

## PROJECT PROFILE

**Title of the Project:** Evaluation of performance of Shola Species of the Nilgiris under projected climate change conditions

**Principal Investigator:** Dr. Rekha R. Warriar, Scientist-E

**Duration of the Project:** 2013-2015

**Objectives:**

1. Assessment of the current floristic diversity in natural habitats of shola ecosystems and preparation of voucher specimens of collected plant species / selected trees.
2. Study the regeneration status of selected tree species
3. Study the impact of predicted climate change through simulation studies to develop an understanding of the responses of species of the Shola ecosystem to varying levels of CO<sub>2</sub> and temperature

**Funding Agency:** Hill Area Development Programme

**Summary**

- ❖ Shola forests are tropical forest vegetations comprising subtropical hill forests and the montane temperate forests, generally inhabiting over 1,500 m asl. The present study on the shola forests of Nilgiris has generated bench mark information on the floristics, community ecology and forest dynamics of the three shola patches in Glenmorgan and Pykara which have been subjected to anthropogenic pressures, and protection has been attempted using chain link fencing.
- ❖ The value of the shola forests in the context of biodiversity conservation therefore demands serious attention. Community ecological studies were conducted by establishing six 0.1 ha releves, each comprising ten non-contiguous 25 m<sup>2</sup> quadrats. Enumeration of all individuals  $\geq 1$  cm dbh was done in the plots. The data were analysed for details of structure and composition, dominance, species richness, biodiversity content, and population structure of selected tree species. When only the  $\geq 10$  dbh class was considered, the tree community was dominated by *Acacia mearnsii* which was observed on the outer regions of the shoals. As we moved towards the interior of the shola, *Syzigium* was observed to dominate the area. Dominant species observed were *Symplocos cochinchinensis* and *Nothapodytes nimmoniana*.

- ❖ The most dominant tree species in the community were: *Litsea* sp., *Isonandra candolleana*, *Syzygium* sp.. The less frequent tree species accounted for 8-10 species. Of the total of 124 trees measured in the shola forests, the highest diameter measured was 160.7 cm for a species of *Syzygium* (200 cm) and *Symplocos obtusa* (210 cm). The total number of species of herbs and/or shrubs always outnumbered the number of tree species at all the undisturbed shola forest sites. Diversity of herbs was very high in grassland ecotones and in disturbed (eg. burned) region in comparison to the undisturbed regions. Taken the tree species individually, some had all life stages represented while in others some stages were missing. These patterns of regeneration were met with in all constancy categories of species.
- ❖ The sholas showed heavy growth of *Cestrum aurantiacum* throughout the patches studied. *Acacia mearnsii* was also observed in the patches. Chain link fencing enabled improving the biodiversity within the patches. However, there is invasion of *Cestrum aurantiacum* which has to be controlled.
- ❖ Climatic factors were observed to affect the flowering and fruiting phenology of the shola species. *Ilex denticulate*, *Myrsine wightiana*, *Phoebe lanceolata* and *Schefflera racemosa* did not show any reproductive phase throughout the period of study. Some species showed fruiting in alternate years. Some species showed constancy during the period of study. Species like *Ilex denticulate*, *Myrsine wightiana*, *Phoebe lanceolata* and *Schefflera racemosa* have to be observed during the coming years so that the different stages of succession prevail in the sholas. These species may have to be monitored closely. For species which show alternations in flowering and fruiting, re-introductions can be carried out to increase the number.
- ❖ Studies on subjecting the shoal regenerants to elevated temperature and CO<sub>2</sub> revealed that *Cestrum aurantiacum* could not survive within the polytunnels. Sholas species studied within the chambers showed increased biomass over the regenerants under natural conditions. Since the study was only for a period of three months, conclusive statements on the performance of the species can be made only after a long term study is conducted.

- ❖ During the course of field survey of the Nilgiri Shola forests, it was realized that it is not easy to identify trees, lianas and shrub species, in vegetative condition and also with reproductive parts. The officials of State Forest Departments who have accompanied us also faced problems in identifying of the species. This prompted us to prepare an illustrated botanical field guide on the flora of Nilgiris with special reference to Shola tree species where colourful illustrations have been provided with flowering twig, fruits, leaf, bark, blaze colour etc. Certain characters which remain constant like leaf arrangements, simple or compound leaves, architecture, presence of glands, exudation, armature, presence of buttresses and branching pattern along with habitat, topography, exposure, updated botanical names, vernacular names etc. are also presented. This book is an effort to explain the different facets of shola species in a simple and lucid manner.