✦ Vol 1 ✦ No. 2 ✦ Oct. 2019

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

"IFGTB News" aims to familiarize the institute's research efforts and accomplishments with the stakeholders like the State Forest Departments and Forest Development Corporations, wood based industries, forestry research and academic institutions, nursery growers as well as farming communities.

Forests are a rich resource of valuable biomolecules. IFGTB has been mining these resources to develop bioproducts for the benefit of tree planting farmers. This second issue of "IFGTB News" highlights the products developed at IFGTB like the biopesticides "Tree PAL^{H} " and "Crawl Clean", the growth promoting "Tree Rich Biobooster", and the natural colourant "Tara Red". This issue also highlights the extension activities along with other recent events. The information provided would enable their wider dissemination and benefit the farmers.

Dr. S. Murugesan
Director, IFGTB

IFGTB Product: Biopesticides

Tree PAL^{H}: Biopesticide with Phytotonic Effect for use in Agriculture and Forestry Crops

About 1 million ha of forest area and 25-30 % agriculture crops are reported to be destroyed by insect pests annually. Hence, management of insect pests in domesticated forestry and agriculture lands are important. Synthetic insecticides have emerged as major tools in pest management. However, the toxic residues in soil, water resources and crops affect public health. Hence, there is a need to develop ecologically sound, environmentally safe and economically viable pest management strategies. Biopesticides have the potential to replace about 2-3 % of conventional synthetic insecticide use in the country. In India, there are about 227 registered biopesticides most of which are microbial insecticides. Neem formulation is the only oil based biopesticide available in the market. The seed oil based biopesticide named Tree PAL^{H} has been developed as an alternative to chemical pesticides for the management of insect pests of forestry and agricultural importance.

Seed-oil based formulation is becoming popular for managing insect pests of agriculture and horticulture crops.

To spray over 1.5 to 2.0 lakhs seedlings in the nursery, 100 ml of Tree PAL^{H} is to be mixed with 10 l of water. For 1 ha of 1-2 years old plantations, 500 ml of Tree PAL^{H} may be needed.

Tree PAL^{H} has been found to be very effective against paddy leaf roller, showing 60-70 % reduction in population when compared to synthetic insecticide. It was also noticed that there was no further infestation of leaf roller after application of the biopesticidal formulation. Furthermore, the phytotonic effect of the Tree PAL^{H} was also recorded in paddy. A crop-protection agent with phytotonic effect will be attractive to farmers as it would bring down the cultivation cost. Tree PAL^{H} has been distributed to 650 farmers in Tamil Nadu for the management of insect pests of agricultural crops viz., brinjal, paddy, turmeric, sugarcane, green leafy vegetables etc. and found to be very effective.

Crawl Clean : Green Insecticide for Controlling Papaya Mealybug

The papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink (Hemiptera : Pseudococcidae), native to Mexico and Central America, is a minor hemipteran insect found to colonize diverse plant species within a community of agri-horti-forestry ecosystem. Its host range includes more than 100 species of plants. In India, it was recorded during July 2008 on papaya (*Carica*

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papaya L), jatropha (*Jatropha curcas* L.) and tapioca (*Manihot esculenta* Crantz) besides incidence on flower crops, vegetables and fruits. It has been found to attack tree crops like *Ceiba pentandra, Pongamia pinnata, Dalbergia latifolia, Terminalia arjuna, Gmelina arborea, Samanea saman, Pterocarpus marsupium, Calophyllum inophyllum, Strychnos nux-vomica, Justicia beddomei, Ficus religiosa, Anogeissus latifolia, Swietenia mahogani, Thespesia populnea, Azadirachta indica, Peltophorum pterocarpum, Erythrina indica, Sapindus emarginatus, Erythrina pubescens* and *Madhuca longifolia* in Tamil Nadu.

A biopesticide formulation was developed from leaf powders of *Melia dubia*, *Pongamia pinnata, Aristolochia bracteata, Justicia adhatoda* and *Vitex negundo*. Appropriate proportion of finely sieved leaf powders of these plants were mixed with the sticking agent and packed. Packet containing 200 g of leaf powder is to be mixed with 10 l of hot water and boiled for 10 minutes, followed by filtration using fine mesh cloth after cooling. The volume is then made upto 10 l using water and sprayed over the leaves infested with mealybug. Mortality or shrinkage of mealybugs could be observed within 12 h of application.

IFGTB Product: Food colourant

Tara Red : Natural Colourant from Red Tamarind

Colours from natural sources have been used to colour food, fabrics and cosmetics since ancient times. However, the use of synthetic colours have become common due to their more appealing look. However, natural colours are considered safer to the synthetic colours. The red fruited variety of tamarind known as *Tamarindus indica* var. *rhodocarpa* (red tamarind) is a rare variant with limited distribution in southern states of India.

The anthocyanin pigments from unripened red tamarind fruits are rich in antioxidant properties and are advocated as a potential bio-colourant for use in food and cosmetic applications. It is also used in textile industries as mordant.

The Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore has established a germplasm bank at Kurumpapatti, Salem with 32 individuals of red tamarind identified from different parts of Tamil Nadu and Karnataka. They provide a high quality resource of natural colourant for cosmetics and food. Anthocyanin, extracted from fruits of red tamarind showed a high potential for use as a natural colourant due to their attractive red and purple colours, and water solubility that allows their incorporation into foods. “Tara Red” the natural colourant developed from the unripe fruits of red tamarind gives a sour and sweet taste and could be used in preparations of cake toppings, jam, lip stick, nail polish and bindhi without addition of any preservatives.

IFGTB Product: Instant Potting Mix

Tree Rich Biobooster : Organic Growth-Promoting Potting Mixture

Plantation forestry has tremendous scope for rural livelihood improvement and meeting the raw material requirements of wood based industries. More than 70 % of wood supply in the country comes from farm lands, which have given boost to setting up of private nurseries in rural areas to make available the required quality planting stock. Consequently, there is a huge demand for sand and soil, which are major ingredients of conventional potting mixture for raising nurseries. Various nursery practices are available individually for pests, diseases and nutrient management. Growth promoting substances and insect pest and disease control also entail additional expenditure. Integrated nutrient management using appropriate growth media would improve plant health thereby reducing pest and disease incidences.

To attend to these issues, a potting medium "Tree Rich Biobooster (TRB)" was developed. It is purely organic and with out sand or soil. "Tree Rich Biobooster" is made from decomposed organic materials derived from coir pith waste, vegetable and flower wastes abundantly available in Coimbatore, thereby addressing solid waste management issues of the city. The composts are added in appropriate composition and made into a disc/ pellet of 100 mm/ 25 mm size with 150-160 g weight. The EC is 0.23 and the pH is 6.4. On adding 700 ml water to the disc, it expands to 20 cm height and 17 cm diameter.

"Tree Rich Biobooster" developed in a pilot scale has been introduced to terrace gardens and home gardens. About 5000 pellets have been distributed to 100 beneficiaries in various districts of Tamil Nadu, and the product has received very good feedback. With no sand or soil, it has less weight and requires less irrigation (once in a week), thereby making it suitable for terrace gardens. An assured growth improvement of 30-40 percent could be obtained.

Organic instant potting mixture alternative to conventional nursery medium for nursery, home, kitchen and terrace gardens.

"Tree Rich Biobooster" (TRB), is a nutrient rich comprehensive potting mix and a suitable alternative to conventional potting mixture. It is a suitable medium for raising nursery, terrace garden and home garden to grow vegetables/ plants. It has been developed for the production of healthy, quality planting stock for farm and plantation forestry, and results in reduction of fertilizer and irrigation requirements, decreased nursery cost and enhanced growth performances and crop yields.

Extension activities

Popularization of Windbreak Clones of Casuarina released by IFGTB: in collaboration with ICAR-KVK, Karamadai

IFGTB, Coimbatore, had released five superior clones (WBC-1, WBC-2, WBC-3, WBC4 and WBC-5) of *Casuarina junghuhniana* for providing protection against windstorms to horticultural and agricultural crops. In light of recent damages reported to banana crops due to wind, a training on "Windbreak Tree Varieties" was organised on 24th July, 2019 for Banana growers under the Van Vigyan Kendra (VVK), Coimbatore, in collaboration with ICAR-KVK, Karamadai. A total of 62 farmers participated and were taken to Idikkarai, Coimbatore, for on-farm trial demonstration of IFGTB windbreak clones. A brochure on "Windbreak Tree Varieties" (Tamil) of IFGTB was released by the Director, IFGTB.

Participation in Agricultural Trade Fairs : in collaboration with CODISSIA, Coimbatore

IFGTB participated in the 19th edition of Agricultural Trade Fair "AGRI INTEX 2019" at the CODISSIA Trade Fair Complex, Coimbatore from 12-15th July, 2019. More than 6000 people including farmers, agripreneurs, technology developers, marketing consultants, scientists and technicians had visited the IFGTB stall. Popularization and sale of IFGTB clones, commercial products viz., biofertilizers, biopesticides, growth boosters and ICFRE/ IFGTB publications were carried out. Mobile App on "Disease Management in Forest Nurseries & Plantations" was also popularised.

Dignitary Visits

Visit of Shri. R. Kamalakannan, Hon'ble Minister, Govt. of Puducherry

Shri. R. Kamalakannan, Hon'ble Minister for Agriculture & Farmers Welfare, Education & DRDA, Govt. of Puducherry visited IFGTB on 15.07.2019 and addressed the Scientists and Officers. The institutes research and outreach activities were appraised to the Minister.

Events: July – September 2019

- **Memorandum of Understanding (MoU):** IFGTB signed MoU with Tamil Nadu Forest Plantation Corporation (TAFCORN), Tiruchirapalli for collaborative research in plantation forestry (19th Jul).
- **Monthly Periodical Seminars:** "Conservation and Management of Deltaic Mangroves" (26th Jul), "Molecular Breeding Approaches for Tolerance to Abiotic Stresses" (03rd Sep) and "Plant Volatiles in Forest Pest Management" (30th Sep).
- **Meetings:** "Assessment of Adaptive Genetic Diversity in Teak and Sandalwood to Guide Conservation and Genetic Improvement Efforts" (19th Jul), "Riverscape for Forestry Interventions to Rejuvenate River Cauvery" (26th Sep), "Stakeholder's meet: KAU, KVK, Thrissur & VVK Kuthiran, Kerala" (27th Sep).
- **Awareness programmes:** "Prevention of Sexual Harassment of Women at Workplace" (22nd Aug), "Skin and Organ Donation" (22nd Aug), "PRAKRITI" (Aug- Sep).
- **Trainings/ Demonstrations:** "Plant Tissue Culture" (4th-5th Jul), "Capacity Building on the Development of Tree Rich Biobooster" (15th Jul; 16th Sep), "VAM Bio-fertilizer Production Technique" (8th- 9th Aug), "Bio-fertilizer Production and Application Methods in Nursery and Field" (22nd Aug), "Characterization of Forest Genetic Resources and its Conservation" (28th-29th Aug), "Bioprospecting: Instrumentation Methods and Phytochemical Analysis" (19th & 20th Sep) and "Biological Diversity Act, 2002" (25th-27th Sep).
- **Days celebrated:** World Bamboo Day, International Day for the Preservation of Ozone Layer, Hindi Day, Independence Day.
- **Repatriation:** Dr. Mohit Gera, IFS, Ex-Director, IFGTB, repatriated to J&K cadre on 2nd Aug and took over charge as PCCF, J &K Forest Department.

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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