CHAPTER VIII

INSTITUTE OF FOREST PRODUCTIVITY RANCHI

The Institute of Forest Productivity, Ranchi came into existence in July' 1987 when the Directorate of Lac Development, Ranchi (earlier under the Ministry of Agriculture) was brought under the Forest Research Institute, Dehra Dun alongwith four centrally sponsored schemes viz., 'Forest Soil Vegetation Survey' and 'Eucalyptus Research Centre' of Midnapore, West Bengal, 'Cash Crop Centre', Ranchi, Bihar and 'Environmental Research Centre', Sukna, West Bengal of Forest Research Institute, Dehra Dun. Subsequently it was upgraded and declared as full-fledged institute in 1993 under the Indian Council of Forestry Research and Education. Now, the Institute is mandated with steering the forestry research in the states of Jharkhand, Bihar, West Bengal and Sikkim having total actual forest cover of about 38002 sq. km. i.e.14.1% of total geographical area. Six agro-ecological zones and eight main forests types are covered within its jurisdiction.

PROJECTS COMPLETED DURING THE YEAR 2002-2003

NIL.

PROJECTS CONTINUED DURING THE YEAR 2002-2003

NIL.

NEW PROJECTS INITIATED DURING THE YEAR 2002-2003

Project 1: Planting stock improvement in relevance to Chotanagpur plateau area and south- west Bengal.

Sub-project 1: Standardization of suitable potting media and root trainer size for improved planting stock production of some mandate species of Jharkhand and southern west Bengal [IFP-1/BS-SP-1/P-I/2002-2006]. *Principal Investigator - Dr. P.K. Das.*

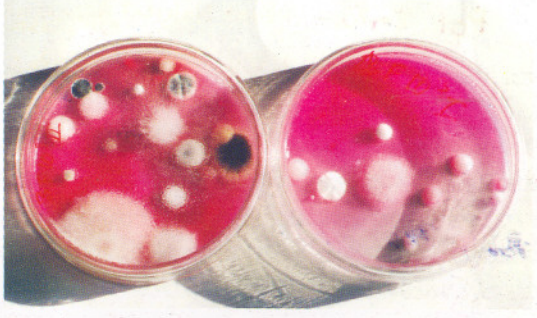
Status: Four media ingredients viz.; soil, FYM, sand and compost were mixed in different ratios in combination with two or three main media and prepared seventeen mother media mixture. Biofertilizer, specific for *Dalbergia sissoo* (Rhizophos) in three doses 10g, 15g, 25g per hykopot, NPK mixture in two doses (low and medium) and the combination of three doses of biofertilizer and two doses of NPK mixture (a total of 6 treatments) were taken for trial. A total of 204 treatments in replicate were carried out for assessing suitable media for *D. sissoo*. The trial for suitable potting media has also been carried out in three different sizes of hykopots (150 ml, 250 ml and 350 ml).

Sub-project 2: Trials on composting for specific afforestation needs and development of cost-effective packages [IFP-2/BS-SP-2/P-I/2002-2007].
Principal Investigator - Dr. P.K. Das.

Status: Compost was prepared (aerobic method) from rice straw, putus (*Lantana* sp.) and ghanto shrub. seed haul of *Dalbergia sissoo* has also been taken for compost preparation. soil, cow dung, urea and single super phosphate were used as decomposing agent. The content of total nitrogen (1.96%) and available nitrogen (984.24 ppm) was found highest in the ghanto-rice straw mixture among the eleven raw material mixtures. Content of available phosphorus (456.25 ppm) was found highest in the rice straw- rice husk mixture. Micronutrient like, iron and manganese of the compost produced were ranged from 0.64 to 1.09 and 0.037 to 0.063 %, respectively. Compost volume out put to input ratio varied from 30 to 45 %, compost weight out put to input ratio varied from 35 to 65 % and compost production time varied from 61 to 131 days.

Sub-project 3: Development of biofertilizers and standardization of their application in relation to productivity of forest tree species under degraded lateritic soil condition. [IFP-3/BGT-SP-3/P-I/2002-2006].
Principal Investigator - Dr. S. Nath.

Status: Survey of *Acacia auriculiformis, A. mangium, Albizia lebbek, Dalbergia sissoo, Cassia siamea, Pterocarpus marsupium, Peltoferum ferruginium* and *Delonix regia* plantations was conducted, growth data were recorded and nodules were enumerated from the plantation. Rhizosphere soil and plant samples were collected to correlate growth data, nodulation and soil nutrient status. Nursery trials were conducted with different doses of VAM in combination with N, P and K and organic matter on *Eucalyptus* species and recorded periodic growth data. The standardization of methods of biofertilizer of non-symbiotic N-fixers was also under taken, simultaneously. Studies were conducted in nodulation capacity and effectiveness of *Rhizobium* from different sources taking *A. auriculiformis* as the test species.



Study of soil fungi for biofertilizer development

Sub-project 4: Multilocational field trial of tissue culture raised plantlets of *Dendrocalamus asper* [IFP-4/BGT-SP-4/P-I/2002-2006]. *Principal Investigator - Mr. Animesh Sinha.*

Status: Two hundred numbers of plantlets of *D. asper* were produced through tissue culture. Methods for shoot multiplication, subculturing, root initiation, primary and secondary hardenings of plants were standardized. Premonsoon and post monsoon field plantations has resulted in 85% survival. Good quantity culm formations have been noticed and recorded. Intercultural operations are being taken up in these areas. Growth data are being recorded accordingly. In middle of Sept. 2002 infestation of insect pests (leaf binder) was observed at Mandar plantation area. Spraying of 0.2% cypermethrin insecticide to the leaves controlled the insect attack.

Sub-project 5: Genetic improvement of Eucalyptus through progeny trial and hybridisation [IFP-7/BGT-SP-7/P-1/2002-2006]. *Principal Investigator - Dr. H.C. Sindhu Veerendra.*

Status: Sample plots of 10 x 10m were laid out to assess growth variability and 66 superior trees were selected from *Eucalyptus tereticornis* and 80 candidate plus trees were selected from *E. camaldulensis*. An index selection method has been evolved to select best performing genotypes giving major thrust to quantitative traits such as total height, clear bole height, GBH, number of branches and wood qualitative traits such as stem roundness, stem straightness and total health. A selection pressure of moderate 27 to high of 68 % has been exerted during the selection of genotypes. Total variability in the selected population has been reduced.

Sub-project 6: Follow up activities and maintenance of PSIP assets developed under FREE project [IFP-19/BGT-SP-8/P-1/2002-2007]. *Principal Investigator - Dr. S. Nath.*

Status: Subsidiary silvicultural operations for improvement of the plants have been done in the SSO of *Gmelina arborea* (8 ha), *Dalbergia sissoo* (9 ha), VMG of *Paulownia fortunei* (4 ha), *Acacia* sp. (10.0 ha), *Eucalyptus* sp. (17.5 ha), CSO of *Eucalyptus tereticornis* (5.0 ha) and VMG of bamboo sp. (6.0 ha). Stock improvement by casualty replacement in gamhar and *Paulownia* sp. has been completed.

SSO- *Acacia* species

Project 2: Soil vegetation interaction with special reference to nutrient cycling in some selected plantations under different edaphic conditions [IFP-9/SLR/P-III/2002-2006]. *Principal Investigator - Dr. S. Nath.*

Status: Growth density, height, DBH, crown diameter and overall productivity assessment in respect to soil attributes of the following species: *A. auriculiformis* (5 yrs), *A. mangium* (5 and10 yrs), *A. indica* (5 yrs), *Eucalyptus* (5 and 10 yrs), Bamboo *T. grandis* (5 yrs) and *(balcooa)* (5 yrs) was carried out. Gradual increase in growth was observed with N upto 80 kg/ha for *A. auriculiformis* and up to 120kg/ha for Eucalyptus after 30 days of nutrient applications. P at the levels of 30 to 60 kg/ha as SSP in *A. auriculiformis* and Eucalyptus recorded significant height increments. K application favoured growth of both *A. auriculiformis* and Eucalyptus in pots but no definite trend was noticed up to 30 days of growth. Overall increase in leaf weight and leaf area has also been noticed in plant treated with N, P and K individually.

Soil profile study soil-vegetation interaction assessment

Optimum N requirement (60-75kg/ha) for Eucalyptus was found to be more than *A. auriculiformis*. Combined application of P, N and K @ 50 kg/ha was found to be sufficient for *A. auriculiformis* till 30 days growth after amendments. Irrespective of doses of N, requirement of P&K was found to be at lower moderate doses i.e. 5 to 10 kg/ha.

Project 3: Studies on variability of bamboo species, their performance, conservation and economics with reference to Bihar, Jharkh and and west Bengal [IFP-10/BS/P-IV/2002-2007]. *Principal Investigator - Mr. Nirami Ram.*

Status: Survey for species distribution, culm and sheath characteristics (internodal length, circumference of old and new culm) clum formation and utilisation of bamboo sp. have been conducted in selected villages. Phytosociological structures (ground floras) and soil of the rhizosphere of the clum have been collected for analysis in the laboratory. The bamboo species found were as below:

(i) Jharkhand -Latehar: (6 vill. + 1 forest area covered): (7) Ropa bans, dehati bans, bhomba bans (*B. Polymorpha, B. balcooa, B. bamboos*), peela bans (*B. striata*). jangli bans (*D. strictus*), solid bans (*D. strictus*). lathi bans/Pahari bans (*Dendrocalamus* spp.).

Bamboo propagation - from culm cuttings

Bamboo propagation from culm cuttings

(ii) South- west Bengal- Midnapore: (7 villages+fornt area covered): (12) Kanta bans (*Bamboosa arundir aceae*), hedua vulki, Dehmna vulki (*Bambusa balcooa*), Guri vulki, Buri vulki, Valku (*B. balcooa*), Baria, Baisani (*B. vulgaris*), Hedua Sonakani (*B. vulgaris*), Yellow bamboo (*B. vulgaris*), Jawa, taral, janta baria (*B. tulda*), Lathi bans (*D. strictus*), bamboo buris (unknown), Kaldhemni (knknown), champa baria (unknown), karda champate (unknown).

(iii) North-west Bengal- Terai region: - (10 villages covered): (8) Makia (*Bambusa nutans*), sinji (*Arundinaria hookeriana*), bhalu (*Dendrocalamus sikkimensis*), nal (*Pseudostachyum polymorphum*), muli (*Melocanna bambusoides*), jawa (*Bambusa tulda*), bans (*Bambusa balcooa*), karia (*Bambusa pollida*), peela bans (*Bambusa striata*). Some unidentified species of bamboo were also encountered during the survey and for identification in progress.

Project 4: Cultivation and extension of lac on new non-traditional hosts.

Sub-project: Exploration of lac cultivation on non-traditional host *Flemingia* sp. and its possibility in sustainable plantation forestry [IFP-13/NWFP-SP-l/P-VII/2002-2005]. *Principal Investigator - Dr. R. Sett.*

Status: Seeds of *Flemingia macrophylla* and *Flemingia semialata* collected from Chandwa weighted 1.407 g and 2.394 g (for 100 seeds), which resulted into 48.68 and 16.8 percent germination, respectively in nursery. Seedlings of *F. macrophylla* (550) and *F. semialata* (50) attaining height (average 20 cm) have been transferred to poly bag containing sand : soil: FYM in a ratio of 1:2:1.

Exploration of lac cultivation on non-traditional host *Flemingia* sp. and its possibility in sustainable plantation forestry. *F. mocrophylla* at 4 months after planting under *D. sissoo* shade.

Project 5: R and D and extension activities in nucleus brood lac farms and market data collection and dissemination [IFP-18/ERM/P-XII/2002]. *Principal Investigator - Mr. P. Anand.*

Status: Four Nos. of nucleus brood lac farms for production of good quality of brood lac for fulfillment of demand of lac growers were maintained. 50 kg of brood lac was distributed among 20 local villagers to promote lac cultivation. The seasonal farm activities for production of brood lac of both rangeeni and kusumi strains were taken up creating a cycle of brood production, which had earlier been disrupted. N.B. Farm, Chandwa and Malichak Farms have been rejuvenated by planting new young plants of lac host species, palas. At Chandwa, 985 palas seedlings have been planted and at Malichak, 3000 palas trees have been thinned out in the coppice crop. Data on lac production, marketing and haat were collected and compilation works are in progress.

Education and trainings

- Training cum Demonstration was organised on Modern Nursery Techniques and Planting Stock Improvement. 14 ACFs and 13 ROFs of Jharkhand SFD participated in the training programme on 21-23 January, 2003 and 28-30 January, 2003.

Modern nursery technique and planting stock improvement

- Modern Nursery Techniques and Mass Propagation through Tissue Culture Techniques and Hardening of plantlets was demonstrated to the students of Forestry Faculty of Birsa Agricultural University, Ranchi.
- One day training cum field demonstration on modern technique for lac cultivation for local farmers/ lac growers was organized on 25.03.2003 at N.B. Farm, Chandwa in which 60 villagers participated.
- Training on lac cultivation and application of composts was imparted by the Institute's experts to the members of Joint Forest Management Committees of Giridih district of Jharkhand on 29.03.2003 in a programme under the auspices of SFD, Jharkhand.

Publications

- A brochure titled "Institute of Forest Productivity- A Profile" has been published.