones.

In collaboration with International Neem Network (INN) international provenance trial has been established. *Azadirachta indica* trees with high azadirachtin content have been identified and Clonal Seed Orchard established for production of quality seeds and planting stock.



Molecular Biology

Molecular characterization of species, provenances and clones of Casuarina, Eucalypts, Teak and Jatropa using Random Amplified Polymorphic DNA (RAPD), Amplified Fragment Length Polymorphism (AFLP), Simple Sequence Repeats (SSR) and Inter Simple Sequence Repeats (ISSR) has been carried out. Attempts are being made to incorporate genes conferring salt tolerance into high yielding genotypes of Casuarina and Eucalypts.

Micropropagation

Micropropagation protocol has been standardized for *Tectona grandis*, *E. camaldulensis*, *E. tereticornis*, Eucalypts hybrid (*E. citriodora* x *E. torelliana*), Acacia hybrid, *Bambusa bambos*, *B. nutans*, *Dendrocalamus strictus* and *D. stocksii* and technology transferred.



Planting Stock Improvement

IFGTB has assisted the Forest Departments of Tamil Nadu, Kerala and Andaman & Nicobar Islands to establish Seedling Seed Orchards, Clonal Seed Orchards, Seed Production Areas and Vegetative Multiplication Gardens of Casuarinas, Eucalypts, Teak and Andaman Padauk.



A cost effective clonal propagation technique for mass multiplication of superior teak trees and Clonal Seed Orchard Seedlings has been developed.



Seed Handling and Seed Testing

Standardized seed handling techniques for Teak, Eucalypts, Casuarinas, Acacias, Neem, Jatropa, selected medicinal plants of commercial importance and Rare, Endangered and Threatened (RET) species. Formulated seed testing procedures for Casuarina, Eucalypts, Pongamia, Tamarind and Acacia species.

Green Technologies

Suitable tree species for reclamation of quartz sand, limestone, magnesite, fly ash dumps and bauxite mine dumps have been identified. Package of practice with soil amendments have been prescribed to the user agencies.

Potential isolates of native entomopathogenic fungi for the management of teak and casuarina stem borers have been identified. Effectiveness of mycorrhizal biofertilizers and other beneficial microbes for increased biomass production of



important tree species are under evaluation. Optimum dosages and methods of application of bioinoculants have been standardized for enhanced growth and productivity. Protocols for mass production of biofertilizers are being developed.

Agroforestry Systems

Teak, Casuarinas and Acacias based agroforestry systems have been developed and demonstrated for higher economic returns.

Productivity and Nutrient Cycling

Productivity assessed viz-a-viz ecology of site for plantations of Teak, Casuarina, Eucalyptus & Mangium. Developed prediction models for estimating biomass and volume production in plantation grown teak. Nutrient cycling studies for teak in plantations, agroforestry and natural forests have been undertaken.

Climate change research

Carbon sequestration potential for important tree species is being assessed. Response of tree species to elevated CO₂ and temperature is being researched using Automated Open Top Chambers (AOTC)

Integrated Disease and Pest Management

Key insect pest and disease problems of selected economically important tree species have been identified. Developed Pest Calendar depicting period of occurrence of key nursery pests and their integrated methods of management involving surveillance, cultural practices, conservation and augmentation of natural enemies, use of plant based extracts and need based application of non persistent and safer chemicals.



Conservation

Species recovery research on selected RET medicinal plants in Silent Valley and Kolli hills Medicinal Plant Conservation Areas (MPCAs) carried out for developing *in situ* conservation strategies. A bambusetum containing 17 species is being maintained in the Forest campus. IFGTB maintains a Botanical Garden recognized by the Botanical Garden Conservation International, UK and the Indian Botanical Garden Network, Lucknow.

Mangrove and Coastal System Management



The Institute has raised nurseries and plantations of *Casuarina equisetifolia* to an extent of 60 ha in Tsunami devastated areas of Andaman Islands. IFGTB has taken up studies to comprehend reproductive biology and breeding systems in endangered mangrove taxa such as *Bruguiera* and *Ceriops*.

Package of Practices for Bamboos

Model plantations of seven bamboo species have been raised in different agroclimatic zones of Tamil Nadu in 100 ha to assess the performance of tissue culture raised vis a vis seed raised plants. The species include *B. balcooa*, *B. bambos*, *B. tulda*, *B. vulgaris*, *B. nutans*, *D. strictus* and *D. stocksii*. Studies are underway to optimize the requirement of fertilizer, irrigation and spacing for different bamboo species.

Registering Varieties of Forest Tree Species in India

The Institute has developed guidelines for DUS (Distinctness, Uniformity and Stability) testing of *Casuarina equisetifolia*, *C. junghuhniana*, *Eucalyptus tereticornis* and *E. camaldulensis* with financial support from Protection of Plant Varieties and Farmers' Rights Authority, Government of India for registration of varieties in forestry species.

Extension

IFGTB, through its strong extension cell, disseminates various technologies developed to end users including farmers through trainings and demonstrations at Van Vigyan Kendras (VVK). VVKs have been established in Tamil Nadu (Coimbatore), Kerala (Kuthiran, Thrissur) and Andaman and Nicobar Islands (Port Blair). The Institute has



extended training on nursery techniques and management, use of biofertilizers, insect pest management, Tree Borne Oilseeds, Bamboo Cultivation and Management etc. to staff of Forest Departments and nursery workers of Tamil Nadu and Andaman and Nicobar islands.



A demo village has been adopted in Kandiyur, Mettupalayam for on-field demonstration of technologies developed by the Institute.

Education

IFGTB, a centre of FRI University, Dehradun and Bharathiar University, Coimbatore - conducts Ph.D. programmes in forestry and allied fields.

Capacity Building

Client Oriented training programmes and refresher courses are designed and conducted right from grass root level workers to senior executives of State Forest Departments, Forest Development Corporations, other Govt. Departments like Agriculture and Horticulture etc., farmers, NGOs, wood based industries, academic and research institutions.

Frontline staff upto Range Forest Officers

1. Establishment of SPAs / SSOs / CSOs
2. Clonal Technology in Forestry
3. Advanced nursery management and macropropagation techniques.
4. Quality seed procurement, processing and storage.
5. Afforestation of mine spoils and usage of fly ash.
6. Isolation, Identification and Mass Production of Bio-fertilizers and bio-inoculants
7. Plant identification, field botanisation and herbarium techniques
8. Vegetation survey techniques.

Senior executives

1. Clonal forestry and tree improvement strategies.
2. Biotechnology and tissue culture.
3. Mangrove Management for field personnel
4. Advances in Forestry Research

Scientists and Researchers

1. Advanced techniques in genomics and molecular biology
2. Advanced techniques in phytochemistry.
3. Advanced techniques in Bioinoculants.

Farmers, Village Level Workers and NGOs

1. Capacity Building and value addition in Agroforestry
2. Cultivation and management of Tree Borne Oilseeds
3. Quality Planting Stock Production
4. Isolation, Identification and Mass Production of Bio-fertilizers and bio-inoculants
5. Integrated Pest and Disease Management

Public Services

1. DNA Fingerprinting of plant materials.
2. Analysis of soil, water and plant samples.
3. Plant identification.
4. Sale of improved high quality seeds and planting material.

Consultancies

1. Clonal propagation of teak, eucalypts, casuarinas, neem, bamboos and tamarind.
2. Raising high yielding pulpwood plantations.
3. Rehabilitation of mine dumps.
4. Production and application of biofertilizers.

Phytosanitary Certificate

Ministry of Agriculture, Government of India has authorised the Institute for issuing Phytosanitary Certificates for plant and plant products for exporting.

Gass Forest Museum

H. A. Gass, Conservator of Forests Coimbatore Circle in 1902 established the Museum and H. E. Amphill the Governor of Madras named it as Gass Forest Museum on 18th September 1905. This unique museum consists of about 4000 collections representing wildlife, entomology, timber, non timber forest produce, arms, weapons, mycology, geology ethnology and wood craft.

Fischer Herbarium

The Fischer Herbarium has 15,881 plant specimens of 3259 species belonging to 1329 genera and 172 families. A century old collections by eminent botanists including CEC Fischer, T.F. Bourdillon, M. Rama Rao, P.F.Fyson, A.W. Lushington and C.A. Barber are maintained.

The Director

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