



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

During the last 3 decades, the Institute of Forest Genetics and Tree Breeding, Coimbatore, has made significant progress in breeding trees and releasing clonal varieties. The Institute initially focussed on fast growing tree species like *Eucalyptus* and *Casuarina*. The current issue traces the introduction of *Casuarina junghuniana*, and the breeding efforts that has culminated in making this species extensively planted thereby benefitting the farmers and the paper industries alike. The expertise gained from these species is helping accelerate breeding efforts in longer generation indigenous species that have different end uses. The recent efforts made in this direction in *Thespesia populnea*, *Haldina cordifolia*, *Gmelina arborea*, *Ailanthus excelsa* and *Tectona grandis* are presented in this issue. IFGTB has also raised to the occasion of meeting local research requirement of the Smart City programme by documenting the phytodiversity in and around the lake in Signanallur, Coimbatore. The information would serve as a baseline document for monitoring the flora and fauna that are under the onslaught of urbanisation induced land use changes in addition to changes in climate. Thus, this issue of IFGTB News provides a glimpse of the ongoing research activities at IFGTB that could be of interest to our stake holders viz., the farmers, paper industries, and the conservationists alike.

Dr. C. Kunhikannan
Director, IFGTB



Silver Jubilee for Introduction of *Casuarina junghuhniana* in India by IFGTB

A. Nicodemus

Casuarina junghuhniana (CJ), introduced from Indonesian Islands entered its 25th year in India during July 2020. The first recorded introduction of *Casuarina equisetifolia* (CE) was in Karwar during 1868. More than 80 years later an interspecific hybrid clone between CJ and CE was introduced from Thailand in 1951. The next major introduction was that of CJ provenances from Indonesia and East Timor in 1996 by the Institute of Forest Genetics and Tree Breeding. Most of the nearly half a million hectares of casuarina plantations in India can be traced to any of these introductions.

The seed lots of CJ were provided under the Species Improvement Network Programme (SPIN) of the UNDP/FAO Regional Project FORTIP with collaboration from the Australian Tree Seed Centre, CSIRO. Two international provenance trials were planted in July 1996: one in Panampalli field station in Kerala State (inland) and the other in Union Territory of Pondicherry (coastal). Six provenances from Wetar and Timor islands showed the best survival and growth which marked the arrival of a new species for planting in India. A part

Casuarina junghuhniana introduced 25 years ago by IFGTB has become an extensively cultivated tree benefitting farmers and paper industries.

of the original introductory trial with majestic trees is still surviving in Panampalli.

CJ is not only faster growing than CE, it also has many desirable qualities like drought tolerance, disease resistance, prolific seed production, high germination and coppicing ability. All these traits helped CJ to become a widely planted species within a short period of ten years. Propagation of juvenile coppice shoots from outstanding trees

resulted in the release of commercially successful clone CJ-9 in 2014. Casuarina clonal plantation area rapidly expanded due to the adaptability and impressive growth of CJ9. Wood

production increased to 150 tonnes per hectare in a 4-5 year rotation period. Paper industries included CJ9 in their farm forestry programme and helped a large number of farmers realize increased farm income. The availability of two *Casuarina* species with the same chromosome number ended up in creation of interspecific hybrids between them. The hybridization programme started in 2004 resulted in the release of five interspecific hybrid clones (CH- series) in 2017. Owing to their faster growth than all the currently grown seedling and clonal accessions of the parent species, the CH clones are rapidly expanding in planting area.

The successful introduction of CJ was made possible only with the tireless efforts of many



people. Dr. C. Kunhikannan, Director, IFGTB, and all his predecessors are thanked for supporting the casuarina improvement programme. Dr. K. Vivekanandan (late), the Chief Technical Advisor of FORTIP is gratefully remembered for his services. Mr. Khongsak Pinyopusarerk organized the seed collection in highly challenging conditions and has continually guided the casuarina improvement programme at IFGTB. Dr. K. Gurusurthi, the then

Director of IFGTB, Mr. P. Pugazhendi and Dr. R.S.C. Jayaraj, Silviculturists, Dr. B. Gurudev Singh and Dr. B. Nagarajan, the co-planters of trials in Panampalli were sources of encouragement. Mr. S. Shanmugam, Mr. V. Dananjeyan, Mr. K. Gopi, Mr. A. Arumugam, Mr. K.T. Moorthi, Mr. P. Vipin, Dr. B. Kannabiran and Dr. P. Devaraj were highly supportive for establishing and maintaining the trials.

New Initiatives for Improving Indigenous Trees

A. Mayavel, D. Rajasugunasekar, Kannan C.S. Warriar, V. Sivakumar and A. Nicodemus

Plantation productivity of Acacia, Casuarina, Eucalyptus has been substantially increased through systematic selection and breeding programmes benefitting forest department, wood-based industries and farmers. However, most of the indigenous trees have low productivity due to lack of improvement efforts. IFGTB's recent initiatives on native tree improvement are briefly discussed below.

Thespesia populnea

Thespesia populnea (Family Malvaceae) is a multi-purpose tree used for timber, fodder, green manure and afforesting

water-logged and salt-affected areas. The timber is highly sought in rural areas for house construction and making furniture, agricultural implements and carvings. It helps in meeting the rural timber needs as it is widely available and affordable. *Thespesia* generally has a crooked stem form which limits timber production. IFGTB selected nearly 140 trees having straight stems and vigorous growth from south India. They were

Genetic Improvement of indigenous species having timber, pulp, fodder, medicinal and manure values.

vegetatively multiplied and planted as clone banks and clonal trials. Early observations showed that certain accessions possessing the desired traits of straight stem, axis persistence and fast growth, have the potential for release as tested clones in the near future.

Haldina cordifolia

Haldina cordifolia (Family Rubiaceae) is a multipurpose tree found in moist deciduous forests and possess high quality timber and various medicinal properties. Many phytochemicals and medicinal compounds have been

identified from this tree. IFGTB has identified around 90 Candidate Plus Trees with fast growth and straight stems from different locations in



Kerala. With a few more selections, it is planned to establish clone banks and progeny tests in multilocation to carry forward the improvement programme.

Gmelina arborea

Gmelina arborea (Family Lamiaceae) is a fast-growing tree with many uses like timber, pulp, fodder, manure and medicinal value. Its timber is widely used for construction, furniture, handicrafts, plywood and particle board manufacturing. Roots are used in Ayurvedic medicine to treat many ailments. IFGTB has selected about 150 trees with superior growth and stem form from south India, and obtained seeds of around 100 trees from Eastern and North Eastern regions to establish multilocation progeny trials. Sixty trees were vegetatively propagated and a vegetative multiplication garden was established. Clones propagated through mini-cutting techniques were deployed in multilocation clonal tests. Early evaluation of these trials has helped in identifying a few clones with superior growth and stem form for their public release in the near future. Initiatives are being taken up to cultivate *Gmelina* under multitier cropping system along with coconut, banana and pepper.



Ailanthus excelsa

Ailanthus excelsa (Family Simaroubaceae) is highly preferred for match splints and fodder. Its wood has desirable qualities like colour, wax stability, consistent burning and splinting ability for use as matchwood. Due to poor domestic production, the industry is importing softwood from Europe to meet the demand. IFGTB has established provenance-progeny trials with a broad genetic base. Outstanding trees of the best



provenance / family were vegetatively propagated and deployed in multilocation clonal test. Clonal propagation techniques are being evolved for selected clones showing early vigorous growth. DUS (Distinctiveness, Uniformity and Stability) testing guidelines were developed to facilitate the registration of new varieties under the PPVFR Act, 2001.

Tectona grandis

Tectona grandis (Family Verbenaceae) is well known for its high quality wood that is used for furniture, door and window frames, flooring, panelling, wharves, bridges and ship building. Progeny and clonal trials of teak have been subjected to intensive evaluation to select the best accessions with superior adaptability and end-use characters for public release. Shortlisted clones are assembled in vegetative multiplication garden



for further propagation for testing and plantation development. On-farm test plots were developed in combination with superior clones of *Casuarina* to tend the plants for attaining a straight and smooth stem. DUS testing guidelines have been finalized and submitted to the PPVFR Authority for approval and notification.

Outlook for future

The new initiatives are expected to result in periodic release of high-yielding varieties of native tree species for increasing plantation productivity. Similar programmes for other indigenous species like *Azadirachta indica*, *Chloroxylon swietenia*, *Mitragyna parvifolia*, *Pterocarpus santalinus* and *Santalum album* are also in the pipeline.

IFGTB Outreach

Phytodiversity in and around Singanallur Lake, Coimbatore

Prasanna, R., Balaji, R., Thamilarasi, R. and Kunhikannan C

Lakes are wetland ecosystems that offer several ecological goods and services. They support diverse and unique habitats for flora and fauna. Urbanisation puts them under severe stress due to pollution, over exploitation of water and reduced drainage into lakes resulting in habitat modification. Singanallur lake is one among the 9 lakes in Coimbatore, and covers an area of 165 acres and is located within the city limits. Considering the pressures of the rapidly growing city on this unique habitat for several flora and fauna, and to sustain city's water resources, the Coimbatore City Corporation has declared the lake as an Urban Biodiversity Conservation Zone. To support this initiative, IFGTB took up studies to document phytodiversity in and around Singanallur lake with support of an NGO, the Centre for Urban Biodiversity Conservation and Education (CUBE). The study resulted in documenting 453 plant species belonging to 304 genera and 84 families around the lake. The vegetation was dominated by herbs (193

The documented phytodiversity of Singanallur lake would serve as a baseline for monitoring the impact of urbanization on the flora and fauna in the wetland.

species), followed by trees (144 species), shrubs (56), climbers (55) and lianas (5). The flora consists of 328 medicinal, 86 ornamental, 72 edible and 46 fodder species. Top ten families contributed 60 % of the species in the lake area. Leguminosae comprised the most abundant family with 64 species. Thirty nine families were represented by only one species. Among the grasses, *Brachiaria mutica* (Dutch grass) was the most dominant, and served to protect the bunds by spreading along the inner bunds. The lake vegetation serves as the nesting or hiding places for the birds, herpetofauna and small mammals, and it supports 116 bird species including pelican, painted stork and white ibis, reptiles like flapshell turtle, butterflies, moths and dragon flies. The herbarium specimens of the plant species were prepared and deposited in the IFGTB's Fischer herbarium. The information on the biodiversity of Singanallur lake would serve as baseline for further monitoring of the flora and fauna in the wetland.



Events: April - June 2020

- ◆ **SEMINAR (Webinar):** “High yielding Casuarina Clones” (05th Jun), “Agroforestry Models and Casuarina Windbreak Clones” (12th Jun), “Cultivation Practices in *Gmelina arborea* (Kumil)” (19th Jun), “Grooming Tribal Youth As Change Makers Facilitating Development Through GOAL (Going Online As Leader)” (19th Jun), “Cultivation practices in Cadamba” (26th Jun), “Advances in Genomics -Implications and Perspectives” (30th Jun).
- ◆ **PRAKRITI:** 101 School students and 282 College students participated in the PRAKRITI awareness program “*Online Knowledge Series - Talk to Scientist Program*” (Apr - Jun).
- ◆ **OTHER EVENTS:** Digital Observance of Earth Day, 2020 (22nd Apr), International Day for Biological Diversity (22nd May) [Image: Poster on "Threats to Indian Biodiversity" released by the Director, Dr. C. Kunhikannan], World Environment Day 2020 (5th Jun).



About IFGTB

The Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore, is a national institution of the Indian Council of Forestry Research and Education (ICFRE), an autonomous council under the Ministry of Environment, Forest and Climate Change, Government of India. 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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