

## CHAPTER VIII

# INSTITUTE OF FOREST PRODUCTIVITY RANCHI

**T**he Institute of Forest Productivity (IFP) under the Indian Council of Forestry Research and Education is mandated for steering the forestry research in the states of Jharkhand, Bihar, West Bengal and Sikkim having total actual forest cover of about 38002 sq. km, which is 14.1 per cent of total geographical area. Six agro-ecological zones and eight main forests types are covered within its jurisdiction.

### PROJECTS COMPLETED DURING THE YEAR 2004-2005

NIL.

### PROJECTS CONTINUED DURING THE YEAR 2004-2005

**Project 1: Soil Vegetation interaction with special reference to nutrient cycling in some selected plantations under different edaphic conditions [IFP-9/SLR/P-III/2002-2006]**

**Status:** A series of nursery trials have been conducted at Netaipur, Midnapore to study the role of major plant nutrients (N, P, K, Mg and Lime) on growth and uptake pattern of nutrients for optimization of most suitable combinations of nutrient doses for *A. auriculiformis*, *A. mangium* and *Eucalyptus* sp. The optimum doses of individual N, P, and K for *A. mangium* seedlings on degraded lateritic soil without liming were found to be 25 to 40 mg N, 25 mg  $P_2O_5$  and 5 mg  $K_2O$  per kg soil. While combined dose of 54 to 81.5 mg urea, 27.5 to 42 mg SSP with 8 to 12 mg MOP was found to be optimum. Liming (@ 2.84 mg / kg soil) of degraded soil favoured

growth of all the three tested species and combined application N, P and K have further improved the growth. For the seedlings of the said species under lime treatment the most economic doses were found to be 67.8 mg urea, 27.5 mg SSP and 8.33 mg MOP. The individual optimum doses for these species were: 97.83 mg urea, 27.78 mg SSP, 33.33 mg MOP for *Eucalyptus* sp.; 32.6 mg urea, 111.1 mg SSP, 33.33 mg MOP for *A. auriculiformis*; 65.22 mg urea, 69 to 111.1 mg SSP and 33.33 mg MOP for *A. mangium*.

**Project 2: 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]**

**Status:** Rhizobium inoculation with organic amendments in soils on *Acacia auriculiformis* showed incremental role of biofertilizers for growth and biomass production. In the absence of organic amendments Rhizobium culture Rz/A-02 favoured maximum growth followed by Rz/A-06. Pot soils untreated with biofertilizers favoured maximum growth with vermicompost followed by coconut coir, rice husk, bamboo litter and FYM. However, coconut coir did not favour better growth increase with rhizobium culture. Steady growth and organic matter production were recorded in *A. auriculiformis* treated with acacia seed hull bamboo litter and vermicompost in addition to biofertilizer inoculation. As far as collar diameter is concerned, vermicompost, compost, FYM and bamboo litter accentuated growth of the plants though biofertilizer



application with saw dust showed delayed but little positive effect.

The percent increment in stem length of *Eucalyptus tereticornis* in soils without organic matter amendment was increased from 240 to 288 with *Azotobacter* culture. In general, all the organic matter except rice husk increased the growth of plants (up to 414% increment in stem length) without biofertilizers. With biofertilizers, this increase attained maximum value of 543% with bamboo litter. For combined effect of biofertilizer and organic matter, consistently better performance was recorded with bamboo litter followed by vermicompost, compost and rice husk. This trend was reflected in collar diameter development and total organic matter production by the *Eucalyptus* sp.

Results on the role of VAM and *Azotobacter* on *Azadirachta indica* showed that organic matter addition significantly enhanced the growth of the species in comparison to that observed in untreated soil. Liming was found to be more prominent than individual influence of VAM fungi and *Azotobacter* bacterial inoculation in soil treated or untreated with organic matter. However, mixed biofertilizer inoculation in addition to liming were found to be more effective in increasing shoot length, collar diameter root and above ground biomass of *Azadirachta indica*.

### **Project 3: Follow-up activities and maintenance of PSIP assets developed under FREE Project [IFP-19/BGT-SP-8/P-1/2002-2007]**

**Status:** Due to financial crunch in the current financial year 2004-2005, action plan has been revised. The work is being done according to revised action plan. Weeding, hoeing, and fertilizer application has been completed in VMG and SSO plots of Gamhar and Sissoo. The Bark treatment of insecticide (Dursban) to all Sissoo plants was done. After maintenance for two years

some plants showed good growth in seed orchards.

### **Project 4: Multilocal field trial of tissue culture raised plantlets of *Dendrocalamus asper* [IFP-4/BGT-SP-4/P-I/2002-2006]**

**Status:** Pre-monsoon 2002 plantation at Mandar and Midnapore has crossed two years of age. Mean performance for all characters has been computed. Though the increase in mean culm height along with duration has been found in both the locations, the rate of increment is more in Midnapore.

Monsoon plantation has been carried out in all the three locations in 2003. Till now the performance of Sukna is the best among three locations. Moreover, pre-monsoon and monsoon plantation has already been carried out in this year in all the three locations with 4 irrigation treatments including control as per the recommendation of RAG. For the plantation in post-monsoon 2004, hardened plantlets have already been sent to Sukna and Midnapore.

### **Project 5: Genetic Improvement of *Eucalyptus* through progeny trial and hybridisation [IFP-7/BGT-SP-7/P-1/2002-2006]**

**Status:** Seedlings were planted and established well. Mortality were replaced. Phytosanitary measures were undertaken by applying bavistin and dursban. Growth data (Collar diameter, height and number of branches) of all the plants have been recorded. Further work is in progress.

### **Project 6: Studies on variability of Bamboo species, their performance, conservation and economics with reference to Bihar, Jharkhand and West Bengal [IFP-10/BS-P-IV/2002-2007]**

**Status:** Field survey was conducted in Deoghar, Dumka, Hazaribagh and Chatra districts of



Jharkhand, Purnia district of Bihar and West Midnapore district of West Bengal. Altogether, distribution of 22 species was observed of which 12 were identified. Two flowering species (*B. tulda* and *Dendrocalamus strictus*) were also recorded during survey work.

Natural regeneration of Bamboo have been studied at Trikut hills, Deoghar, Saparam Hills, Dumka, National Park, Hazaribagh and Natural Forests, Pabo, Chatra. Natural regeneration has also been observed in villages of Midnapore, West Bengal. Only two species (*Bambusa arundinaceae* and *Dendrocalamus strictus*) were found to be regenerating naturally within the study areas. Forest plantation data have also been collected from Purnia, Bihar, Deoghar (Jharkhand) and Midnapore (South-West Bengal).



*Dendrocalamus membranaceus*  
Rhizome

Among the species studied in Jharkhand and South-West Bengal, *Bambusa vulgaris* and *B. balcooa* showed higher growth in terms of culm

circumference at breast height and culm or clump height. In respect to number of culms per clump, naturally occurring *D. strictus* showed rapid development. Among the species of Bihar, Kathiashoed bears maximum culm height and diameter at breast height. This is followed by Ban Bans, Harauth, Chabb and *B. nutan*.

### **Project 7: Planting Stock Improvement in relevance to Chotanagpur plateau area and South-West Bengal [IFP-1/BS-SP-1/P-I/2002-2006]**

#### **Sub-project: Standardization of suitable potting media and root trainer size for improved planting stock production of some mandate species of Jharkhand and Southern West Bengal**

**Status:** *Acacia mangium* and *Eucalyptus camaldulensis* species have been raised in three sized hykopots of 150 cc, 250 cc and 350 cc for assessing the suitable media mixture, dose of biofertilizer and chemical fertilizer for hykopot. Height of the seedlings raised in 350 cc hykopot was found higher after 45 days than that under 250 and 150 cc hykopots.

### **Project 8: Cultivation and extension of Lac on new non-traditional hosts [IFP-13/NWFP-SP-I/P-VII/2002-2005]**

#### **Sub-project: Exploration of Lac Cultivation on non-traditional host *Flemingia* spp. and its possibility in sustainable plantation forestry**

**Status:** Jethvi and Baisakhi plantations were pruned for inoculations and Agani and Katki plantations were inoculated with broodlac in *Flemingia macrophylla*, sub-plot Jathvi and Baisaki crop of Kusumi and Rangeeni strains respectively were pruned and five shoots per plant are maintained. Sub-plot Agani and Katki crop of Kusumi and Rangeeni strains,





respectively, were inoculated with brood lac. Lac crop is maintained by timely application of insecticide (Thiodan and Nuvon) and fungicide (Bavistin). Insect pest of lac and lac host are recorded. Light intensity and humidity both in under shade and open conditions were recorded.

*Flemingia macrophylla* and *Flemingia semialata* plantations were maintained with proper weeding, watering and timely application of fertilizer, FYM and insecticide.



Lac cultivation in Agani plot

#### **Project 9: Trials on composting for Specific afforestation needs and development of cost-effective [IFP-2/BS-SP-2/P-I/2002-2007]**

**Status:** Pot trial with compost (5 treatments) under *D. sissoo* and *G. arborea* species has been carried out for 6 months to study the effect of compost on the growth of the said species. Growth of *G. arborea* under field trial of compost was measured and data tabulation and computation have been done. In field trial of compost 5 treatments 0, 200, 300, 400 and 500 g/pit compost were applied. Growth of plant (height and collar dia) was measured and data were

recorded. Tabulation and computation of data for the experiments are being carried out.

#### **Project 10: R&D Activities on Lac (Annual Programme) “R&D and Extension Activities in Nucleus Broadlac Farms and Market data collection and dissemination” [IFP-18/ERM/P-XII/2002/R&D and Extension on Lac]**

**Status:** Training programmes were organized at different locations. Work is in progress.

#### **Project 11: Development of appropriate agro-silvicultural systems for selected medicinal flora of Chotanagpur and Santhal Parganas [IFP-20/ERM (MP)/2003-2008]**

**Status:** Plants collected from the wild in Parasnath and Netarhat tour viz. *Asparagus racemosus*, *Rauwolfia serpentina* and *Withania somnifera* were planted in big cement pots containing a mixture of mud, sand, compost and insecticide. Some of the tubers of *Gloriosa superba* and *R. serpentina* plants were also planted in 500 cc hycopots where they have grown quite well. All the plants grown in pots survived very successfully. Germination experiments were conducted with the seeds of the plants *A. racemosus* and *R. serpentina*.

#### **Project 12: Creation of Germplasm Resource bank of threatened medicinal plants of Darjeeling, Himalaya [IFP-11/ERM (MP)/P-V/2003-2008]**

**Status:** Five medicinal plants species i.e. *Rauwolfia serpentina*, *Dioscoria deltoidea* and *Curculigo orchioidea*, *Acorus calamus* and *Hedychium spicatum* have been collected from different regions of Darjeeling and are being raised in nursery beds. Herbarium of collected specimen species has been prepared. Soil



samples were also collected for analysis. All medicinal plants under study except *Aconitum ferox* have been raised in permanent nurseries at Udai Singh Jote Research Plot. Proper caring and maintenance of growing plants are being carried out. Timely intercultural operations and pest control measures were provided to plants in beds. Plants are grown at different spacing to see the effect of spacing on growth and yields of crop.

**Project 13: Studies of perceptible transitions and their dynamics in forest management policies and operational mechanism in Bihar (Now Bihar and Jharkhand), West Bengal and Sikkim in recent times [IFP-21/FMS (Policy Research)/2003-2006]**

**Status:** Documents related to study (chiefly circulars, executive instructions and policy guidelines) has been collected from Sikkim and Bihar.

Design of Questionnaire Survey for JFM has been finalized and question contents on JFM policies (for top executives) have been formulated with special reference to Bihar and Jharkhand and it has been circulated to the top officials of both the states (Secretary to the Ministry of Forests, Principal Chief Conservator of Forests and C.C.F. (Development)).

**NEW PROJECTS INITIATED DURING THE YEAR 2004-2005**

**Project 1: Development of agro-techniques for *Gynmena sylvestre* and *Embelia ribes*-medicinal plants of high marketing potential [IFP-22/ERM(MP)-P-VIII/2004]**

**Status:** Plants and seed collection activities have been going on from various sources viz. natural forests, SFDs, NBPGR and private nurseries. Appropriate planting techniques for the propagation of different medicinal plants are being developed. Suitable germination experiments have been designed for the seeds collected from different sources.

**Project 2: Progeny trial of *Gmelina arborea* [IFP-24/BGT(TI)/2004-2007]**

**Status:** Progeny trial is in progress. Attempts to replace causalities are being made.

**Project 3: Documentation of indigenous knowledge on conservation and sustainable management in Darjeeling, Himalayas [IFP-25/EE/2004-2007]**

**Status:** Literature survey was conducted during the period. Local forest officials and personals from University and NGO were contacted. Topographical map of area was obtained.

**PROJECTS COMPLETED DURING THE YEAR 2004-2005**

**(Externally Aided)**

NIL.

**PROJECTS CONTINUED DURING THE YEAR 2004-2005**

**(Externally Aided)**

**Project 1: *Schleichera oleosa* (Lour.) Oken, a lac host: *In vitro* propagation (Funded by DBT) [IFP/2003-2006]**

**Status:** So far 17 CPTs has been selected from different regions of Jharkhand and Orissa.





## RESEARCH ACHIEVEMENTS

| Name of State | No. of Projects completed in 2004-2005 | No. of on-going Projects in 2004-2005 | No. of Projects initiated in 2004-2005 |
|---------------|--|---------------------------------------|--|
| Jharkhand     | Nil                                    | 11                                    | Nil                                    |
| West Bengal   | 2                                      | 11                                    | 2                                      |
| Bihar         | Nil                                    | 2                                     | NIL                                    |
| Sikkim        | Nil                                    | 1                                     | Nil                                    |

## TECHNOLOGY ASSESSED AND TRANSFERRED

1. Clearing of ground weed before inoculation prevents lac crop from predator insects.
2. During summer, when temperature was around 38-45<sup>0</sup> C, spraying of water on lac crop has prevented lac crop from mortality.
3. For few species optimal dose of fertilizer requirement for nursery seedlings was developed under the Project "Soil-Vegetation interaction with special reference to nutrient cycling in some selected plantations under different edaphic conditions".
4. Optimization of time for biofertilizer application in seedlings.
5. Compost prepared from rice straw and rice husk mix in below and above ground chamber in bulk quantity.
6. Vermicompost has been prepared from cowdung and rice straw.

programmes on "Modern Nursery Techniques" in four modules from 6<sup>th</sup> and 7<sup>th</sup> May, 11<sup>th</sup> and 12<sup>th</sup> May, 14<sup>th</sup> and 15<sup>th</sup> May and 18<sup>th</sup> and 19<sup>th</sup> May, 2004.

## LINKAGE AND COLLABORATION

### International

- DFID (U.K.)
- IDRC

### National

- NABARD
- Medicinal Plant Board
- Department of Biotechnology
- Central Coalfields Limited
- Damodar Valley Corporation
- ILRI, Namkum
- ISM, Dhanbad
- HARP, Plandu
- BAU, Kanke, Ranchi
- SFD, Jharkhand
- SFD, West Bengal
- SFD, Bihar

## EDUCATION AND TRAINING

1. 60 Foresters/Forest Guards of SFD Jharkhand participated in two day training

## PUBLICATIONS

- Annual Lac Bulletin of the Institute.



## CONSULTANCY

Consultancy was taken up on Green Belt Development in Chandrapura Thermal Power Station and Maithan Right Bank Thermal Power Station proposed by Damodar Valley Corporation, Kolkata.

## CONFERENCES/MEETINGS/ WORKSHOPS/SEMINARS/ SYMPOSIA/EXHIBITIONS

### Organized

1. One day training programme on “Lac Cultivation on Modern Techniques” was imparted by Shri S. N. Vaidya, R.A.-II and Shri B. D. Pandit, R.A.-II of the Institute on 9<sup>th</sup> June, 2004 at Gumla Divisional Forest Office, in which DFOs, ACFs. Foresters, Forest Guards, Villagers, Van Samiti Members of different Van Samitis participated.
2. Two days training programme on “Lac Cultivation on Modern Techniques” alongwith demonstration with Kusmi Broodlac was imparted at Kansabel Range and Pathargaon Range (Chingrapathak), Chhattisgarh by Sh. S. N. Vaidya, RA-II, Shri B. D. Pandit, RA-II and Shri Basant Kumar, TA-‘C’ of the Institute on 25<sup>th</sup> and 26<sup>th</sup> June, 2004 in presence of SDO (ACF), Asstt. Development Officer of Kansabel Block in which Farmers, Members of Van Samiti and Forest Staff participated.
3. Two days field training on “Improved and Scientific Methods of Lac Cultivation” was organized at Pendra Road, under Marwahi Forest Division, Chhattisgarh from 6<sup>th</sup> and 7<sup>th</sup> October, 2004. The training was imparted by Shri S. N. Vaidya, RA-II and Shri B. D. Pandit,

RA-II and was attended by 30 trainees which included Foresters, Forest Guards and members of Van Suraksha Samitis under Marwahi Forest Division.

4. Four days Training Program on “Improved and Scientific Methods of Lac Cultivation” for 10 number of Forest Guards and Van Suraksha Samiti of ‘Jaspur Forest Division, Chhattisgarh from 27<sup>th</sup> to 30<sup>th</sup> October, 2004. The training also included Field Demonstration at Turhamu N.B. Farm and field visit at ILRI Namkum and Sidrawl Lac Factory of JHASCOLAMF, Ranchi.

### Attended

1. Shri R. K. Mishra, DCF attended the 24<sup>th</sup> meeting of Kharif Research Council of Birsia Agricultural University, Ranchi on 1<sup>st</sup> and 2<sup>nd</sup> June, 2004.
2. Shri R. K. Mishra, DCF attended the 22<sup>nd</sup> Research Advisory Committee – Vanya Silk meeting held at Central Tassar Research and Training Institute, Central Silk Board, Nagri, Ranchi on 10<sup>th</sup> and 11<sup>th</sup> June, 2004.
3. Shri R. K. Mishra, DCF and Dr. B. N. Diavakara, Scientist-B attended the meeting of “Inter Institutional linkage for Agroforestry Research” held on 28<sup>th</sup> June, 2004 organized by Horticulture Agriculture Research Programme, Ranchi at Plandu.
4. Shri Premjit Anand, DCF attended group meeting of ‘Lac Related Organizations’ on “Researchable Issues” held on 24<sup>th</sup> August, 2004 at ILRI, Namkum, Ranchi.
5. Shri M. P. Gupta, Technical Assistant Gr.’C’ is attending three weeks Agromet Observer’s Course scheduled from 20<sup>th</sup> September to 8<sup>th</sup> October, 2004 conducted by Office of the Deputy Director General of



Meteorology (Agrimet Division), Shivajinagar, Pune.

6. Dr. V. P. Panwar, Research Officer attended the International Workshop on “Ecological Process” held from 4<sup>th</sup> to 8<sup>th</sup> October, 2004 at Shenyang, China organized by Institute of Applied Ecology, Chinese Academy of Sciences, China. An oral presentation on the topic “Patterns of Liter Nutrient Concentration in *Taxus baccata* Linn. and *Quercus semecarpifolia* Smith forests of the Western Himalayas” was delivered by him.
7. Shri P. K. Chawdhry, Director of the Institute attended the Regional Workshop on

“Non Wood Forest Produce including Medicinal, Aromatic and Dye Plants” held from 3<sup>rd</sup> and 4<sup>th</sup> November, 2004 at Raipur organized by Chhattisgarh State Minor Forest Produce (T&D) Cooperative Federation Ltd., Raipur.

8. Dr. Animesh Sinha Scientist-C and Shri B. S. Chandrashekar, Scientist-B attended IUFRO International Conference on “Multipurpose Trees in the Tropics: Assessment, Growth and Management” at AFRI, Jodhpur from 22<sup>nd</sup> to 25<sup>th</sup> November, 2004.