

PROJECTS COMPLETED DURING THE YEAR 2008-2009

PLAN PROJECTS

Project 1: Documentation of (traditional knowledge) ethno-medicinal information from traditional herbal healers (Vaidyas, Ojhas, Guniyas) in central Madhya Pradesh. [Project ID No.: TFRI-084/TFRI/2005/Biod. 1(4) / (2005-2008)].



Findings: The ethno-botanical study was conducted at Jabalpur, Seoni, Hoshangabad, Chhindwara, Sehore, Bhopal, Betul, Harda, Raisen and Vidisha of Madhya Pradesh to document the traditional knowledge on ethno-medicine prevailing in the tribal communities over the years. The tribal pockets and traditional herbal healers were identified for each district for documentation work. The tribal villages were selected from tribal blocks by random sampling method.

Traditional herbal healer
of Seoni district of
Madhya Pradesh

Herbal plant parts for sale at
Van Mela

A questionnaire/schedule was developed to document the information prevailing in the community by periodical visits.

For documentation work, local guide, villagers, traditional herbal healer (Vaidyas, Ojhas and Guniyas), tribal heads and tribal persons were contacted and enquired to gather related information. Identification of plants has been made through the local name of plant with the help of existing literature. Total 563 herbal plants from 103 traditional herbal healers were documented.

Project 2: Impact of pollutants on growth of plants. [ICFRE – 115/TFRI-2007/Ecol-1(8)]

Findings: Seventy-two sponge iron factories have come up at and around Raigarh, Chhatisgarh, India during the last 20 years. A huge amount of SO₂ and NO_x along with CO, CO₂, volatile organic compounds (VOC) and suspended particulate matters (SPM) are emitted into the atmosphere during the extraction of iron from hematite that relies on burning of inferior quality coal. SO₂ and NO_x are the primary causes of acid rain. The other most dangerous pollutant is SPM (<1mm in diameter). Study was conducted at Raigarh to determine the detrimental effects of severe pollution on the vegetation there.

The trees at the polluted sites at Raigarh, were found to be poorly grown with reduced collar girth, stem and branches deformed, leaves being chlorotic and/or necrotic with black patches. The levels of pH and organic carbon were lower in all the polluted rhizospheric soils while the EC was found to be higher in comparison to the control samples. In the present study, the levels of exchangeable Ca⁺⁺ and Mg⁺⁺ were found to be much higher in the rhizospheric soils of the polluted samples, which strongly support the hypothesis that in acidic environment, Ca⁺⁺

and Mg^{++} leach out from the roots in exchange with Fe^{+++} and Al^{+++} from the soil leading to deformed and retarded growth of the trees. Interestingly, except for few species, the seeds never germinated in soil-mix with SPM in nursery. SPM and slag were dumped on roadside vegetation areas. Unlike other byproduct dykes like that of fly ash or aluminium extraction wastes or different mine overburden areas, where at least some herbs or shrubs were found to be growing naturally, no vegetation came up in the sponge iron waste slag dumps and all the tree species died shortly. This indicates that perhaps the dispersion of the SPM from the sponge iron factories would slowly render the areas infertile turning them into deserted waste lands.

Project 3: Studies on forest dwelling Braconids (Hymenoptera : Braconidae) from central India and their role in biological control of important forest insect pests. [081 / TFRI / 2005 / Ento-2 (10) 2005-2008].

Findings: A total of 1587 samples of Braconid parasitoids collected from eleven ecological/ agro-climatic zones of Madhya Pradesh. A total of 37 Braconid species viz. *Apanteles tachardiae*, *Apanteles machaeralis*, *Apanteles hyblaeae*, *Apanteles leptothecus*, *Apanteles antipoda*, *Apanteles cajani*, *Apanteles caniae*, *Apanteles colemani*, *Apanteles hasorae*, *Apanteles bambusae*, *Apanteles agilis*, *Apanteles attevae*, *Parahormius stom*, *Parahormius nr. jason*, *Parahormius deiphobus*, *Parahormius absonus*, *Parahormius zonus*, *Parahormius rameshi*, *Hormius lamidae*, *Hormius vitabilis*, *Hormius longiventris*, *Eutropobracon granulatus*, *Cassidibracon sumodani*, *Cassidibracon indicus*, *Adialytus salicaphis*, *Adialyts arvicola*, *Trioxys (Binodoxys) rubicola*, *Trioxys (Binodoxys) indicus*, *Trioxys (Trioxys) soporensis*, *Diaeretiella rapae*, *Chelonus (Chelonus) deogiri*, *Chelonus (Chelonus) narayani*, *Chelonus (Chelonus) gastrus*, *Chelonus (Chelonus) dwibindus*, *Chelonus (Microchelonus) chailini*, *Chelonus (Microchelonus) scutellatus* & *Chelonus (Microchelonus) shyamus*, were identified up to species level. Of them, six species were proposed as the species new to science. They were illustrated and described in detail. Complete host-record of all Indian Braconid species has been prepared after careful consultation of available literature on the subject.

Project 4: Studies on bacterial and viral diseases of teak, *Gmelina* and *Albizia* and their management. [066/TFRI/2004/Patho-1(8)].

Findings: In all 245 bacterial wilt and collar rot disease samples of teak and *G. arborea* and 5 virus infected samples of *A. lebbek*, *A. procera*, *T. grandis*, *G. arborea* from 27 forest nurseries of MP, CG and MS were collected. 2-5% economic losses were recorded in different nurseries caused by bacteria and viruses. A total of 9 bacterial isolates were purified and sensitivity test carried out to assess suitability of antibiotics for their application in nursery. Experiment was conducted in nursery to control wilt and collar rot disease of teak, *A. procera*, *A. lebbek* and *Gmelina arborea*. Incidence of *Xanthomonas* leaf curl and stunting in young teak plantations at Raipura, south Panna division was recorded. Disease was successfully controlled with the application of streptocyclin 0.1% in combination with monocrotophos 0.036%. The cost of treatment was found to be Rs. 952 per acre.

**Project 5: Evaluation, modification and value addition of starches of forest origin.
[TFRI-083/NWFP/2005-2008]**

Findings: Physico-chemical properties of starch isolated from *Careya arborea* seed and *Curcuma aromatica* rhizome were determined. Potential of starches for preparation of different value added products was evaluated. Seeds of *C. arborea* and rhizome of *C. aromatica* have an average of 34.08 and 25.3 % starch respectively. Value added products like dextrin, syrup and pappad from starch of *Careya arborea* and pickles from carboxymethylated starch of *Curcuma aromatic* were prepared.

Project 6: Evaluation of management systems and level of community participation under Joint Forest Management (JFM). [071/TFRI-2004/ Silvi-1(6)]

Findings: A field study was conducted for assessing plant density, regeneration, coppice growth, woody perennial species and ground flora by laying out quadrat in People Protected Area (PPA), Rehabilitation of Degraded Forest (RDF) and unprotected forest area (UPF) at Udaipur forest village in Satna Forest Division and Narwar, Nipnia, Aintajhar, Singpur forest villages of south Shahdol Forest Division in Madhya Pradesh. Under PPA scheme 19 species with 1950 tree density were observed in the first year. After two years of implementation of scheme, there was 1.35% and 1.47% increase with respect to number of species and density of trees. After three years, 1.53 % and 1.68% increase was observed in respect of above parameters. Under RDF, scheme 19 species with 1605.3 tree density were observed. After three years of implementation of scheme, there were 1.11% and 1.36% increase with respect to number of species and density of trees. In unprotected, site 16 numbers of species with 1106.3 tree density was observed during the first year. After three years, 1.11 % and 1.36 % increase with respect to number of species and density of trees was noted.

As far as density of coppice of tree species was concerned, after three years of implementation of scheme, there were 9.84 times and 5.66 times more coppice production was observed in PPA and RDF as compared to that of unprotected site. Density of regeneration of tree species after three years of implementation of scheme was noticed 3.58 times and 1.98 times more in PPA and RDF as compared to unprotected site. In PPA, the ground flora was observed 1.25 times more than that of unprotected site. Due to RDF activities status of ground flora was found less as compared to PPA.

Plant density regeneration, coppice growth of woody perennials species and ground flora were better in the forests having Joint Forest Management programme as compared to the forest areas having no JFM programme.

Closure of biotic interference (including fire protection) through patrolling and CPT under PPA scheme resulted in increased biomass of upper, lower and middle storey trees, shrubs, herbs and ground flora by active involvement of local people.

Soil and moisture conservation model with emphasis on gully plugging and nala bunding etc., water table was found to increase and the water was available throughout the year. Consequently, litter thickness increased resulting in increased moisture and nutrient status of soil. Rate of soil erosion, water run-off and loss of nutrients reduced due to soil and moisture conservation

activities under RDF schemes. Population of ground flora having medicinal plants were found to increase by controlling grazing, fire protection and with active involvement of local people. Implementation of JFM programme has positive impact on socio-economic condition of people.