ITTO-TEAK IN MEKONG

Bi-monthly online

Teak Mekong Newsletter

October 2021- Volume 3(5)

Inside this issue

TEAK Mekong Newsletter support and facilitates teak networking in the Mekong sub-region through ITTO member countries and partners, and support sharing lessons of the project results through short news release, occasional papers, project related teak-based research and development information. The bi-monthly newsletter is released online through TEAKNET webpage www.teaknet.org and co-hosted by Kasetsart University, Thailand.

For more information please contact,

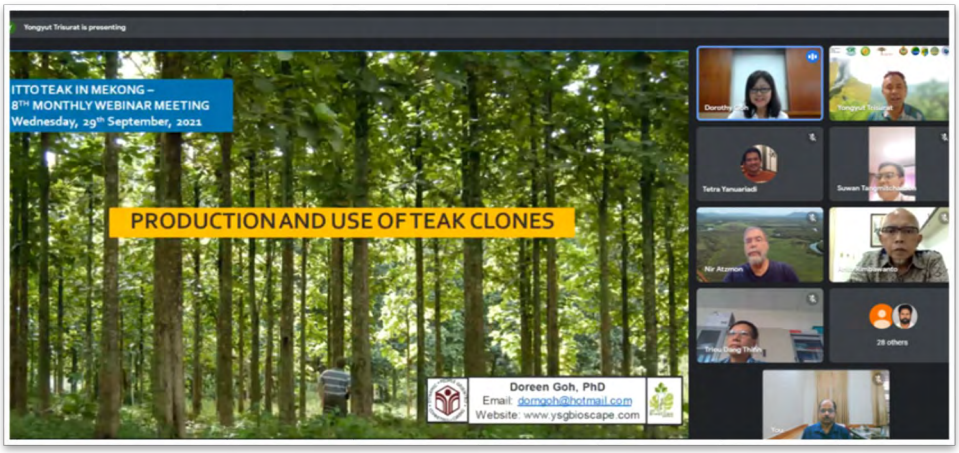
PK Thulasidas (thulasidas.teak@gmail.com)
or
Yongyut Trisurat (fforyyt@ku.ac.th)

ITTO-BMEL Teak Project

8th Monthly Webinar

Wednesday, 29th September 2021

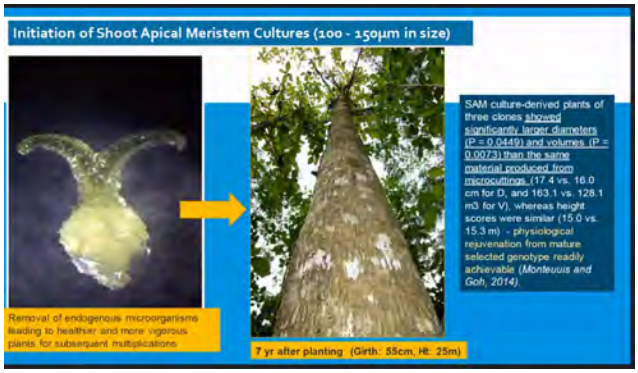
The 8th Webinar Series of ITTO-BMEL Project was conducted on 29th September 2021 in collaboration with TEAKNET- India. The webinar topic was on *"Production and Use of Clonal Teak"* given by Dr. Doreen Goh, Managing Director, YSG Bioscape Sdn Bhd Sabah, Malaysia. The webinar was moderated by Prof. Yongyut Trisurat, Project Team Leader of ITTO Teak Mekong, Kasetsart University, Bangkok and opening remarks was delivered by Dr. Tetra Yanuariadi, ITTO, Japan.



Dr. Doreen Goh started her talk on the joint tissue culture project of the forestry division of Sabha Foundation and CIRAD, Montpellier, France on the R & D on teak initiated way back in 1993. - mainly focussing on mature selected plus trees with economically important traits for higher yield. The origin of plus trees selected were from Solomon islands based on superior phenotypical characteristics such as fast growth rate, straight bole, improved vigour, minimal branching, wood quality, resistance to pest and diseases. These plus trees in Solomon islands are no more available now as it was cut down; however, standing trees are available in Sabah as stock plants for tissue culture - 8 clones were selected for mass production.

Teak clonal plantations are rapidly expanding over the past several years. The mass production of teak clones, especially from mature selected trees has for a long time been hindered by the lack of efficient technology. The situation changed dramatically during 1990s with development of efficient nursery and tissue culture techniques adapted to the mass production of clones by rooted cuttings and microcuttings of any selected teak tree, regardless of its age.

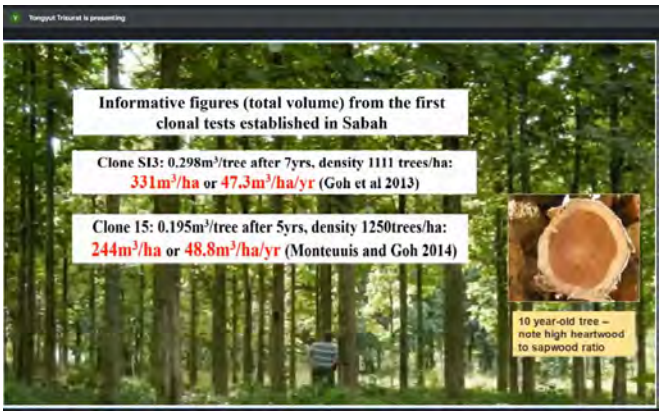
The easier and more efficient procedure for mass producing teak clones in tissue culture conditions is micropropagation by axillary budding. This is also the safest way for guaranteeing the genotypic conformity required for true-to typeness. Apical shoot meristem culture was also found efficient and showed significantly larger diameters than the same material produced from microcuttings as shown in below picture.



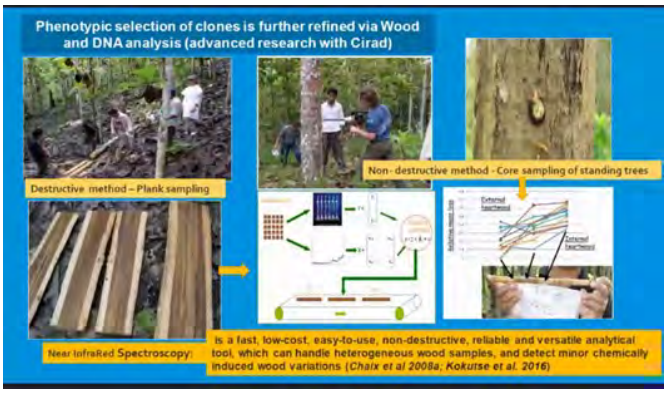
Once the tissue culture protocols were standardised, extensive field testing was undertaken in different site conditions in Sabah to verify the efficacy of *in vitro* technique and compared the pros and cons of seed derived and clonal plants before deploying the YSG clones to different destinations across the world.

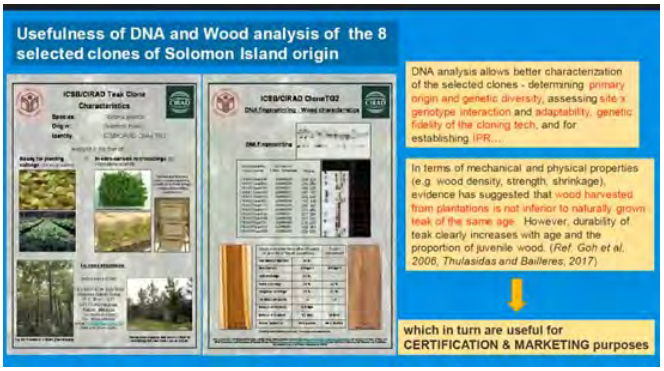
Comparative average height (H) and diameter at breast height (DBH) of the 8 YSG clones in two different planting sites in Lahad Datu, Sabah, 5 years after planting. Clone identity was changed. N: number of trees recorded.

Clones	Site 1			Site 2		
	N	H (m)	DBH (cm)	N	H (m)	DBH (cm)
D	20	15.61	15.31	30	13.79	17.73
X	20	14.61	13.67	30	13.42	17.18
Z	20	13.88	14.44	30	13.71	17.82
O	20	16.6	15.58	30	15.31	14.62
C	20	15.28	16.82	30	13.54	17.26
E	20	15.68	18.06	30	13.7	17.88
K	20	17.45	15.34	30	13.27	14.88
S	20	17.28	17.99	30	13.54	17.23
Mean	160	15.84	15.90	240	13.78	16.82
MAI		3.2	3.2		2.8	3.4



The phenotypic selection were further refined with wood and DNA analysis through non-destructive easy to use methods by employing NIR spectroscopy in collaboration with CIRAD, France. Usefulness of DNA analysis of teak clones were tested for their site x genotype interaction, adaptability and genetic fidelity of clones. In terms of physical and mechanical properties (density and strength properties), the evidence suggest that wood harvested from clonal plantations are not inferior to natural teak of the same age. However, durability of teakwood increases with age of the trees and proportion of juvenile wood. This method is useful for Certification and Marketing of clonal teakwood in the long run.



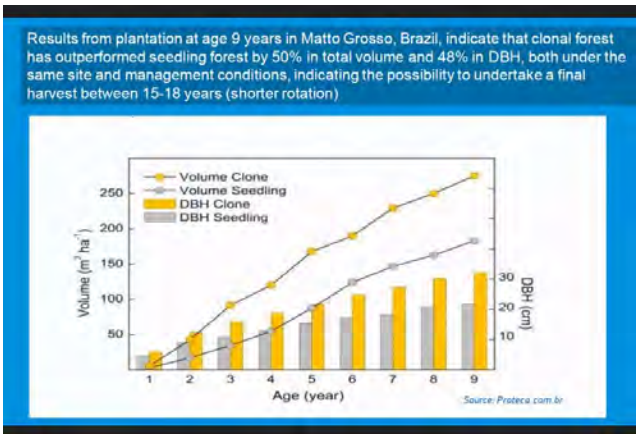


Notwithstanding higher initial investment, the advantages of mass propagating teak clones by tissue culture of mature selected genotypes compared to conventional nursery methods are of greater overall efficiency, especially utilising much smaller surface area regardless of the climatic conditions. Moreover, tissue cultured clones, being pathogen-free can be sent overseas across the globe in the absence of any phytosanitary restrictions. Coupled with superior performance in growth and yield of cloned teak, the growth and investment in commercial clonal teak plantations of shorter rotations accelerated in many countries under the humid tropics over the past several years.

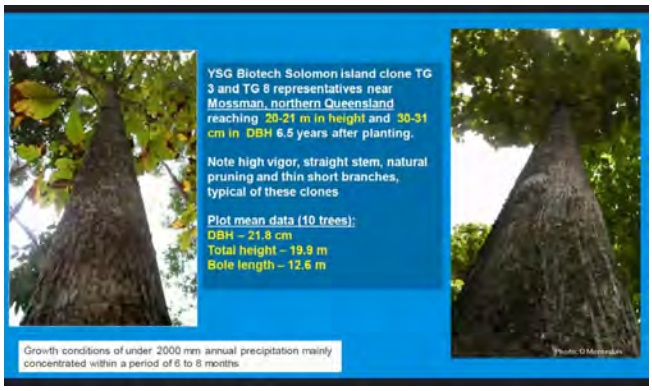
After more than 25 years of activity of YSG Bioscapes is still increasingly supplying broad variety teak clones of known genetic origin and genetically improved seeds from progeny/provenances trials all over the world.

The growth performance and yield of YSG clones deployed in different countries was evaluated by taking data from different planting sites as shown in below pictures.

In Mato- Grosso Brasil (planted in 2003)



In Northern Queensland, Australia



In Java, Indonesia

In Mexico

In Cambodia

In West Africa

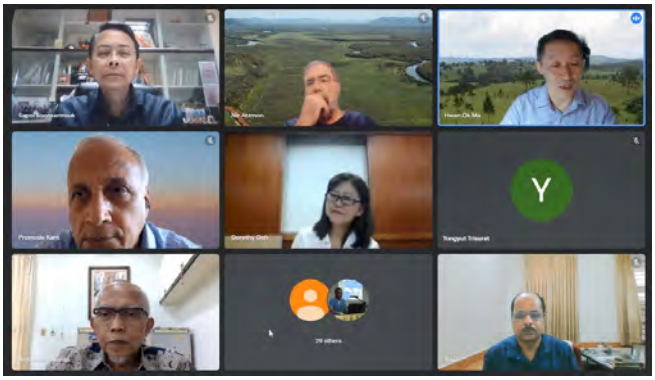
Clones can be used for establishing monospecific plantations, but also to be intercropped with other species of a different kind within agroforestry systems or even silvopastoralism. Examples are shown below from Malaysia with border planting of teak clones with Oil Palm and intercropping with Rubber in Ivory Coast for alternative income generation.

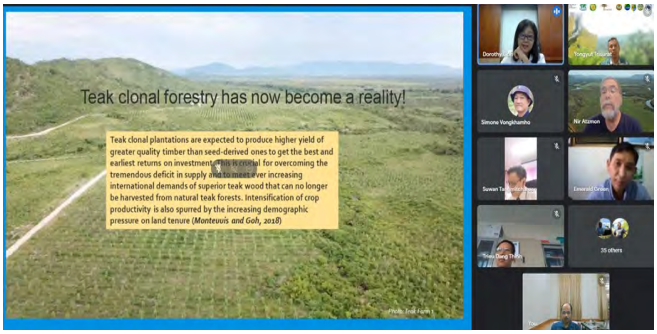
After the talk, a 20-30 minutes panel discussion was held moderated by Dr. MA Hwan-ok of ITTO-Japan with the following panellists: Dr. Anto Rimbawanto, Indonesia; Dr. Suwan Tangmitcharoen, Thailand; Dr. Dang Thinh Trieu, Vietnam; Mr. Chheang Dany, Cambodia and Dr. PK Thulasidas, India.

14:50-15:20	Panel discussion	
	Moderator	Dr. MA Hwan-ok, Senior Project Manager, ITTO, Japan
	Panelists	Prof. Dr. Anto Rimbawanto, Centre for Forest Biotechnology and Tree Improvement, Indonesia
		Dr. Suwan Tangmitcharoen, Chair of PTC, Royal Forest Department, Thailand
		Dr. Dang Thinh Trieu, Vietnamese Academy of Forest Sciences (VAFS), Hanoi, Vietnam
		Mr. Chheang Dany, Dy. Director General, Forestry Administration, C ambodia
		Dr. PK Thulasidas, TEAKNET, India
15:20-15:35	Open Q&A	
15:35-15:40	Wrap-up and closing remarks	

Conclusion

For teak, the high value tropical timber species planted worldwide, clonal forestry has demonstrated its capacity to overcome most of the limitations associated with seedling derived plantations. It is now possible to establish fast-growing and uniform teak clonal teak stands of enhanced yields, high wood quality and commercial value on short rotations. The clonal option appears to be the best way to maximise returns of investments for the fast-growing teak plantations. Teak clonal forestry can thus become a success story providing outstanding genotypes that can be wisely and reliably selected to be mass clonally multiplied and deployed in suitable planting sites.





The recorded presentation is available with ITTO- Teak Mekong project leader

Prof. Yongyut Trisurat
Email: fforyyt@ku.ac.th

Propagation of Teak for Clonal Testing: Part III (Planting)

Ms. Somporn Khumchompoo[1] & Ms. Chumnun Piananurak[2]

[1]Scientist, Maegar Silvicultural Research Station,
Forest Research and Development Office,
Royal Forest Department (RFD), Thailand

[2]International Consultant, ITTO-TEAK Project

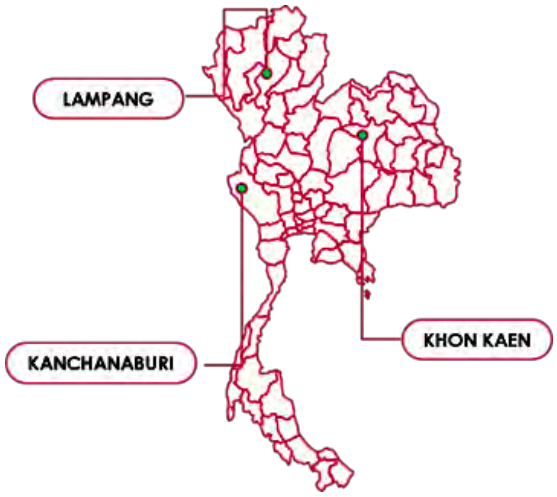
Email: chumnunpian@gmail.com

Thailand has already established teak clonal test of about 400 plus trees in the improvement program. There are about 100 plus trees remained untested. Clonal test of the remaining plus trees is an activity proposed by a demonstration site at Maegar Silvicultural Research station, Phayao Province, Thailand as part of ITTO Teak Project in Mekong.

The objective of clonal test is to evaluate genotypic value of plus trees by planting in the same environment. The phenotypic characterestics that is observed in the clonal test is controlled by genetic. We also evaluate genotype and environment interaction on plus trees by testing at multilocational field trials.

Planting site and site preparation

Teak clonal testing sites are at 3 provinces: Lampnag, Kanchanaburi and KhonKaen as shown in below map.



These three planting sites are at (1) Dong Lan Silvicultural Research Station (RFD) Chumpae district, Khonkan province; (2) Krengkawia plantation under Forest Industry Organisation (FIO), Thongphaphum district, Kanchanaburi province and (3) Thungkwian plantation (FIO), Hangchat district, Lampang province. The area covers in each site is about 2.4 ha (15 rai). Clear felling and slash burning was undertaken as the usual practice in conventional forest planting. Staking was done with the clone number wired together in the lay out plan.



Seedling transportation to planting site

It is important to harden the seedling prior to transportation. The hardened seedlings could be transported safely by pickup truck. To prevent messing up clone numbers, every seedling is tagged with clone number properly labelled and must be put into the same bag.

Checking of clone number was done when loading the seedling up in the truck and unloading at the planting site. Avoid damage of seedlings exposed to direct sunlight burn and wind during transportation by covering it with shade net. Seedlings were measured before planting.




Seedling transportation planning

Planting Design

Planting design of every site is following CRBD. The treatment was 100 clones with 4 replications of 3 lines plot. Planting spacing was 4 x 4 m. The clones were randomly displayed using CycDesign program of row-column design. The seedlings have been already planted in 3 sites at Thung Kwian, Thong Phaphum plantations and Donglan Silvicultural Research Station during August-September 2021. The buffer zone around the whole area was planted with seedlings in 1-2 rows.

Clone ready for planting

Visit of ITTO Teak project team

The ITTO Teak Mekong Project team lead by the Project Manager, Dr. Yongyut Trisurat, Project Consultants and staff visited the planting site at Krengkawia plantation on 8th of October 2021. Ms. Somporn Kamchompoo briefed them the progress of planting to the visitors. After the field visit, the consulting team recommended the following to the field staff:

1. Counting and survival rate of clones and reporting to Ms. Somporn for preparation of seedlings for casuality replacements.
2. Planting 1 more row of teak seedling around the whole area of buffer zone.
3. Collection of 9 soil samples from 3 spots around the area from slope, middle slope and bottom slope. From each spot soil samples may be collected from 3 depth levels - 1-15 cm (top soil), 15-30 cm and deeper than 30 cm. The soil samples will be tested in the soil laboratory at faculty of Forestry, Kasetsart University to analyze their chemical and physical properties.

The team suggested design of a sign board for display at the testing site.

Project team at planting site and engaged in group discussion

Schedule of Teak Clonal Test

1st Year (2019 – 2020)

Activities	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1. Budding	←	—	—	—	→							
2. Cutting								←	—	→		
3. Tending of Nursery						←	—	—	—	—	—	→
4. Contact for planting in 3 sites									←	—	—	→

2nd Year (2020- 2021)

Activities	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1. Tending of Nursery	←	—	—	—	→							
2. Preparing planting sites						←	→					
3. Hardening of seed-lings							←	→				
4. Planting								←	→			

3rd Year (2020- 2021)

Activities	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1. Budding			←	—	→							
2. Cutting	←	→				←	—	→				
3. Tending of Nursery	←	—	—	—	—	—	—	→				
4. Replanting & maintenance of plantations	←	—	—	—	—	—	—	—	—	→		

Picture: Maeger, Silvicultural Research Station, Payao Province, Thailand

(1st and 2nd part of the article has been published in Vol. 2 (3): 2020 & Vol. 3 (4): 2021)

Editorial Committee

ITTO Teak Mekong Newsletter is a bi-monthly electronic newsletter of the Project Team which is intended for circulation among the stakeholders of global teak sector. The views expressed in the newsletter are those of the authors and do not necessarily reflect the views of the organization. The readers are welcome to express their opinions or pass on information concemed with teak. However, we reserves the information on the project and publishing through this newsletter for our esteemed readers.

Address all communications to:

TEAKNET Secretariat
International Teak Information Network
Peechi-680 653, Thrissur, Kerala, India
Tel: +91 487 2690396; Fax: +91 487 2690111
Email: secretariat@teaknet.org