

CHAPTER-II
SUMMARY OF MAJOR ACHIEVEMENTS
DURING 1997-98

1. Developed new F1 hybrid by crossing *E. tereticornis* (Mysore gum) with *E. camaldulensis* (Southern form).
2. Developed protocol for mass clonal multiplication of superior phenotypes of *E. tereticornis* via. micropropagation.
3. Standardized macropropagation technique for mass multiplication of *D. sissoo* through bi-nodal cuttings.
4. A modified ACA technology for preservative treatment of *Eucalyptus* hybrid was developed through treatment at elevated temperature. This resulted into reduction of treatment time from 7 days to just 4 hours.
5. A clipper for pruning of trees has been developed for pruning operations in the field avoiding fungal attack to the cut surface.
6. About 1200 wood samples were examined and identified received from various Govt. Deptts., Public undertakings, CBI/Police Deptts.
7. The pollen of teak and *Casuarina equisetifolia* were successfully stored for 15 days in order to carry out effective control crosses.
8. Micropropagation of *Oxytenanthera stocksii* was successfully carried out using 1.5 cm long single node stem segments.
9. Successful rhizome production was induced in multiple shoot cultures of *Bambusa nutans* and *Dendrocalamus strictus*. Micropropagation techniques for commercial production has been standardized and protocols have been transferred for *Bambusa arundinacea*, *Bambusa nutans*, *Dendrocalamus strictus* and *Dendrocalamus membranaceus*.
10. Seed collection, extraction and germination procedure were standardized for commercially important forestry medicinal plants namely, *Feronia elephantum*, *Terminalia* spp. and *Syzygium cumini*.
11. Experiments were carried out on reclamation of magnesite, limestone spoils and quartz dumps and a range of species suitable for different problematic soils was determined.
12. Size of root trainers, potting mixture and watering regime were standardized for some of the mandate species.
13. The pest problems and intensity of pest attack in nursery and plantations of Teak, Casuarina and Tamarindus were studied and control measures established.
14. Anatomy of four more timber species (now totalling 44 species) has been fully described.
15. Alternative timbers for making various artifacts have been suggested based on the results on anatomical characteristics.
16. A software called CALPRO to calculate strength properties, suitability indices and classification of timber has been developed.
17. For imparting dimensional stability in rubberwood, treatment with Acetic anhydride was established.

18. Treatment to restrict photo chemical degradation of wood was devised with chromium trioxide.
19. Different heat-trapping systems were tried for improving the Kiln design and it was established that glass wall with blackened wire-net is the most efficient for retaining heat.
20. Studies on oil from *Eucalyptus* hybrid were carried out to establish that lesser the amount of cineole, better is the aroma of oil.
21. Scientific method of debarking *Machilus macrantha* was developed which revealed that regeneration of bark takes place when longitudinal strips of original bark is retained on the tree.
22. Attack of lac insects on sandal trees was controlled by spraying Quinalphos/Rhogar.
23. Parthenium weeds were successfully controlled in experiments using extracts of *Eucalyptus* bark and leaves. Spraying of the extracts resulted in immediate wilting and blackening of the weeds.
24. A clonal seed orchard of teak comprising of 20 genotypes has been established in an area of 2.5 hectares.
25. In *B. nutans* shoots obtained from explants of seedlings, rooting success of 60 - 70% was obtained. 40% rooting in shoots of *B. tulda* was observed which was derived from explants of mature clumps. *Bambusa vulgaris* (green) using nodal segments from mature culm showed four times multiplication of shoot. More than 80% rooting was obtained on auxin supplemented MS medium. *Kaempferia galanga* showed 13 times multiplication on MS medium supplemented with auxins and cytokinins giving 100% rooting.
26. In rice-babul AF system in Chhatisgarh region *Acacia nilotica* ssp. *cupressiformis* has been introduced in the place of *Acacia nilotica* ssp. *indica* for its narrow crown advantage. Improvement sought has proven to be successful in increasing yield of JR 75, short duration rice.
27. Seedling wilt disease has been controlled by sterilizing nursery soil with drenching of formaldehyde solution and bavistin 0.2% before seed sowing.
28. Thirty two plant species during ethnobotanical studies have been found useful for tribals. Uses of five potential plant species have been recorded for the first time. Successful demonstration plots of *Dendrocalamus asper* (Edible bamboo) have been established at Jabalpur and Kanker. Plantation at Jabalpur shows highest survival of 98%.
29. 4000 rhizomes of bamboo (*D. strictus*) and 2000 plants of neem, babool, shisham and mulberry alongwith 300 fruit yielding tree species were distributed amongst farmers.
30. Under Planting Stock Improvement Programme (PSIP), work on establishment of seedling seed orchards of *Dipterocarpus macrocarpus* and clonal seed orchards of *Gmelina arborea* is in progress. In case of former 52 plus trees spread over 15 forest areas of four forest divisions in Assam were selected. Collection of seeds and production of seedlings is being undertaken, while for the latter different areas of occurrence of the species spread across the states of Assam, Meghalaya and Mizoram were surveyed. Out of 53 selected and marked CPTs 36 were identified as plus trees after evaluation as per the prescribed standards. Work on creation of seed production areas (SPAs) and vegetative multiplication garden of bamboo is in progress.

31. A new record of galls in *Styrax* sp. from India has been discovered.
32. Biological control agents for insect pests of Agar wood (*Aquilaria agallocha*) and Gamari wood (*Gmelina arborea*) have been discovered.
33. Three leaf spot diseases of *Gmelina arborea*, *Albizia* sp. and *Bombax ceiba* caused by *Cercospora* sp., *Phyllachora* sp. and *Corynespora* sp. respectively have been recorded for the first time in these host from north-east India.
34. Collection and *ex-situ* conservation of 35 ethno-medicinal plants has been made and demonstrated to the people.
35. Clonal propagation of neem through tissue culture has been successfully achieved and the plants so raised have already been planted out in the field.
36. In Rohida (*Tecomella undulata*), success has been achieved not only in establishing it *in vitro* culture but also in regenerating complete plantlets by culturing nodal segments of adult trees.
37. *In vitro* multiple shoot cultures of *A. excelsa* and *A. nilotica* from mature trees have been established and multiplied for long term sub-cultures. Rooting of microshoots have also been achieved in both these species.
38. Protocols have been developed for 3 species viz., *Acacia nilotica*, *Prosopis cineraria* and *Dalbergia sissoo* for seed viability by TTC method.
39. Rain water harvesting methods have been developed for improving survival percent and growth of vegetation.
40. Irrigation water management experiments have established that application of higher quantity with longer interval yields better results than application of lesser water quantity at short intervals.
41. During the year the Institute undertook various research activities under various schemes funded by GOI, WB, UNDP and IDRC. The major research achievements of the Himalayan Forest Research Institute, Shimla during the year can be grouped under following broad heads.
42. The nursery techniques related to different species about optimum depth of sowing, optimum time of sowing, optimum time of seed collection and pricking have been standardised.
43. Some mined areas have been ecologically rehabilitated and biologically rejuvenated.
44. About 40,000 ETPs of *Populus deltoides* have been raised in the nursery for distribution to the target groups.
45. Nursery techniques for *Paulownia* and Poplar have been developed for Chhotanagpur region.
46. More than 15,000 nos. of seedlings have been planted under different agroforestry models. Besides, different combinations and doses of biofertilizers have also been applied in field plantations and various measures for moisture conservation in Bhagvatpur micro-watershed have also been undertaken.
47. More than 11,000 nos. of seedlings of different MPTs have been distributed to the beneficiaries of 10 selected villages for establishment of demonstration plantations. 545 nos. of seedlings have also been inoculated with different biofertilizers.