Completed ICFRE research projects, 2009-10 IFP

Sl. No	Projects	Name of PI	Thrust area	Research Findings
1	Genetic evaluation and molecular characterization of *Jatropha curcas* L. of Eastern India (**Project completed, March, 2010**)	Sanjeev Kumar Bhatia, Scientist - B	Genetic improvement (Conservation of FGR)	There was found large amount of variability among the selected candidate plus trees for seed physical & biochemical traits. Most of the plus trees yield seed oil more than 37% & upto 45%, which is an encouragable result as the seed oil content is the main economic trait of Jatropha. Clones were planted in the field. Statistically significant variability was observed among the clones for growth characters, which is a pre-requisite for further improvement work. Seed length, weight, width & carbohydrate content had significant correlation with germination percentage, which shows the selection of these traits as an criteria for large scale plantations. Like wise plant height and collar diameter had positive and significant correlation with dry shoot weight. The variability among the clones was grouped under four clusters. Collar diameter followed by plant height contributed maximum to the genetic divergence. Out of 25 used primers 12 primer showed amplification. All the primers were not used in history. Moderate genetic variability was recorded by the use of markers.
2.	Assessment of genetic diversity and development of species specific molecular markers in bamboos from eastern India (**Project completed, March, 2010**)	Dr. Sanjay Singh, Scientist - D	Genetic Improvement (Conservation of Forest Genetics Resources)	Conservation and evaluation of bamboo species is essential because several bamboo populations have already been lost by the destruction of natural forests causing severe genetic erosion. The improvement of bamboo as a multipurpose plant on global scale will critically depend on basic research. As authentic recognition of taxa is necessary for propagators and consumers, Classification and genetic relationships in bamboo is very difficult because of the lack of morphological differences and unpredictable flowering. Genuine Therefore, assessment of the nature and level of molecular deviation between and within the species and development of molecular tools for species identification for their utilization, management and conservation is urgently needed. In recent years, DNA fingerprinting

				through RAPD procedure has been used for the analysis of identification and diversity. RAPD technology is a quick and sensitive technique, which can be used to assess relationships between closely and more distantly related species and groups of bamboo. We have taken an initiative on assessment of genetic diversity of eastern Indian bamboo species involving *Bambusa bambos, B. Balcooa, B. nutans, B. Tulda and Dendrocalamus strictus* as target species for their intra and inter species molecular markers. A total of 576 amplified bands were scored from the 35 RAPD primers, and a mean of 7 amplified bands per primer and 68% percentages of polymorphic bands (PPB) were found. The Hardy-Weinberg disequilibrium was used to screen genetic diversity and to ensure the phylogenetic relationships among these bamboo accessions, UPGMA dendrogram were analysed. The resulting data reveals that *Bambusa tulda* and *Bambusa nutans* are genetically very close to each other in comparison to other species. In conclusion, RAPD has been shown to be helpful in studying the genetic resemblance between bamboo species and genera as well as identifying molecular markers specific for a particular species.
3.	Studies on reproductive biology and propagation techniques of *Schleichera oleosa* Lour (Oken) an oil bearing tree and important lac host plant. (**Project completed, Dec, 20 09**)	Dr. Animesh Sinha, Scientist - C	Genetic Improvement (Biotechnology, Vegetative Propagation)	***Objective 1: Standardization of macro & micro-propagation techniques of Schleichera oleosa*** The extensive exploration was carried out for the collection of superior *S. oleosa* trees from the whole lac producing region in eastern part of the country, represented by three states, West Bengal, Jharkhand and Orissa. Around 30 trees were selected. Point Grading Method for tree selection in *S. oleosa* was followed. The same may be used by the forest researchers in future for its improvement program. A good account has been given on various aspects of collection of branches for macro-propagation. Very good information has been generated by identifying the hormonal treatment combinations for rooting after a thorough testing by stem cutting trial. The genotypes suitable for more rooting success can be screened in and further multiplied for supplying

				planting material for large scale plantation of this species. Besides stem cutting, other macropropagation methods like air-layering, grafting and budding experiments was carried out. On an average more than 50% rooting was observed through these methods. In a research project funded by DBT, New Delhi *in vitro* shoot proliferation of this species has been achieved. So far no rooting of these shoots was observed. Therefore present investigation initiated to work on rooting and acclimatization of these shoots with a view to develop full protocol for micropropagation of Kusum. However, in spite of several efforts, no rooting was observed in micro-propagation experiments. Attempts were taken for *in vitro* seed germination to get cotyledonary nodes for using it as explant. Attempts were also taken for multiplication and elongation of shoots in culture. A good account of data has been generated in these aspects. DNA extraction method from juvenile leaves of clones has been standardized with the aim to test the clonal fidelity. Institutional support is adequate so far field research is concerned. However, lab facilities need to be strengthened. Keeping in mind the sensitivity of tissue culture work the lab must be supplied with 24 hrs uninterrupted power supply. The tissue culture lab and the molecular biology lab are located 25 km apart. In any case the two should be brought at one place on priority basis. ***Objective 2: To study on blooming, flower structure & pollination*** The extensive survey was carried out throughout the Kusum growing areas in Jharkhand and Orissa for data collection on flowering of this species. Very good information has been generated on time of flower initiation in different places. The quantum of flowering was inconsistent, abundant in some years and meager in others. However, the study of pollination could not be carried out due to non availability of flowering plant inside the campus.

				Objective 3: To study on fruiting phenology The extensive survey was carried out throughout the Kusum growing areas in Jharkhand and Orissa for data collection on fruiting of this species. The maturity of fruit and flower to fruit ratio was recorded. ***Objective 4: To improve seed germination*** The extensive tour was also carried out throughout the Kusum growing areas in Jharkhannd, West Bengal and Orissa for collection fresh seed of this species in each year. Different methods were applied for enhancement of seed germination percentage viz., mechanical scarification, soaking of seed in cold/ hot water, acid or Gibberellic acid or other chemicals, etc. Seed germination trial was conducted in seed germinator as well as in open bed & poly-shade house conditions. Seed germination after different days of storage was also recorded. Very few seed germination was observed even after 1 year of storage. Pretreatment of seeds with KNO_3 for 1 hour showed higher germination in fresh seeds.