TISSUE CULTURE PRODUCTION
OF CLONAL TEAK FOR LARGE-SCALED
PLANTATION ESTABLISHMENTS

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FIRST STARTED AS A R & D PROJECT BETWEEN CIRAD AND THE FORESTRY DIVISION OF INNOPRISE CORPORATION, COMMERCIAL ARM OF SABAH FOUNDATION GROUP

(TAWAU, 1991 – 2005) LOCATED IN TAWAU, EAST COAST OF SABAH
INVOLVED IN THE DEVELOPMENT OF IN VITRO PROTOCOLS FOR THE MICROPROPAGATION OF HIGH VALUE AND FAST-GROWING INDUSTRIAL FOREST TREE SPECIES, NAMELY, TEAK AND ACACIA SPP.
ONE OF THE MOST SOUGHT AFTER TIMBERS IN THE WORLD!

Approximately 3 million cubic metres of Teak is harvested globally per annum from both native forests and plantations. Natural forests of Teak do not meet current or future demands and will soon be banned totally. A rising trend towards large-scaled Teak plantation establishment in Australia, Latin American countries and Africa is now observed.
STAGES IN THE DEVELOPMENT OF TISSUE CULTURE PROCESS OF TEAK

Selection of superior clone

Introduction of Explants for in vitro culture

Collection of young branches and shoots

Shoot development from responsive explants

Elongation and Rooting stage

Multiplication of plantlets
Ex-vitro acclimatization of tissue-cultured teak plantlets

Rooting of tissue culture plantlets 3 weeks after ex-vitro transfer
Straightness of bole with small branches (minimal knots), fast growth, and high heartwood to sapwood ratio, are characteristics of the selected clones, Solomon Island Origin, under Sabah’s growing conditions. Mean annual growth of 2.5-3 cm in diameter and 3-4m in height can be expected.
REASONS FOR THE SUCCESSFUL PROPAGATION OF TEAK AT YSG BIOTECH

1. Optimal protocol developed
   - High multiplication rate, simple and cost-efficient

2. Possibility of introducing and mass multiplying any selected genotypes (clones) regardless of ortet age
   - Ensure homogenous growth for plantation establishment

3. Allows the delivery of plants to overseas markets
   - Benefit of a phytosanitary certification overcoming quarantine constraints
ADVANCED RESEARCH ACTIVITIES WITH CIRAD

WOOD AND DNA ANALYSIS (FINGERPRINTING) FOR CERTIFICATION AND MARKETING PURPOSES
ICSB/CIRAD Teak Clone

Identification

Species: Tectona grandis
Origin: Solomon Island
Clone number: TG2

Available in the form of rooted cuttings or tissue-cultured microcuttings

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ICSB/CIRAD Clone TG1

DNA fingerprinting - Wood characteristics

DNA Fingerprinting

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Wood characteristics after 10 years of growth in Sabah conditions

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<th>Characteristic</th>
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<tr>
<td>Heartwood proportion</td>
<td>55 %</td>
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<tr>
<td>Basic density</td>
<td>550 kg/m³</td>
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<tr>
<td>Total shrinkage</td>
<td>4.3 %</td>
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<td>Number of rays</td>
<td>2.3 %</td>
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<tr>
<td>Tangential shrinkage</td>
<td>2.3 %</td>
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<td>TIR Ratio (keresticity)</td>
<td>1.1</td>
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<td>Modulus of Elasticity</td>
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<td>Modulus of Rupture</td>
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<td>Natural Durability *</td>
<td>Durable</td>
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Data produced by: UFS: 1) Genetic Diversity and Breeding of Forest Tree Species Laboratory (Biotechnological and Genetic Techniques Division) with the help of H. Robel, O. Côte and R. J. R. Production and Processing of Tropical Wood Material (Biotechnological and Genetic Techniques Division) with the help of H. Robel, M. P. Thilimken and H. Ballmes, both research units of the Forestry Department of CIRAD.

* Durability towards Basistempol woods. 2* http://www.cirad.fr/teak/pdf
PLANTLETS PACKED FOR OVERSEAS MARKET

REGISTERED TRADE MARK FOR PLANT PRODUCTS
WORLDWIDE EXPORTATION OF TEAK PLANTLETS
FIRST COMPANY APPROVED BY AUSTRALIAN QUARANTINE & INSPECTION SERVICE (AQIS) AS A SUPPLIER OF TC TEAK PLANTLETS
Newly-established tissue culture teak plants in Queensland, Australia
TEAK PLANTATIONS USING MATERIALS FROM YSG BIOTECH

CLONAL MATERIALS
- yield improvement of 30% observed

SEED SOURCE
BRAZIL
AUSTRALIA
TANZANIA
COSTA RICA
2 year-old clonal plantation established in fertile soils and showing very good uniformity in Brazil
TODAY, YSG BIOTECH SDN BHD IS ONE OF THE COMMERCIAL COMPANY UNDER THE SABAH FOUNDATION GROUP

(MAY 2005 – PRESENT)
NEW LOCATION IN KOTA KINABALU, WEST COAST OF SABAH