

Eucalypts Hybrid Breeding Programme at IFGTB

Eucalyptus and *Corymbia* species are industrially important species yielding raw material for paper pulp, plywood and biofuel. Eucalypts breeding programs around the world have paid rich dividends in the form of growth and yield through deployment of inter-specific hybridization and clonal selection. IFGTB initiated eucalypt improvement program in 1995 under the auspices of FORTIP (UNDP/FAO Regional Project) and CSIRO, Australia. By the year 2000 clones of pure species and landraces were identified. Infrastructure such as clonal gardens, vegetative multiplication garden and propagation methods such as conventional cuttings, mini cuttings and micropropagation were developed.

Controlled hybridization programs were initiated during 2002 and various combinations of hybrids with *E. tereticornis* as seed parent were developed. Interspecific crosses between, *E. tereticornis* x *E. grandis*, *E. tereticornis* x *E. camaldulensis*, *E. tereticornis* x *E. alba*, *E. tereticornis* x *E. pellita*



Platforms raised for controlled pollination activities



Monitoring seed set in CP experiments

were attempted. On realizing the success of these dihybrid combinations, the Department of Biotechnology, Government of India identified IFGTB as one of the potential nodal agency for eucalypt hybrid production. Financial support was extended for developing inter-specific mapping populations followed by development of DNA markers for marker assisted breeding. Currently, phenotypically characterized male and female parents of *E. camaldulensis*, *E. tereticornis* and *E. grandis* were used for controlled pollination and the hybrid populations of *E. terigrandis*, *E. camagrandsis* and *E. tericamaldulensis* were

field planted for multi-environmental phenotyping. The phenotypic characteristics considered for trait improvement through this approach are microfibril angle, salinity tolerance, adventitious

rooting, cellulose and lignin content. Genetic linkage maps will be developed with SSR/SNP markers and quantitative trait loci (QTLs) controlling the traits will be identified.

Recently, industries such as Messrs. ITC Ltd and Tamilnadu Newsprints and Papers Ltd have signed agreement with IFGTB for development of hybrids of *Corymbia* (spotted gum) and eucalypts respectively. *Corymbia torelliana* x *C. citriodora* hybrids are known to perform better than either of the parents for characteristics such as biomass volume, stem straightness and higher pulp content. Presently, controlled hybridization experiments have been successfully concluded and seeds are being harvested for nursery trials. The sustenance of continuous genetic gains for economic traits and identification of new breeding options would be the major challenges in future eucalypts breeding.



Hybrid seed germination

Further, balancing of genetic variation to reduce economical and environmental risks associated with large scale clonal forestry deployment also warrants generation of new hybrid combinations. IFGTB being a co-ordinating agency for the All India Program of eucalypts, the ongoing and future programs target introduction of new germplasm and also selection of candidates from the second generation seedling seed orchards and clonal seed orchards. These efforts would facilitate hybrid breeding program on a continuous and sustainable basis.