

## CHAPTER VII

# HIMALAYAN FOREST RESEARCH INSTITUTE SHIMLA

**H**imalayan Forest Research Institute (HFRI), Shimla, Himachal Pradesh was established as Conifer Research Centre during May, 1977 for carrying out Research on problem associated with natural regeneration of Silver fir and Spruce. The Centre developed the technology for the same and transferred it to the State Forest Departments. During reorganization of forestry research and coming up of Indian Council of Forestry Research and Education (ICFRE), Dehradun in 1987, the mandate of this Centre was enhanced from Regeneration of Silver fir and Spruce to Eco-Rehabilitation of Cold Deserts, Mined Areas Rehabilitation besides studies on Regeneration of Coniferous and Broadleaved Forests with the responsibility of addressing the problems of Forestry Research in the Western Himalayan States of Himachal Pradesh and Jammu and Kashmir. This Centre was re-designated as Himalayan Forest Research Institute, Shimla in 1998.

### PROJECTS COMPLETED DURING THE YEAR 2003-2004

NIL.

### PROJECTS CONTINUED DURING THE YEAR 2003-2004

**Project 1: Comparative studies on the ecology of degraded forests viz.-a-viz. relatively undisturbed forests in different eco-climatic zones of the region [HFRI-010/01(EBC-04)/PLAN/2000: 2000-2005]**

*Principal Investigator - Dr R.K. Verma*

**Status:** A degraded site was identified in Mandhala Forests of Kuthar Forest Range falling under Kunihar Forest Division, Himachal Pradesh and initial ecological survey of the area was conducted. Dominant species of the sites identified and diversity index was also recorded. Survey to assess the needs pertaining to fuel wood and fodder-requirements etc. of the villagers living around the degraded areas was also carried out following PRA techniques.



(1)



(2)

Rehabilitated Sites at Mandhala - Supporting: (1) *Acacia catechu* (2) *Dalbergia sissoo*

After analyzing the initial information, a demonstration plantation of *Grewia optiva*, *Bauhinia variegata*, *Acacia catechu* and *Leucaena leucocephala* was established over an area of 1 ha.

Plant diversity studies in and outside the experimental plot by laying out quadrats were carried out. *Andropogon* species was still found to be dominating the area. Also collected the soil samples to assess the changes in fertility status of the soil.

**Project 2: Assessment of conservation status of Hill Bamboos (Nirgals), collection of germplasm from various eco-climatic zones in Sutlej catchment area and establishment of germplasm bank [HFRI-011/02(EBC-05)/PLAN/2000: 2000-2005]**

*Principal Investigator - Dr K.S. Kapoor*

**Status:** Survey of Hill Bamboos i.e. *Arundinaria falcata* (*Sinarundinaria falcata*) – growing in the lower altitude and *Arundinaria spathiflora* (*Thamanoacalamus spathiflorus*) – a species of higher elevations – commonly known as Nirgals, was conducted in Sutlej catchment of Shimla district comprising forest areas of Taklech, Khunni, Khul in the lower zones and

forests of Kashapath, Sungri-Bali, Nankhari, Hattu and Chichhar, etc. in the higher zones. It was revealed that above two species showed peculiar distribution in the areas of their natural occurrence. Ecological studies were also conducted, where the clump size, number of stems, number of new shoots in a single clump, maximum and minimum diameter of shoots, etc. were recorded for detailed analysis.

During the survey, which continued for more than two years, mass flowering of Hill Bamboos was noticed in different forest areas. *A. falcata* flowered mostly during 2000 whereas this phenomenon in *A. spathiflora* was noticed during 2001 in most of its locations. Mass flowering thereafter, lead to its detailed studies on the germination behaviour and the related growth details of both these Bamboos and their variations amongst the identified blocks. . Later, studies as regard to germination and regeneration behaviour in the Hill Bamboos were conducted in certain identified locations like Batnal, Chicher, Hattu (Narkanda) and Adu Gad (Nankheri) forests. Field observations revealed profuse regeneration of *A. falcata* in different sites, whereas in case of *T. spathiflorus* the germination/ regeneration was negligible.



(1)



(2)

*Thamnocalamus spathiflorus* - (1) Growing under thick blanket of snow (2) Ex-situ Conservation

**Project 3: Development of suitable models for afforestation of mined areas [HFRI-018/01(EBC-07)/PLAN/2002: 2002-2006]**

Principal Investigator - Dr R.K. Verma

**Status:** Ecological survey to assess the vegetational and other related status of the mined out areas was taken up. Trees were found to be absent on the hilltop especially near the vicinity of the mining and slope facing the mine. However, main fodder and fuel wood tree species found in the villages surrounding the mine areas included *Celtis australis*, *Grewia optiva*, *Bauhinia variegata*, *Toona ciliata* and *Quercus leucotrichophora*. Main shrub species were: *Rubus ellipticus*, *Berberis aristata*, *Rabdosia rugosa*, *Hypericum oblongifolium*, *Rosa moschaeta*, *Rhamnus virgatus*, *Hamiltonia sauveolans* and *Prinesipia utilis*. Herbs recorded were: *Eupatorium glandulosum*, *Rumex hastatus*, *Artemesia parviflora*, *Mocromeria biflora*, *Bidens spinulosa*, *Leucas lanata*, *Apluda mutica*, *Polygonum capitatum*, *Blumea mollisina* and *Eulaliopsis binata* etc.

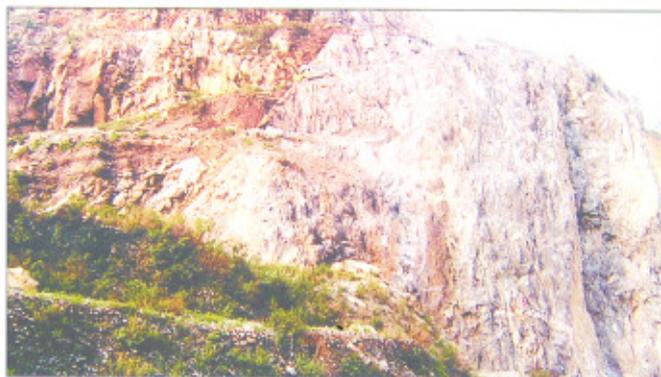
Nursery experiments were conducted in polythene bags of the size of 12"x 22" so as to evaluate the effect of different combinations of Lime Mine Spoil and Forest Soil on the performance of five tree species viz. *Bauhinia variegata*, *Robinia pseudoacacia*, *Eucalyptus* hybrid, *Grewia optiva* and *Toona ciliata*. Combination of Lime Mine Spoil: Forest Soil in the ratio of 1:5 or 1:2 (v/v) was found to be the most effective combination with regard to survival, growth and biomass parameters in all the five species under trial.

As far as species performance in nursery conditions was concerned, *Eucalyptus* hybrid showed the maximum value for height, collar diameter, shoot, root dry weight and total

biomass whereas, survival was observed highest in *Grewia optiva*. The performance of *Eucalyptus* hybrid was followed by *Bauhinia variegata*, *Grewia optiva*, *Robinia pseudoacacia*, and *Toona ciliata* in term of growth and biomass parameters.



Nursery Trials on Various MPTs



Study Site - JST Limestone Mine, Baldwa

Another nursery trial with different combinations of lime mine spoil, forest soil, farm-yard manure, sand and compost was also laid out and it was observed that the combination of lime mine spoil: forest spoil: farm yard manure in the ratio of 1:2:1 was the most effective combination with regard to growth and biomass production in case of *Leucaena leucocephala*, *Eucalyptus* hybrid, *Bauhinia variegata* and *Acacia catechu*.



Field trial was established by planting 600 plants of the species like *Robinia pseudoacacia*, *Leucaena leucocephala*, *Bauhinia variegata* and *Grewia optiva* in JST Limestone Mine, Baldlwa (Paonta Sahib).

**Project 4: Standardization of nursery techniques of five dominant indigenous species (*Capparis spinosa*, *Collutea* sp., *Caragana* sp., *Ribes* sp. and *Cratagus* sp.) besides *Elaeagnus angustifolia* and *Rosa webbiana* of Cold Deserts [HFRI-019/03(EBC-08)/ PLAN/ 2002: 2002-2007]**

*Principal Investigator - Dr K.S. Kapoor*

**Status:** Number of trials were laid out in the nursery to understand the effect of IBA on rooting in shoot cuttings of *Ribes* sp., *Collutea* sp., *Elaeagnus angustifolia*, *Hippophae rhamnoides* and in root suckers of *Rosa webbiana* and *Capparis spinosa*. The effects of different pre-sowing treatments (hot-water and Gibberellic Acid) on germination behaviour in the seeds of *Ribes* sp., *Collutea* sp., *Elaeagnus* sp., *Hippophae rhamnoides*, *Capparis spinosa* and *Rosa webbiana* were also assessed. Sites for taking up detailed ecological studies for these five identified species were selected at Mane, Ladang, Kurith, Hurling, Tabo and at Samdoh.

Species like, *Collutea*, *Cratagus* and *Ribes* were investigated from ecological point of view. Biomass studies of these species were conducted and main associates of these were also recorded. Maximum aboveground ( $2.45 \text{ kg/ m}^2$ ) and belowground ( $1.27 \text{ kg/ m}^2$ ) biomass was recorded in *Cratagus* sp. followed by *Collutea* sp. having aboveground and belowground biomass of  $2.16 \text{ kg/ m}^2$  and  $1.27 \text{ kg/ m}^2$ , respectively.

**Project 5: Screening and selection of insect pest and diseases resistant phenotypes/ provenances**

**of important tree species. [HFRI-013/06 (FPT-02) PLAN-2000: 2000-2005]**

*Principal Investigator - Shri Ranjeet Singh*

**Status:** Provenances and clones of selected tree species were surveyed for insect-pest and disease incidences. Seedlings of deodar from 19 seed sources raised at Shilly were examined regularly and systematically for Deodar defoliator attack. Seedlings raised from the seeds collected from Sareen, Solan, Kalpa and Himgiri showed more resistance against *Ectropis deodarae* compared to others.

Clonal Seed Orchard (CSO) of Shisham at Gondpur, Paonta Valley having 35 clones was screened against *Odontotermis parvidens*. 29 clones and 25 provenance of *Dalbergia sissoo* were also screened against *Plecoptera reflexa* and it was observed that clones with code numbers 90, 203, 36, 260, 107, 66, 59 and 42 were susceptible with infestation level ranging from 97 to 100 percent and least susceptible clones were 28, 101 and 103 having infestation varying from 21.91 to 25.98 percent in field conditions. Among different provenances, provenances with code number 53, 35, 61 and 2 were found susceptible showing infestation level ranging from 89.13 to 93.75 percent and the provenance with code no. 46 and 94 had shown 21.02 to 24.11 percent infestation.

Seven provenances of Chir Pine in Himachal Pradesh were screened against the insect stem borers complex. Data as collected for 4 provenance was analyzed and it was found that Seer Kunar Khud provenance is comparatively more resistant to insect borer complex in comparison to provenances of Giri Gambhar, Kangra valley and Pabbar Tons.



**Project 6: Development of model for integrated pest management with special reference to *Cedrus deodara* [HFRI-017/06(FPT-03) PLAN-2000: 2000-2005]**

Principal Investigator – Shri Ranjeet Singh

**Status:** Bio-ecology of *Ectropis deodarae* Prout was studied and it was observed that the pest was able to complete only one generation in a year. Females were found to deposit eggs on the tender needles of Deodar during the spring and the total incubation period ranged from 8.5 to 15.0 days. Light green colour larvae of *E. deodarae* were found to be hatching out from the eggs during April and May. These were observed changing their colour from pale straw to pinkish brown during development in the last larval stage. Its larvae showed quite high resemblance to the smaller twigs and arrested shoots of infested trees. It was seen that the larvae feed on the needles for about 32 to 37 days and cause maximum damage during May to June. During the larval development, larvae moulted four times and thus passed through five larval instars. It fed voraciously from the top to the base of needles and also damaged the apical shoots in the seedling stage, thereby forming bushy and stunted growth. Full fed larvae pupated without forming silk in the humus by the end of June or first week of July. Thirty-seven tree species were surveyed and infestation of this pest was found only on four coniferous trees. Maximum infestation was observed on *Cedrus deodarae*. Economic Threshold level (ETH) was worked out to be seven larvae per meter branch. Low to moderate larval parasitization by the hymenoptern parasites *Apanteles glomeratus* Linn., *Apentalus ruficrus* Haliday, *Dusoma deodarae* Cruch., *Brechymeria obscurata* Walk. and *Campoplegidae deodarae* were reported.

The larva and pupa of this pest of *Ectropis deodarae* were found to have infections of different fungi, bacteria and a virus. Six different fungi viz., *Asparagillus flavus*, *Aspergillus* sp., *Beauveria bassiana*, *Dimargasis* sp., *Fusarium moniliforme* and *Mucor* sp. were isolated and identified from larvae and pupae of *E. deodarae*. *Asparagillus flavus*, *Aspergillus* sp. *Dimargasis* sp. and *Fusarium moniliforme* were isolated only from pupae of *E. deodarae*. However, *Beauveria bassiana* and *Mucor* sp. caused mortality both in larval and pupal stages. Two species of *Bacillus* viz., *Bacillus ceceus* var. *mycoides* (Flugge) and *Bacillus thuringiensis* (Ber.) infected larval stages of *E. deodarae*. NPV was also isolated from larvae of *E. deodarae* collected in Jhungi forest. *Bacillus cereus*, *Beauveria bassiana* and NPV were found causing considerable larval mortality, which, of-course changed with time. Maximum infection was noticed from *Beauveria bassiana*.

**Project 7: Standardization of nursery techniques for mass propagation of selected medicinal plant species [HFRI-009/07(NWFP-01)/ PLAN/ 2000: 2000-2005]**

Principal Investigator - Dr Sandeep Sharma

**Status:** Germplasm of 33 species of medicinal plants of temperate Himalayas in Brundhar nursery (Manali), 30 species at Shilly nursery, Solan and 10 species each at Shillaru and Model Nursery (Shimla) was maintained. In one of the studies, preliminary results indicated that optimum spacing/density for commercially raising *Valeriana jatamansi* in the field is 9 plants/m<sup>2</sup>. Based on this, Multiple Nursery Planting Bar has been designed, fabricated and commissioned for large scale adoption of the study results. In another study, first fortnight of June found to be the best period for



multiplication/proliferation of *Valeriana jatamansi* in the nursery with maximum survival. In higher hills, it was found that the optimum period for collection of *Angelica glauca* and *Picrorhiza kurooa* from natural habitat for cultivation in nursery/field is the first fortnight of May and second fortnight of May respectively. In mid hills, it was found that the optimum period for collection of *Viola serpens* and *Asparagus adscendens* from natural habitat for cultivation in nursery/field is the second fortnight of July and first fortnight of August respectively.

Trials are in progress for improving the agro-techniques of economically important medicinal plant species viz. Karu, Patish, Mushkbala, Salam-Misri and Chora etc. Information pertaining to ethnobotanical importance for 25 plant species was collected from the villagers of Solan and Shimla districts of Himachal Pradesh. Population status of medicinal plants in the Shilly area of Solan district was also assessed by laying out quadrates. The result indicated that *Rhododendron arboreum* is the dominant medicinal tree whereas *Myrsine africana* and *Viola* spp. were the dominant and medicinally important shrub and herbs respectively.

**Project 8: Standardization of methodology for collection of seed, its handling, storage, testing and certification of seeds of important tree species [HFRI-012/05(SFG-04)/PLAN/2000 : 2000-2005]**

Principal Investigator - K. S. Thakur

**Status:** Seeds of *Prunus cornuta*, *Aesculus indica*, *Acer caesium*, *Abies pindrow*, *Picea smithiana*

and *Quercus dilatata* were collected at 7-10 days interval and were sown in the nursery to find out the optimum time of collection. It was found that in Moru Oak (*Quercus dilatata*), the optimum time of collection of acorns under temperate conditions of higher hills of Shimla district (H.P) was the first week of August with 72.67 percent germination whereas acorns collected during first week of September produced only 6.67 percent germination. In one of the storage trials, seeds of *Cedrus deodara* stored in refrigerators (<4°C) in paper bags retained substantially high germination percent as compared to other containers/storage environment. Germination studies were conducted on the seeds of *Embllica officinalis* collected from 12 different seed sources. The maximum germination was recorded in Durang seed source (66 percent) of Sirmour district followed by Chandi seed source (49.33 percent) of Solan district of Himachal Pradesh. The germination per cent in the fresh seeds of *Viola serpens* reduced from 85.33 percent to 68.66 percent after two months of their collection and touched a low of 22.66 percent within six months of seed collection when stored under ambient conditions.

**Project 9: Developing efficient methods for preparation of compost from different locally available raw materials in different eco-climatic zones [HFRI-015/05(SFG-05)/PLAN/2000: 2000-2005]**

Principal Investigator - Dr Sandeep Sharma

**Status:** It was seen that in the temperate conditions almost 10 months are required for the



production of compost through aerobic composting in case of Deodar and Kail needles whereas, such type of composting from grasses, nursery weeds and leaves of broadleaved species like Poplars, Salix and Alnus etc. can be accomplished within 4-5 months if taken up during April to December months. During the present study, composting time of Deodar and Kail needles was reduced to 8 months when the same was treated with fresh cow dung or mixed with weeds or leaves of broadleaved species during composting. During the period, a new compost unit had been designed and commissioned at Nalagarh for studying compost production from different locally available raw material of lower Himalayas. Studies indicated that in Temperate Himalayas aerobic composting of weeds, grasses and leaves of broadleaved could be done easily from the month of March to November. The work on composting of Pine needles is in progress particularly to reduce the composting time. The composting time of deodar and Kail needles was further reduced to 6 months when fresh cow dung fully soaked in urine added around 20 percent of the total volume during composting. Further refinements in aerobic compost production at different nurseries are in progress.

**Project 10: Standardization of nursery techniques of raising containerized seedlings of conifers and their broadleaved associates [HFRI-016/05(SFG-06)/ PLAN/ 2000: 2000-2005]**  
*Principal Investigator - Dr Sandeep Sharma*

**Status:** In the preliminary trial of root-trainer seedling production system in deodar, it was observed that single celled root trainer of 300 cc capacity performed better than other types and

sizes of root trainers used in the trial. In case of plug+2 experiment in Spruce (*Picea smithiana*) root plug formed in 250 cc block type root-trainer of one year old and subsequently planted in nursery beds for 2 1/4 years resulted in better root biomass and root/shoot ratio over control. Trials on vegetative propagation of *Elaeagnus umbellata* and *Colutea nepalensis* indicated that IBA significantly promoted induction and growth of adventitious roots. Studies on vegetative propagation of *Cedrus deodara* and *Juniperus macropoda* are in progress.

**Project 11: Studies to evaluate impact of ban on green felling on regeneration of conifer species (Deodar) [HFRI-20/05(SFG-07) PLAN-2002: 2002-2006]**

*Principal Investigator - Dr Rajesh Sharma*

**Status:** Stand evaluation of Cheyog forest, Chopal (Chopal forest), Kullu (Manali and Nagar forests), Chamba (Khani and Kalhail forests) and Dalhousie (Kalatop forests) was carried out and 16 sites were covered and the relevant data was collected accordingly.

It was observed that stands with wide openings, small openings and no opening had profuse, medium and poor regeneration, respectively.

## NEW PROJECTS INITIATED DURING THE YEAR 2003-2004

**Project 1: Introduction and performance trial of *Paulownia* species for agro-forestry in different agro-climatic zones of Himachal Pradesh [HFRI-026/08 (AGF-02) Plan-03: 2003-08]**

*Principal Investigator - Shri Jagdish Singh*

**Status:** Survey was conducted and the sites of approximately 1 ha. each were selected in

different agro-climatic zones for establishing the introductory plantations. Vegetative propagules of four different species of Paulownia viz. *P. fortunei*, *P. elongata*, *P. tomentosa* and *P. fargessi* were procured from ICFRE, Dehradun and the seeds of *P. fortunei* were collected from Kullu (H.P.). About 2500 Entire Trans Plants (ETPs) - through vegetative multiplication and also from seeds were raised for carrying out field plantation. Nursery trials of *Paulownia* species at Johron, Poanta Sahib - representing the Lower Hill Zone and at Model nursery Baragoan, Shimla - representing the Mid Hill Zone of Himachal Pradesh were established.



3½ months old *Paulownia* spp. trial at (Poanta) Lower Hill Zone



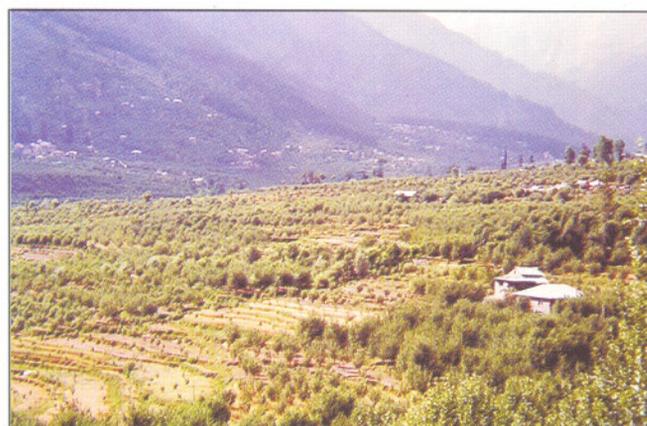
3½ months old *Paulownia* spp. trial at (Model nursery) Mid Hill Zone

To assess the field performance and suitability of different species of Paulownia for the state of Himachal Pradesh, field trials had been laid out in village Johron (Paonta Sahib), District Sirmour falling in the lower hill zone and at village Dharja, District Solan representing the mid hill zone of Himachal Pradesh.

**Project 2: Diagnostic survey and appraisal of existing agroforestry systems in mid and high hills of Himachal Pradesh [HFRI-028/08 (AGF-03) Plan-03: 2003-2008]**

*Principal Investigator – Shri Jagdish Singh*

**Status:** Surveys were conducted in Kullu district of Himachal Pradesh to select main sites representing mid and high hill zones of the state, to assess the existing agroforestry systems in these identified zones of the district. As a result of this survey it was observed that horticulture is predominant system in high hill zone of the district.



Horticulture - A Predominant System in the High Hills



Ghasnis - being managed by the locals

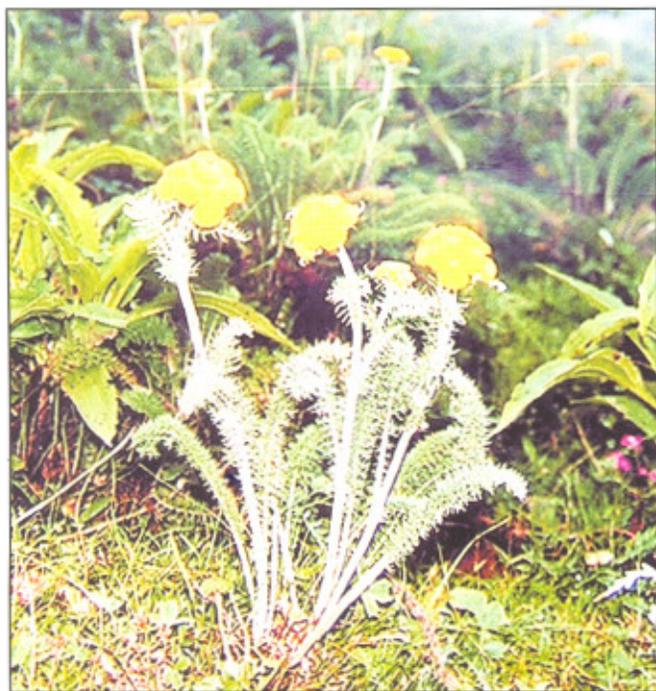
In existing agroforestry systems scattered trees of *Quercus dilatata* (Mohru), *Ulmus laevigata*, *Grewia optiva*, *Morus alba*, *Robinia pseudoacacia*, *Alnus nitida*, *Aesculus indica*, *Ficus palmata*, *Prunus armerinica*, *Pistacia integerrima*, *Populus ciliata*, *Pyrus pashia* and *Salix* sp. etc. were found lining the field boundaries in this zone. Local communities manage Ghasnis - locally known as Phats.

**Project 3: Comparative Studies on the Floristic Composition of Two Diversely Located Alpine Pastures [HFRI-023/ 03(EBC-09)/ PLAN/ 2003: 2003-2006]**

*Principal Investigator - Dr K.S. Kapoor*

**Status:** Field survey in the alpine and sub-alpine areas in Churdhar Wildlife Sanctuary was conducted and following lead to different forest types viz., Anthropogenic Grasslands (2,150–2,450 m); Kharshu Oak – Rhododendron forests (2,400 p 2,700 m); conifer dominated forests (2,700–3,000 m); sub-alpine forests (3,100–3,250 m) and alpine pastures (3,200–3,450 m) were identified.

During field investigations approximately 80 species new to the HFRI herbarium were collected and recording of about 350 species in the total area during the period was done.



*Tanacetum longifolium*



*Goodyrea* sp.

General observations revealed that the grass production and the species composition in the alpine pastures have been affected adversely because of the areas of the sanctuary remaining open to the grazing throughout the year.

**Project 4: Studies on plant diversity of Renuka and Simbalwara Wildlife Sanctuaries of Himachal Pradesh [HFRI-024/ 02(EBC-10)/ PLAN/ 2003: 2003-2006]**

Principal Investigator - Dr R.K. Verma

**Status:** Plant diversity studies to assess the diversity of trees, shrubs and herbs/ regeneration by laying out of quadrats of different sizes in

Renuka and Simbalwara Wildlife Sanctuaries of Himachal Pradesh, those are located at altitude varying from 600 – 850 m asl and 400 – 650 asl, respectively were conducted. Approximately 250 plant species from Renuka and 200 odd plant species from Simbalwara were recorded. On the basis of importance value index (IVI), *Xanthium indicum* was the dominant species followed by *Oplimonus* sp., *Neuimbo nucifera* and *Phylla nudiflora*. Distribution of most of the plant species was contiguous. The value of diversity index and dominance index was 5.976 and 0.021, respectively.



An overview of the Wildlife Sanctuaries: (1) Renuka, (2) Simbalwara



Wild flora of the Sanctuaries; (3) *Gloriosa superba* and (4) *Rauwolfia serpentina*

**Project 5: Development of ecologically viable and socio-economically acceptable integrated model for arresting Willow (*Salix* sp.) mortality in Lahaul Valley of Himachal Pradesh [HFRI-021/03(EBC-09)/PLAN/2003:2003-2006]**

*Principal Investigator - Dr K.S. Kapoor*

**Status:** After carrying out initial survey and ascertaining the basic cause behind large scale mortality of Willow, a detailed report was submitted to the State Forest Department and all other concerned authorities of the state of Himachal Pradesh. Dr (Ms) Ketrin Heinsoo from Estonian Agricultural University was contacted for import of clonal material of Willow. Eight different species of *Salix* from seven different provenances/ sources including Tabo – the cold deserts – and about 350 cuttings raised and maintained in the Model Nursery for establishing demonstration trials.

**Project 6: Natural enemy complex of key and potential pests of five *Quercus* species of Himachal Pradesh [HFRI-027/06 (FPT-05) Plan-2003:2003-2008]**

*Principal Investigator - Dr S. Chakrabarti*

**Status:** The work has started and is in progress



(1) Beetle infected acorns of Ban Oak on forest floor Beetle



(2) Fourth instar larva of *Curculio sikkimensis* damaging Ban Oak acorns

**Project 7: Planting Stock Improvement Programme in *Cedrus deodara* [HFRI-028/05 (SFG-08) PLAN-2003:2003-2008]**

*Principal Investigator – Shri K.S. Thakur*

**Status:** After finalizing the criteria for selection of phenotypically superior trees, 19 CPTs have been marked in different deodar forests. The selection of plus trees is in progress.

**Project 8: Planting Stock Improvement: improved technology for mass production of quality planting stock of *Dalbergia sissoo* [HFRI-026/05(SFG-08) Plan-2003:2003-2005]**

*Principal Investigator - Dr Meena Bakshi*

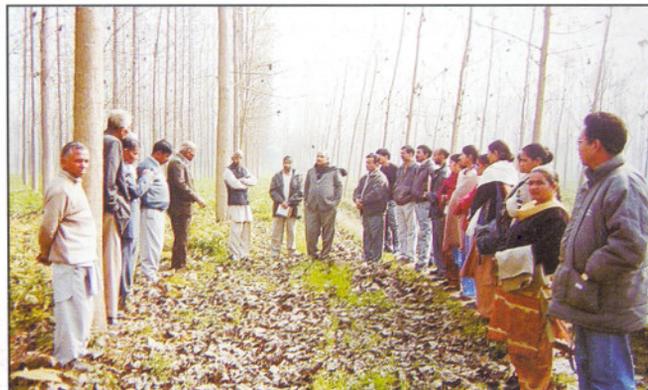
**Status:** Work has been initiated.

### RESEARCH ACHIEVEMENTS

Name of State	No. of projects completed in 2003-04	No. of ongoing projects in 2003-04	No. of projects initiated in 2003-04
Himachal Pradesh	—	20	8
Jammu & Kashmir	—	—	—

## EDUCATION AND TRAINING

1. A student from Indira Gandhi Academy of Environmental Education, Research and Eco-Planning, Jeevaji University, Gwalior (M.P.) was at this Institute for 10 weeks for completion of the project report, which forms an essential part of curriculum for the award of post graduate degree in Environmental Science of the said University.
2. Students undergoing B.Sc. (Forestry) courses at Dharwad Agriculture University, Tamil Nadu Agriculture University, Kerala Agriculture University and other Universities visited the Institute and had interactions with the Officers and Scientists of the Institute.
3. A four members team of Bhutan German Project from Bhutan visited the Institute during March, 2004 for discussing the trends of the modern forestry research. They were also apprised of the various research activities, which are being undertaken by the Institute.
4. An exposure visit of 16 farmers including 7 womens of Balh Valley of district Mandi, Himachal Pradesh was organized. During this visit, the farmers were taken to FRI, Dehradun and the surrounding Poplar growing areas in Uttaranchal to acquaint them with the various end uses of the Poplar wood.
5. Three training programme each of two days duration on commercial cultivation of high altitudinal medical herbs were organized at Roerich Art Gallery, Naggar, Kullu and at Bruhan Dhar Research Station, Manali. These training were sponsored and financed by Ananda Society – a Naggar (Kullu) based NGO.



On field demonstration to the village folk during training on medicinal plants

6. Training on cultivation and marketing of medicinal plants was organized in collaboration with Parvatiya Jan Shiksha Avam Vikas Sansthan – a Sirmour based NGO – at village Bag-Pashag, Sarahan (Sirmour), Himachal Pradesh, where different cultivation techniques and marketing strategies of the important plants of the region were taught and discussed with 40 women trainees.
7. Training cum workshops on conservation and long-term utilization of medicinal plants were organized in various parts of Himachal Pradesh in collaboration with the State Forest Department of Himachal Pradesh. During the workshop importance



of medicinal plants and measures for their long-term conservation for ultimate benefit of the society were discussed.

## LINKAGES AND COLLABORATION

The Institute remained in constant touch with the State Forest Departments of Himachal Pradesh and Jammu & Kashmir, Universities, other research organization and the non-governmental organization working in the field of forestry and forestry research.

## PUBLICATIONS

### Research Papers

1. Tiwari, C.K.; Sharma, S. and Verma, R.K. (2004). Effect of Fungicide and Plant Growth Hormones on Germination of Teak (*Tectona grandis*), *Journal of Tropical Forest Science*, 16(1): 25-34.
2. Singh, Charan; Pandey, V.P. and Kalia, S. (2003). Natural Resistance in Shisham against *Odontotermes parvidens* Holmgren (Isoptera : Termitidae) in foothills of Western Himalays. *Indian Journal of Forestry*, Vol. 26(1): 80-82.
3. Goraya, G.S.; Jishtu, Vaneet; Kapoor, K.S. and Pal, Mohinder (2003). Mass Flowering of Montane Bamboos in Himachal Pradesh: Ushering in the New Millenium. *Indian Forest*, Vol. 129(8): 1013-1020.
4. Kapoor, K.S.; Verma, R.K.; Rawat, Ranjeet S.; Subramani, S.P. and Jishtu, Vaneet (2003). Impact of Plantations Raised in Surface Mined Areas on Floral Diversity and Soil Properties. *Indian Journal of Forestry*, 226(2): 195-200.
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10. Kumar, Surinder; Chakrabarti, S.; Kapoor, K.S. and Kumar, Shailendra (2003). Large Scale Mortality of Willow in Lahaul Spiti Valley, Distt. Lahaul and Sipti, Himachal Pradesh, *The Indian Forester*, Vol. 129 No. 4: 543 – 545.



11. Jishtu, Vaneet; Subramani, S.P.; Kapoor, K.S. and Goraya, G.S. (2003). Medicinal Plants from the Cold Deserts of North-west India. Chapter published in a Book titled, Non-Timber Forest Production of India, 59-94, published by M/S Jyoti Publishers, Dehradun.
12. Verma, R.K; Kapoor, K.S.; Subramani, S.P. and Jishtu, Vaneet (2003). Assessment of Plant Species Diversity in *Betula utilis*, D. Don Forests in Cold Arid Regions of Himachal Pradesh. *Environment and Ecology*, Vol.: 21(4): 922-927.
13. Verma, R.K; Jishtu, Vaneet; Kapoor, K.S. and Subramani, S.P. (2003). Analysis of Plant Diversity in Man-Lunga Valley and Khemangar Valley of Pin Valley National Park in Himachal Pradesh. *Environment and Ecology*, Vol. 21(4): 941-946.

#### Brochures / Technical Bulletins

1. Kumar, Surinder; Singh, Ranjeet; Chakraborti, S.; Karthikeyan, A.; Kumar, Ashok; Singh, Charan; Kumar, Shalindera and Pandey, V. P. (2003). Identification and Management of Pests and Diseases of Important Himalayan Trees.
2. Verma, R.K.; Jishtu, Vaneet; Kapoor, K.S.; Rawat, Ranjeet S. and Kumar, Surinder (2004). Guidelines for Eco-Rehabilitation of Limestone Mined Areas in Himachal Pradesh.

#### Pamphlets

1. Kapoor, K.S. and Rawat, Ranjeet S. (2004). Kachnar – Ek Bahu-Udeshiya Variksha.
2. Sharma, Sandeep; Kumar, Surinder (2004). Variksha Ropan Taknik – Mahatavpuran Jankariyan.

#### Research Reports

1. Singh, Ranjeet; Kumar, Surinder; Kumar, Ashok and Kumar, Shailendera (Sept., 2003). Mortality of deodar trees in and around Shimla town (Research Report No. HFRI/RP/023).
2. Kumar, Surinder; Kumar, Ashok and Singh, Ranjeet (2003). Mortality of Khair (*Acacia catechu* Wild.) in Nahan Forest Division, Himachal Pradesh.

#### CONSULTANCY

1. **Title** : Development of Plan for the Establishment of Temperate Arboratum and Herbal Garden (TAHG) in Himachal Pradesh.  
**Organization** : Wildlife Institute of India, Dehradun  
**Period** : 1 Month  
**Amount** : Rs. 50,000/-
2. **Title** : Cultivation of Medicinal Plants.  
**Organization** : Ananda Society – A Naggar (Kullu) based NGO  
**Period** : 6 days  
**Amount** : Rs. 22,500/-

#### CONFERENCES/MEETINGS/WORKSHOP/ SEMINARS / SYMPOSIA / EXHIBITIONS

##### National Workshops Organized

1. A five day workshop on Conservation, Assessment and Management Prioritization (CAMP) for Selected Medicinal Plant Species of Himachal Pradesh, Jammu & Kashmir and Uttaranchal from 21<sup>st</sup> to 25<sup>th</sup> May, 2003 was organized by the Institute in



- collaboration with Foundation for Revitalization of Local Health Traditions (FRLHT), Bangalore. The finances for the same were fully borne by FRLHT.
2. A two days workshop on Identification of Issues on Sustainable Natural Resources and Land Use was organized on 10<sup>th</sup> and 11<sup>th</sup> December, 2003 in collaboration and full financial support from the Himachal Pradesh Forestry Sector Reform Project (HPSFR), Himachal Pradesh Forest Department, Shimla.
  3. A two days workshop on Participatory Research for Natural Resource Management and Augmentation of Rural Livelihood was organized on 24<sup>th</sup> and 25<sup>th</sup> March, 2004 in collaboration and full financial support from the Himachal Pradesh Forestry Sector Reform Project (HPSFR), Himachal Pradesh Forest Department, Shimla.

### Workshops Attended

1. Shri Surinder Kumar, Dr K.S. Kapoor, Shri K.D. Sharma, Dr R.K. Verma, Vaneet Jishtu, S.P. Subramani and Ranjeet S. Rawat attended 5 days workshop on Conservation, Assessment and Management Prioritization (CAMP) for Selected Medicinal Plant Species of Himachal Pradesh, Jammu & Kashmir and Uttaranchal as organized by HFRI in collaboration and financial support of FRLHT, Bangalore from 21<sup>st</sup> to 25<sup>th</sup> May, 2003 at HFRI, Shimla.
2. Shri Surinder Kumar attended two days workshop on Sustainable Livelihoods for Forest Dependent Women and Men as organized by the Himachal Pradesh Forestry Sector Reform Project at Himachal Institute of Public Administration, Shimla during July, 2003.
3. Shri Surinder Kumar, Dr K.S. Kapoor and Vaneet Jishtu attended two days workshop on Development of Strategic Action Plan for Wildlife Management and Ex-Situ Conservation Strategy for Himachal Pradesh organized by Wildlife Institute of India Dehradun and Wildlife Wing of Himachal Pradesh at Hotel Holiday Home, Shimla on 8<sup>th</sup> and 9<sup>th</sup> August, 2003.
4. Dr K.S. Kapoor attended one day's workshop on Patent on 13<sup>th</sup> August, 2003 at FRI, Dehradun, which was organized by FRI in collaboration with Patent Office, Ministry of Commerce and Industries, New Delhi.
5. Shri Surinder Kumar, Dr K.S. Kapoor, Dr Sandeep Sharma, Dr S. Chakrabarti, Shri Jagdish Singh and Shri Ashok Kumar attended an International Workshop on Short Rotation Forestry for Industrial and Rural Development, which was organized by UHF, Solan in collaboration IUFRO from 8<sup>th</sup> to 10<sup>th</sup> September, 2003 at Solan.
6. Shri Surinder Kumar, K.S. Thakur, Ashok Kumar and Dr A. Rajasekaran attended a workshop on Multi-stakeholder Processes Led Micro-planning for Sustainable Livelihoods, which was organized by HPSFRP at HIPA, Shimla on 30<sup>th</sup> to 31<sup>st</sup> October, 2003.
7. Dr K.S. Kapoor attended presentation made by the Director General, ICFRE before the Secretary, MOEF, New Delhi in the meeting of Board of Governor of ICFRE on 1<sup>st</sup> November 2003 held at Dehradun.
8. Shri Jagdish Singh attended National Workshop on Agroforestry for Sustainable Production at IGFR, Jhansi from 7<sup>th</sup> to 9<sup>th</sup> November, 2003.



9. Shri Ranjeet Singh attended National Symposium on Forest Resource Management as organized by CSA University of Agriculture and Technology, Kanpur from 15<sup>th</sup> to 17<sup>th</sup> November, 2003.
10. Shri Surinder Kumar along with his team of Scientists attended two days workshop on Identification of Issues on Sustainable Natural Resources and Land Use as organized by the Institute in collaboration and financial assistance of HPSFRP, HPFD, Shimla on 10<sup>th</sup> and 11<sup>th</sup> December, 2003.
11. Shri Surinder Kumar along with his team of Scientists attended two days workshop on Participatory Research for Natural Resource Management and Augmentation of Rural Livelihoods as organized by the Institute in collaboration and financial assistance of HPSFRP, HPFD, Shimla from 24<sup>th</sup> and 25<sup>th</sup> March, 2004.
3. Shri D.K. Sharma, Principal Advisor cum Secretary (Planning) to the Government of Himachal Pradesh visited this Institute on 11<sup>th</sup> December, 2003 for inaugurating a workshop on Identification of Issues on Sustainable Natural Resources and Land Use at the Institute.
4. Dr D.N. Tiwari, IFS (Retd.), Member – Planning Commission (Forestry) visited the Institute on 31<sup>st</sup> December, 2003 and held discussions regarding forestry in general and forestry research in particular with the Officers and Scientists of this Institute.
5. Shri J.P. Negi, IAS, Principal Secretary (Forests) to the Government of Himachal Pradesh was at the Institute on 24<sup>th</sup> March, 2004 for inaugurating the workshop on Participatory Research for Natural Resource Management and Augmentation of Rural Livelihoods.

### **DISTINGUISHED VISITORS**

1. Shri Darshan Shankar, Director, FRLHT, Bangalore visited the Institute on 24<sup>th</sup> and 25<sup>th</sup> May, 2003.
2. URS Group from United Kingdom led by Ms Jo Chamberlain along with her team visited the Institute on 26<sup>th</sup> June, 2003 and interacted with the Researchers on different forestry related matters.
6. Shri R.A. Singh, IFS, Principal Chief Conservator of Forests, Himachal Pradesh and Dr Pankaj Kullar, IFS, Managing Director, Himachal Pradesh Forest Corporation, Shimla were at the Institute on 24<sup>th</sup> March, 2004 for participating the workshop on Participatory Research for Natural Resource Management and Augmentation of Rural Livelihoods.