

PCR by Dr. Pattanaik  
i 38

**ABSTRACT OF THE PROJECT**

1.	Project Code	FRC/XI/021
2.	Name of the Project	Molecular assessment of breeding patterns in clonal seed orchards of Teak in Andhra Pradesh.
3.	Funding Agency/ Agencies	ICFRE
4.	Institute/ Directorate (ICFRE Hqrs.)	Institute of Forest Biodiversity (formerly Forest Research Centre), Hyderabad
5.	Name and Designation of Principal Investigator	Dr. Swapnendu Pattanaik Scientist E
6.	Name (s) and Designation (s) of Co-Principal Investigator (s) and Associates, if any	1. Dr. G.R.S. Reddy Scientist G 2. Dr. A. Srivastava Scientist D
7.	Division	Forest Genetic Resources
8.	Project Discipline	Biotechnology
9.	Objectives of the Project	<p><b>Long-term</b></p> <ul style="list-style-type: none"> <li>○ To devise strategies for increasing cross pollination and genetic gains in teak seed orchards.</li> </ul> <p><b>Short-term</b></p> <ul style="list-style-type: none"> <li>○ To assess clonal variation in reproductive phenology.</li> <li>○ To assess clonal variation in mating pattern.</li> <li>○ To assess clonal variation in pollen movement (Gene flow).</li> <li>○ To assess the extent of pollen contamination.</li> </ul>
10.	Species involved	<i>Tectona grandis</i>
11.	Experimental Work	
a)	Methods adopted	<ul style="list-style-type: none"> <li>• Genetic material collection from all (307) candidate pollen parents.</li> <li>• Fruits/seeds collection from five known seed parents.</li> </ul>

		<p>Seeds sown in nursery.</p> <ul style="list-style-type: none"> <li>• Genetic material collection from 105 offsprings belonging to five known seed parents.</li> <li>• Genotyping of 307 pollen parents (candidate fathers), 5 seed parents (known mothers) and 105 offsprings at four microsatellite loci.</li> <li>• Paternity assignment using likelihood approach to arrive at most likely father for each of the offspring.</li> <li>• Spatial analysis to arrive at average pollen movement distance.</li> </ul>
b)	Equipments used, if any	<ul style="list-style-type: none"> <li>• Mini gradient thermal cycler</li> <li>• Agarose gel electrophoresis</li> <li>• Gel documentation system</li> <li>• Micro-centrifuge</li> <li>• Micro-pipettes (4 nos.)</li> <li>• Vortex mixture</li> <li>• Water bath</li> <li>• Dry bath</li> <li>• Refrigerator</li> <li>• Hotplate-cum-magnetic stirrer</li> <li>• Ultra-pure water purification system</li> <li>• Deep freeze (-20°C)</li> <li>• Vertical gel electrophoresis</li> <li>• PCR work station</li> <li>• Rotary mixture</li> </ul>
c)	Scope ( States covered)	Andhra Pradesh and Telengana
12.	Date of commencement of the Project	June 2011
13.	Date of completion of the Project	31st September 2014
14.	Budget outlay of the Project	Rs 26.0 Lakhs (Provisional)

15.	Expenditure incurred on the Project	Rs.22.425 Lakhs
16.	Reason for financial deviation	The actual allotment was less than the provisional budget outlay.
17.	Manpower involved	
(a)	No. of Scientists/ officers	P.I. and two Co-P.I.
(b)	No. of Research personnel	One Junior Research Fellow
(c)	No. of office staff	Nil
18.	Extension of findings to the User Groups	Findings to be disseminated through seminar/conference presentation.
19.	Publications from the findings of the Project	Two manuscripts under preparation.
20.	Patents, if any	Nil
21.	Project Summary/ Achievements/ Findings	<p>The present study was taken up to investigate breeding pattern of clones and distance of pollen movement in the clonal seed orchard of <i>Tectona grandis</i>, located at Achuthapuram, Telengana. A battery of four microsatellite markers were used to generate multilocus genotypes for 105 offsprings, 5 known seed parents and 220 candidate pollen parents. Paternity analysis of the dataset using likelihood approach revealed the following.</p> <ul style="list-style-type: none"> <li>• Out of the 105 offsprings of five known seed bearers analyzed, paternity could be assigned to 55 offsprings with 95% confidence level. A higher assignment rate (78 offsprings: 74.3%) could be achieved at relaxed confidence level of 80%. Twenty-seven offsprings (25.7%) could not be assigned to any candidate fathers.</li> </ul>

		<ul style="list-style-type: none"><li>• Out of the 55 offsprings for which paternity could be established with 95% confidence, only three offsprings were selfed (5.4%) and rest was the result of cross-fertilization (94.6%).</li><li>• Out of the thirty clones planted in the CSO, 22 clones participated in the breeding process. There was difference in male reproductive success of pollen parents. Clone 8 was found to be the most successful pollinator followed by Clone 14.</li><li>• The average pollen movement distance varied from 60.4 m to 155.1 m, with an overall average of 95.1 m. Most of the pollen donors (81.8%) were within 150 m of the seed trees, whereas, only 18.2% pollen donors were beyond 150 m from the seed trees.</li></ul>
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