SFRTI RAIPUR

BIOTECHNOLOGY DIVISION

Presented by

Mr. Sourabh Gupta (JRF)
Mr. Tarunkumar Patel (Intern)

MANDATES

1. To standardize the protocols for tissue culture techniques for Teak.
2. To standardize the protocols for tissue culture techniques for bamboo species (*Bambusa balcoa*).
3. To standardize the protocols for tissue culture techniques for important medicinal plant species (Kalihari, Chitrak etc)
4. To standardize the protocols for tissue culture techniques for RET species. (*Plumbago zeylanica*, *Celastrus paniculatus etc)*
5. Mass multiplication of *Bambusa balcoa*, Teak and some important species.
6. Training on protocols and mass multiplication.
7. Collaboration with Expert institutes/universities to conduct workshops, seminars or related topic.

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
1. To standardize the protocols for tissue culture techniques for Teak.	1. Shirin, F, Sarkar A.K., Ansari S. A. and Mandal A. K. 2002. **Standardization of sterilizing treatment for in vitro propagation of half-sib families of teak**. Teaknet 26: 1-3. 2. Shirin, F, Rana P.K. and Mandal A.K. 2005. **In vitro clonal propagation of mature Tectona grandis through axillary bud proliferation.** Journal of Forest Research 10: 465-469. 3. Ansari, Shamim & Kumatr, Sandeep & Sharma, Sushma & Shirin, Fatima. (2001). CLONAL PROPAGATION OF TEAK.	**Tropical Forest Research Institute, Jabalpur**	**Name** : Dr. Fatima Shirin **Designation** : Scientist "F" & Head, Genetics and Tree Improvement Division **Subject Area** : Tissue Culture of Forestry Species, micropropagation of bamboos, forest trees and medicinal plants **Email** - shirinf@icfre.org	To standardize the protocols for tissue culture techniques for Teak.*(Tectona grandis)*

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
1. To standardize the protocols for tissue culture techniques for Teak(*Tectona grandis*).	1. R. Mahalakshmi, M. V. Vineetha, Rekha R. Warrier. 2018. **Optimising gelling agents, light source and after-care to commercialise teak tissue culture.** Plant Tissue Cult. & Biotech. 28(1): 13-24.	**Institute of Forest Genetics and Tree Breeding, Coimbatore**	**Name** : Dr. Rekha R Warrier **Designation** : Principal Scientist Institute of Forest Genetics and Tree Breeding, **Ph:** 91 422 2484167 (O); 91 422 2431954 (R) Mob: 91 9442918647 **Email-** rekha@icfre.gov.in; rekhawarrier@gmail.com	To standardize the protocols for tissue culture techniques for Teak.*(Tectona grandis)*
	1. **Project** : Documentation of population demography and genetic structure of teak for developing sustainable conservation strategies and resource management **2.** **PROJECT** : Strengthening of tissueculture lab, Identification of genetically superior bamboo species	**Kerala Forest Research Institute, Peechi, Kerala**	• **Dr. R. Yasodha,** Scientist G Email -yasodha@icfre.org • **Dr. EM Muralidharan** Phone: 91 - 487 - 2690192 Mobile: 9446936961 e-mail: emmurali@kfri.res.in , emmurali@gmail.com	

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
2. To standardize the protocols for tissue culture techniques for bamboo species (*Bambusa balcoa*).	1. Shirin, F and Rana P.K. 2007. **In vitro plantlet regeneration from nodal explants of field grown culms in *Bambusa glaucescens* Wild**. Plant Biotechnology Reports 1: 141-147. 2. Shirin, F, Arya S. and Arya I.D. 2003. **Effect of nutrient media on in vitro shoot multiplication and rhizogenesis in *Bambusa vulgaris*** Schard ex Wendl. Indian Journal of Tropical Biodiversity 11: 57-62.	**Tropical Forest Research Institute, Jabalpur**	**Name** : Dr. Fatima Shirin **Designation** : Scientist "F" & Head, Genetics and Tree Improvement Division **Subject Area** : Tissue Culture of Forestry Species, micropropagation of bamboos, forest trees and medicinal plants **Email** - shirinf@icfre.org	To standardize the protocols for tissue culture techniques for bamboo species (*Bambusa balcoa, Bambusa nutans, Bambusa tulda and Dendrocalamus strictus*).

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
2. To standardize the protocols for tissue culture techniques for bamboo species (*Bambusa balcoa*).	1. **PROJECTS** : Monitoring and evaluation of tissue culture grown plants of *Dendrocalamus asper* in different forest divisions of Madhya Pradesh 2. **PROJECTS :** Production of *Dendrocalamus asper* through tissue culture technique 3. **PROJECT :** Multilocational cum provenance trials of important forestry and bamboo species in different forest divisions of Madhya Pradesh	**SFRI, Jabalpur**	**Name** **Dr. S.K. Tiwari** **Designation** Scientist-E and Division Head Email address drsktiwari1963@rediffmail.com Mob. No. 917566372511	To standardize the protocols for tissue culture techniques for bamboo species (*Bambusa balcoa).*

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
3. To standardize the protocols for tissue culture techniques for important medicinal plant species(*Plumbago zeylonica,Gloriosa superba,Kaempferia galanga*).	1. Rekha R. Warrier, Geeta Joshi and A.N. Arunkumar (2019). **DNA fingerprinting in industrially important medicinal trees(*Aegle marmelos, Commiphora wightii, Emblica officinalis, Gmelina arborea, Oroxylum indicum and Santalum album)* Ann.** Phytomed., 8(1):19-35. **2. Chapters : W**arrier, K.C.S. and Warrier, R.R. 2019. **Sacred Groves – Repositories of Medicinal Plants. In: Medicinal Plants Cultivation and Conservation (Amruth, M., Raghu, A.V., Raveendran, V.P., Kunhi, M.K.V. and Viswanath, S. Eds).** KSCSTE - Kerala Forest Research Institute, Peechi, Kerala, pp 72-102	**Institute of Forest Genetics and Tree Breeding, Coimbatore**	**Name** : **Dr. Rekha R Warrie**r **Designation** : Principal Scientist Institute of Forest Genetics and Tree Breeding, **Ph:** 91 422 2484167 (O); 91 422 2431954 (R) Mob: 91 9442918647 **Email-** rekha@icfre.gov.in; rekhawarrier@gmail.com	Creation of superior germplasm bank of medicinal plant at SFRTI.

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
3. To standardize the protocols for tissue culture techniques for important medicinal plant species(*Plumbago zeylonica,Gloriosa superba,Kaempferia galanga*).	1. Shirin, F, Kumar S. and Mishra Y. 2000. In vitro plantlet production system for *Kaempferia galanga*, a rare Indian medicinal herb. Plant Cell Tissue Organ Culture 63: 193-197.	**Tropical Forest Research Institute, Jabalpur**	**Name** : Dr. Fatima Shirin **Designation** : Scientist "F" & Head, Genetics and Tree Improvement Division. **Subject Area** : Tissue Culture of Forestry Species, micropropagation of bamboos, forest trees and medicinal plants **Email** - shirinf@icfre.org	Creation of superior germplasm bank of medicinal plant at SFRTI.

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
3. To standardize the protocols for tissue culture techniques for important medicinal plant species(*Plumbago zeylonica,Gloriosa superba,Kaempferia galanga*).	1. S. Mohana Priya, S. Indhu, R. Kalaiselvi and Rekha R. Warrier (2020).Agrobacterium-mediated transformation in medicinal trees (*Azadirachta indica, Semecarpus anacardium* and *Gmelina arborea*). Ann. Phytomed., 9(1):27-31. 2. **Chapter** : J. Prasanth Jacob and Rekha R. Warrier. 2019. Insect Pests of Medicinal Plants and their Management. Institute of Forest Genetics and Tree Breeding, Coimbatore. 64p.	**Institute of Forest Genetics and Tree Breeding, Coimbatore**	**Name** : Dr. Rekha R Warrier **Designation** : Principal Scientist Institute of Forest Genetics and Tree Breeding, **Ph:** 91 422 2484167 (O); 91 422 2431954 (R) Mob: 91 9442918647 **Email-** rekha@icfre.gov.in; rekhawarrier@gmail.com	Creation of superior germplasm bank of medicinal plant at SFRTI

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
4. To standardize the protocols for tissue culture techniques for RET species. (*Plumbago zeylanica, Celastrus paniculatus* etc)	1. PROJECT: Conservation of RET species of Chhattisgarh - Plumbago zeylanica and Celastrus paniculatus and production of quality planting material	**Tropical Forest Research Institute, Jabalpur**	**Name** : Dr. Fatima Shirin **Designation** : Scientist "F" & Head, Genetics and Tree Improvement Division **Email** - shirinf@icfre.org	Development of tissue culture protocols for RET species of chhattisgarh
	1. PROJECT : Genetic diversity assessment using molecular characterization, chemoprofiling, standardization of micropropagation and cryopreservation protocol of four RET species. (Berberis aristata, Swertia angustifolia, Embelia tsjeriam-cottam, Saraca asoka)	**SFRI, Jabalpur**	**Name** **Dr. S.K. Tiwari** **Designation** Scientist-E and Division Head Email address-drsktiwari1963@rediffmail.com Mob. No. 917566372511	

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
5. Mass multiplication of *Bambusa balcoa*, *Tectona grandis* and some important species.	1. Hamalton, Tresa & Khannam, Almas & Bhuvaneshwari, M & Chandrakala, D. (2022). **Vegetative Propagation Techniques for Bamboo Species (*Dendrocalamus hamiltonii* and *Bambusa bambos*): A Review.**	**Institute of Wood Science and Technology (IWST)**	**Smt. Tresa Hamalton** Scientist- D Silviculture & Forest Management Division Tel No.: 0091-80-22190137 Fax No.: 0091-80-23345029 E-mail: tresa@icfre.org	Mass multiplication of commercially important bamboo species.
	1. Dutta Mudoi, Dr & Saikia, Siddhartha & Goswami, Adrita & Gogoi, Animesh & Bora, Debashish & Borthakur, Mina. (2013). Micropropagation of important bamboos (*Bambusa arundinacea, B. nutans, B. tulda, B. vulgaris* and *Dendrocalamus asper*): A review. AFRICAN JOURNAL OF BIOTECHNOLOGY. Vol. 12(20). 2770-2785. 10.5897/AJB12.2122.	CSIR-NEIST, Jorhat, Assam	Name : Dr.(Ms)Kalpataru Dutta Mudoi Designation : Technical Officer Contact Detail : CSIR-NEIST, Jorhat-785006, Assam, +91-9435351809 Email id : kalpataru_dm@yahoo.co.in, dutta_k@rrljorhat.res.in	

PRIORITY RESEARCH TOPIC FOR SFRTI WITH REFRENCE

Division Mandate	Review of related research work	Concern institute/University	Priorities of concerned scientist	Priority research topic for SFRTI
5. Mass multiplication of *Bambusa balcoa*, *Tectona grandis* and some important species.	1. Arya, S., Sharma, S., Kaur, and Arya, I.D. (1999). Micropropagation of *Dendrocalamus asper* by shoot proliferation using seeds. Plant Cell Reports 18 : 879-882. https://link.springer.com/article/10.1007/s002990050678	**Arid forest research institute (AFRI)**	**Dr.I.D.ARYA** Head & Scientist-G Forest Genetics and Tree Breeding Division Phone: +91-291-2729101(O); +919460745663 E-mail: aryaid@icfre.org	

Training to concern scientist/staff/from reputed institutes

1. Micropropagation of Bamboo (IWST)

- Course Director : Ms. Tresa Hamalton
- Date : 24 – 28 June 2024 (5 days)
- Contact : 080-22190137, 9360473165, tresa@icfre.org
- Fees : Rs. 15,000/- (With boarding and lodging) + 18% GST ; Rs. 10,000/- (Without lodging facility) + 18% GST
- **Course Content** : Preparation of media; Aseptic techniques & Instrumentation; Explant collection, processing, surface sterilization and inoculation techniques; In vitro shoot initiation and multiplication; In vitro and ex vitro rooting; Clonal fidelity testing; Potting mixture preparation & hardening of rooted plants

Training to concern scientist/staff/from reputed institutes

2. Plant Molecular Biology Techniques(IWST)

Course Director : Ms. Tresa Hamalton

Contact : 080-22190137, 9360473165, tresa@icfre.org

Dates : 25 – 29 November, 2024 (5 days)

Fees : Rs. 15,000/- (With boardstrongng and lodging) + 18% GST; Rs. 12,000/- (Without lodging facility) + 18% GST

Course content:Equipments used in molecular biology; DNA extraction from different plant tissues and its quantification using nanodrop; Agarose and Polyacrylamide gel electrophoresis for DNA separation; Applications of PCR and target gene amplification; DNA barcoding for species identification

ACTION PLANS

1. **Training programmes**
2. **Workshop**
3. **Seminars**
4. **Consultancy and Services**
5. **Reasearch areas for future work**

TRAINING PROGRAMME(Short term and long term)

SHORT TERM TRAINING

1. Training in Plant tissue culture techniques and its applications.(participants level-1week/15days)
2. Training on Quality Planting Material Production in Nursery (QPM) .(participants level-1week/15days)
3. One day training programme on “Cultivation techniques of Commercially Important Tree Species” .(participants level-1week/15days)
4. Collaborative ONE WEEK Training on Value Addition of Commercial Bamboo, Tamarind and other minor forest produce.
5. Junior Rangers - Connecting Students with Nature" for students of Kendriya Vidyalaya.
6. Tissue culture plant growers meet.

LONG TERM TRAININGS

1. Training on Tissue Culture techniques & Application in forestry - **03 month**
2. Basics of Plant Molecular Biology **-01 month**
3. Model Nursery Techniques and Propagation Method – **01 month**

SEMINARS AND WORKSHOPS

SEMINARS/WEBINARS

1. Germplasm Conservation: Methods for conserving plant genetic material through tissue culture for future use or research.
2. Clonal propagation of industrially important species
3. Techniques for storing plant cells, tissues, or embryos at very low temperatures for long-term preservation using cryopreservation.
4. Biotech Startup workshop

WORKSHOPS

1. Microbial Culture Techniques on growing, isolating, and maintaining microorganisms like bacteria, fungi, and algae.
2. Identification of Microorganisms: Basic microbiological techniques for identifying microbial cultures, including Gram staining, microscopy, and biochemical tests.

CONSULTANCY AND SERVICES

1. Isolation, identification and mass production of **Mycorrhizal fungi** (ecto and endo)'.
2. **Investigation on genetic variability** of traits of economic importance of forest species.
3. Development of **mass propagation** techniques for superior/ elite materials and their clonal evaluation.
4. Availablity of microscopy services in SFRTI.
5. Vegetative propagation unit.
6. Mist chamber
7. Tree growers Mela

Reasearch areas for future work

1. Selection of Plus Trees of Bael,teak and khamhar.
2. Establishment of Germplasm bank of Teak.
3. Establishment of Clonal Seed Orchard (CSO) of Teak (Tectona grandis)
4. Tissue culture and establishment of field trials of tissue culture raised clones of Tectona grandis
5. Genetic Diversity analysis and population structure of important species
6. Propagation of Bamboo species using culm-branch cuttings
7. Genomics Assisted Conservation of Teak and Sandal Genetic Resources
8. Clonal propagation of industrially important species.