



MINISTRY OF FORESTRY
FOREST DEPARTMENT
AND
INTERNATIONAL TROPICAL TIMBER ORGANIZATION
(ITTO)



*“Ex-situ and In-situ Conservation of Teak (*Tectona grandis* Linn F.)
to Support Sustainable Forest Management”*

ITTO Project PD 270/04 Rev.2 (F)

REPORT ON TRAINING COURSE ON MOLECULAR AND
BIOTECHNOLOGICAL TECHNIQUES IN TREE
IMPROVEMENT AT KERALA FOREST RESEARCH INSTITUTE,
INDIA



27 February to 8 March 2008

*Daw Kyu Kyu Thin
Technical Officer*

and

*Daw Tin Tin Mu
Technical staff*

ITTO Project PD 270/04 Rev.2 (F)

Acknowledgements

The training course was conducted with the approval of the Project Steering Committee and financial assistance from the ITTO Project PD 270 / 04 Rev. 2 (F). We would like to express our gratitude to U Soe Win Hlaing, Director-General of Forest Department and U San Lwin, Director-General of Planning and Statistics Department for their kind permission to attend the training at KFRI, India. We also like to thanks Dr. Hwan Ok Ma, Projects Manager, Reforestation and Forest Management, ITTO for having approved and facilitated the training. Special thanks go to Dr. Nyi Nyi Kyaw, National Project Manager and Staffs of ITTO Project PD 270 / 04 Rev.2 (F) for their kind arrangement for the training.

The patient of the teaching staffs/ Scientists of the Biotechnology Division, KFRI, India, their willingness to share their in-depth knowledge and their valuable suggestion for future research programme, is also gratefully acknowledged.

**Report on the training course on
Molecular and Biotechnological techniques in tree improvement
at Kerala Forest Research Institute, India.**

1. Introduction

In accordance with the selection of the Executing Agency, two project staffs (Daw Kyu Kyu Thin, Technical Officer and Daw Tin Tin Mu, Technical Staff) have attended the training course of Molecular and Biotechnological Techniques in Tree Improvement at Kerala Forest Research Institute, (KFRI) India, from 28 February to 8 March, 2008.

2. Objectives

1. To enhance the capacity of the project staff in the field of micropropagation technique of teak.
2. To upgrade the existing teak tissue culture laboratory through technical assistance of the trained project staff.
3. To get experience in advance technology on teak tissue culture works which is also important for the successful implementation of the project.

3. Expected output

Technical staffs from the Forest Department who work at the tissue culture laboratory will be trained and production of tissue culture seedlings will be carried out both for research and field implementation.

4. Duration

10 days (28 February to 8 March)

5. Programme

- | | |
|------------------------------|---|
| 27 February (Wednesday) | - Departure from Yangon Arrival at Kochi International Airport |
| 28 February 08 (Thursday) | - Briefing about the course by Dr. M. Balasundaran, scientist, Biotechnology Discipline, course coordinator and Dr. E. M. Muralidharan, Scientist, Tissue culture discipline. - Briefing about the course arrangements by Dr. K. C. Chacko, Programme coordinator and Dr. E. J. Maria Florence, scientist, Extension and Training Division. - Lecture on Tissue Culture techniques for tree improvement by Dr. E. M. Muralidharan |
| 29 February 08 (Friday) | - Practical demonstration on preparation of stock solution and basal media, Autoclaving and glassware preparation and sterile procedures for inoculation and subculture of teak and bamboo by Ms. Saritha and Mr. Krishna Das. - Practical work on preparation of stock solution by trainees. |

- 1 March 08 (Saturday)
- Lecture on application of molecular techniques in tree improvement by Dr. M. Balasundaran
 - Lecture on PCR technique, Molecular Markers and DNA fingerprinting by Dr. M. Balasundaran.
 - Practical demonstration on Protein extraction and DNA extraction and preparation of casting gel by Mr. P. M. Sreekeneth.
 - Practical work on Protein and DNA extraction by trainees.
- 2 March 08 (Sunday)
- Visit to KFRI Sub-center Nilumbur, Teak museum, Conolly's plot (Oldest teak plantation in India)
- 3 March 08 (Monday)
- Visit to the Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore.
 - Lecture on PCR technique, Molecular Markers and DNA fingerprinting by Dr. M. Balasundaran
- 4 March 08 (Tuesday)
- Lecture on DNA extraction and RAPD marker by Dr. M. Balasundaran.
 - Practical demonstration on RAPD marker method by using Teak DNA by P.M. Sreekeneth
 - Lecture on Microsatellites markers and ISSR markers by Dr. M. Balasundaran.
 - Practical demonstration on ISSR marker by using Dalbergia DNA by Ms. R. Ramya.
- 5 March 08 (Wednesday)
- Lecture on RFLP AFLP markers by Dr. M. Balasundaran
 - Practical demonstration on RFLP marker by using Teak DNA by P.M. Sreekeneth.
 - Lecture on Molecular markers and gene diversity and Restriction enzymes, Gene sequencing and sequence analysis by Dr. M. Balasundaran.
 - Practical demonstration on RFLP marker by using Rhizobium DNA by Ms. R. Ramya
 - Practical demonstration on RFLP marker by using Elephant DNA by Ms. C. Arathy
- 6 March 08 (Thursday)
- Lecture on marker assisted selection and use of computer software for population genetic data analysis by Dr. M. Balasundaran genetic data analysis by Dr. M. Balasundaran.
 - Practical demonstration on use of of computer software for population genetic data analysis by using popgene software for teak clone DNA marker by P.M. Balasundaran and Mr. P.M. Sreekeneth.
- 7 March 08 (Friday)
- Lecture on use of molecular marker in clonal seed orchard establishment and maintenance by Dr.M. Balasundran
 - Discussion on overall lectures and practical on Molecular marker by Dr. M. Balasundaran and Mr. P.M. Sreekeneth.
 - Closing Ceremony.

- 8 March 08 (Saturday) - Lecture on Genetic engineering in tree crop improvement by Dr. E. M. Muralidharan
 - Practical demonstration on genetic engineering in tree crop improvement (insertion of Agrobacterium plasmid into teak callus tissue) by Dr.E.M. Muralidharan and Mr. Krishna Das.
- 9 March 08 (Sunday) - Departure from KFRI

6. Training Course

There are two sessions in training course. One session is lecture and other is practical demonstration. Biotechnology consists of micropropagation and molecular marker. The lectures on micropropagation were given by Dr. E. M. Muralidharan and practicals were demonstrated by Dr. E.M.Muralidharan, Ms. Saritha and Mr. Krishna Das. After their demonstration practical works had to be carried out by the trainees practical work for micropropagation comprised of multiple shoot propagation of teak and bamboo and genetic engineering such as the plasmid of Agrobacterium inserted into teak callus tissue and induced to form somatic embryo cell from the Agrobacterium inserted callus tissue.

Lectures on Molecular marker methods, application of molecular marker methods for genetic diversity detection was given by Dr. M. Balasundaran. Practical demonstrations on molecular marker methods were given by Dr. M. Balasundaran, Mr. P.M Sreekenth, Ms. R. Ramya, Ms. Anupama and Ms. C. Arathy. Molecular marker methods are isozyme and DNA marker such as RAPD, AFLP, RFLP and ISSR. Genetic analysis between individuals can be calculated base on the variation of banding patterns obtained from isozyme and DNA marker. The interpreting banding patterns was made by using popgene computer software for genetic data analysis.

7. Total cost of training course

| | |
|---|-----------|
| a) Air fares (Yangon - Kochi Round ticket) | 1700 US\$ |
| b) Training fees (for 2 persons) | 2022 US\$ |
| c) DSA 11 days @ 44US\$ (for 2 persons) | 880 US\$ |
| d) Miscellaneous (for 2 persons) | 200 US\$ |
| Total | 4802 US\$ |

8. Conclusion

The training course on molecular and biotechnological techniques in tree improvement was organized from 28 February to 8 March, 2008 at KFRI, India. The trainees have got an opportunity to study the advanced techniques for tree improvement programme. The training course has broadened the knowledge on micropropagation methods and genetic analysis methods for teak tissue culture propagation for both of us and is very beneficial to the Department as well as to the country.



Preparation of culture medium for teak micrpropagation



Loading the DNA sample in the wells of casting gel



Meeting with Director of Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore



Meeting with Scientist, Tree breeding Division, Institute of Forest Genetics and Tree Breeding



Visit to Forest Museum at Coimbatore



Visit to Bioresource Gardens, Nilumbur



Visit to teak nursery from Bioresource Garden at Nilumbur



Visit to central nursery from KFRI subcenter At Nilumbur