

NON-TIMBER PRODUCTS OF MAMANDUR FOREST OF TIRUPATI, CUDDAPAH – NALLAMALAI HOTSPOT IN EASTERN GHATS, INDIA

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SUMMARY

The Mamandur forest situated between Chittoor and Cuddapah districts consists of high degree of phytodiversity along with some highly valuable endemic and endangered species. The area receives water from Thumbura Thirtham of Tirumala Forest. Forest is deciduous type but evergreen plants are mixed together. The forest covered with epiphytes and climbers; and lower group plants like algae, bryophytes, pteridophytes are plenty in water logging areas. The forest is a source of non wood forest products (NWFP) like fibre, fuel wood, gum, resin, vegetable dyes, oil., honey, medicinal plants, bamboo products etc. A large numbers of edible fruits with varietal variation are available in this forest. Highly economic value *Pterocarpus santalinus* is growing luxuriantly in this area. Hedge of elephants are crossing this forest when they are passing from Kuppam to Nallamalai forest areas. The forest is providing food, shelter to wild animals like deer, cats, dogs, birds and leopards to maintain the ecosystem stability and they are providing sustainable environments. Department of forestry of Andhra Pradesh is taking steps to protect this area and improving bio-diversity, by developing check dams and plantations and preventing forest fire along with digging water ditches to the animals and birds in summer.

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Natural resources play an important role in the economic growth and development of the region. Sustainable utilization of the natural resources is needed to meet the demands of future generations. Plants have tremendous potential to become a renewable source of high quality raw materials for industry as well as providing a wealth of genetic diversity which can be lead to the discovery of new things (Bartle, 1997). Sacred grove is a track of virgin forest, harbouring rich bio-diversity and provided a good deal of ecological and genetic services by protecting and conserving the primitive cultivators and other wild flora and fauna. Besides these, sacred groves play an important role in maintaining the micro-climate of the region. Conservation of groves located in different ecological units helps in the conserved water, soil and nutrient, and facilitates the regeneration of plant species (Khumbongamayam *et al.*, 2005). However, these natural resources are not only limited but some of them are also non-renewable. The important ecological and economic keystone species are naturally conserved in this area. With the increasing human population, there is an increasing pressure on the natural resources, as a result of which they are getting depleted at a faster rate. Over exploitation and mismanagement practices are also causing threat to natural resources and biological diversity. The forests are the important source of genetic diversity through which some of the basic requirements of food, fuel, fodder and shelter are realized. A number of plants have been

disappearing every day unknowing their potentialities. Domestication of any wild species of plant by bringing into cultivation is not an easy task. The potentially useful plants of Mamandur are poorly known. Therefore, identification of under-utilized plant resources is primary important. Hence, in the present paper an attempt has been made to list the plant resources available in this forest and utilized by the local people especially by tribals.

MATERIALS AND METHODS

Intensive field works in different seasons were carried out in Mamandur with the help of forest department in such a way to cover the different development stages of plant species like vegetative, flowering and fruiting. Preliminary identification of plants was made with the help of Flora of the presidency of Madras (Gamble and Fischer, 1916; 1920). During the field work, the specimens collected for the preparation of herbarium were processed in accordance with the methodology adopted by Jain and Rao (1977). The Herbaria were preserved in the Department of Botany, S. V. University, Tirupati.

RESULTS AND DISCUSSION

Pieces of vegetation existing at present as consequence of religious refugia offered to them are called sacred groves. In Andhra Pradesh about 800 sacred groves have been enumerated so far (Bhandary and Chandrasekhar, 2003). Sacred grove in Mamandur is dedicated to God Brahma. The local villagers and tribal

people Nakkalas, Sugalis and Chenchus worship the God for their livelihood on these immediate natural resources. Mamandur forest is one of the richest floristic phytogeographical regions in Eastern Ghats of India. On the basis of herbarium collections, a short account of different plant resources was prepared. Number of plant taxa of legume family are available which are rich in protein and keep the soil alive and productive and serve as excellent forage and cattle feed. There are non wood forest products like fibre (Table 1), edible fruits (Table

Table 1 : Fibre yielding from plant sources of Mamandur forest

Plant name	Family	Part
<i>Abutilon indicum</i> G. Don.	Malvaceae	Stem
<i>Agave americana</i> L.	Agavaceae	Leaf
<i>Borassus flabellifer</i> L.	Palmaceae	Petiole
<i>Calotropis gigantea</i> (L.) R.Br.	Asclepiadaceae	Bark
<i>Corchorus aestuans</i> L.	Tiliaceae	Stem
<i>C. trilocularis</i> L.	Tiliaceae	Stem
<i>Crotalaria laburnifolia</i> L.	Fabaceae	Stem
<i>C. pulcherrima</i> Roxb.	Fabaceae	Stem
<i>C. retusa</i> L.	Fabaceae	Stem
<i>C. verrucosa</i> L.	Fabaceae	Stem
<i>Decaschistia crotonifolia</i>	Malvaceae	Stem
Wt. & Arn. <i>Grewia hirsuta</i> Vahl.	Tiliaceae	Stem
<i>G. obtusa</i> Wall	Tiliaceae	Stem
<i>G. tiliaefolia</i> Vahl.	Tiliaceae	Stem
<i>Guazuma tomentosa</i> Kunth.	Sterculiaceae	Stem
<i>Hardwickia binata</i> Roxb.	Caesalpiniaceae	Bark
<i>Helicteres isora</i> L.	Sterculiaceae	Bark
<i>Hibiscus vitifolius</i> L.	Malvaceae	Stem
<i>Phoenix sylvestris</i> L.Roxb.	Palmaceae	Petiole
<i>Sansevieria roxburghiana</i> Schult f.	Agavaceae	Leaf
<i>Sida cordifolia</i> L.	Malvaceae	Stem
<i>Urena sinuata</i> L.	Malvaceae	Stem
<i>Waltheria indica</i> L.	Sterculiaceae	Stem
<i>Yucca gloriosa</i> L.	Agavaceae	Leaf

2), dyes (Table 3), gum and resin (Table 4), non-domesticated species of oil yielding plants (Table 5) and medicinal plants (Table 6). Highly important endemic and endangered medicinal plants (Table 7) of Seshachalam hills of Eastern Ghats of India are common in this grove, (Savithramma and Sulochana, 1998; Nair, 1996; Savithramma, 2003).

Along with the higher plants, the lower groups of bryophytes like *Riccia*, *Marchantia*, *Plageochasma*, *Fimbriaria*, *Anthoceros*, *Polytrichum*, *Funaria* and *Dumontiera* species and Pteridophytes like *Sellaginella*, *Actinopteris*, *Glychenia*, *Nephrolepis*, *Lygodium*, *Pteris*, *Osmunda*, *Isoetes*, *Marsilea*, *Salvenia* and *Hemaenonatis* species are commonly available around

Table 2 : Edible fruits of Mamandur forest

Plant name	Family
<i>Aglaia elaeagnoidea</i> Juss.	Meliaceae
<i>Alangium salvifolium</i> (L.f.) Wang	Alangiaceae
<i>Anacardium occidentale</i> L.	Anacardiaceae
<i>Ananas comosus</i> Merr.	Bromeliaceae
<i>Annona reticulata</i> L.	Annonaceae
<i>A. squamosa</i> L.	Annonaceae
<i>Artocarpus heterophyllus</i> Lam.	Ulmaceae
<i>Calophyllum inophyllum</i> L.	Guttiferae
<i>Carica papaya</i> L.	Caricaceae
<i>Carissa spinarum</i> L.	Apocynaceae
<i>Cucumis melo</i> L.	Cucurbitaceae
<i>C. sativus</i> L.	Cucurbitaceae
<i>Cucurbita maxima</i> Duch.ex Lam	Cucurbitaceae
<i>Ehretia pubescens</i> Benth.	Ehretiaceae
<i>Luffa cylindrica</i> (L.) Roem.	Cucurbitaceae
<i>Mangifera indica</i> L.	Anacardiaceae
<i>Manilkara zapota</i> (Miller) Fosb	Sapotaceae
<i>Memecylon umbellatum</i> Burm.f.	Lecythidaceae
<i>Mimusops elengi</i> L.	Sapotaceae
<i>Momardica charantia</i> L.	Cucurbitaceae
<i>Passiflora edulis</i> Sims.	Passifloraceae
<i>Pithecellobium dulce</i> (Roxb.) Benth.	Mimosaceae
<i>Punica granatum</i> L.	Punicaceae
<i>Scutia myrtina</i> (Burm) Kurz.	Rhamnaceae
<i>Syzygium cumini</i> (L.) Skeels.	Myrtaceae
<i>Terminalia catappa</i> L.	Combretaceae
<i>Trichosanthes anguina</i> L.	Cucurbitaceae

Table 3 : Dye yielding plant taxa from Mamandur forest

Plant name	Family	Part
<i>Bauhinia purpurea</i> L.	Caesalpiniaceae	Bark
<i>Bixa orellana</i> L.	Bixaceae	Pericarp
<i>Butea monosperma</i> (Lam.)Taub.	Fabaceae	Flowers
<i>Erythrina variegata</i> L.	Fabaceae	Bark & leaves
<i>Mallotus philippensis</i> (Lam.) Muell-Arg.	Euphorbiaceae	Seed
<i>Oxalis corniculata</i> L.	Oxalidaceae	Leaves
<i>Peltophorum pterocarpum</i> D.C.Baker	Caesalpiniaceae	Bark
<i>Pterocarpus santalinus</i> L.f.	Fabaceae	Bark
<i>Pterocarpus marsupium</i>	Fabaceae	Wood
<i>Semecarpus anacardium</i> L.f.	Anacardiaceae	Seed
<i>Terminalia arjuna</i> D.C.Wight & Arn.	Combretaceae	Bark
<i>T.pallida</i> Brandis	Combretaceae	Fruit
<i>Thespesia populnea</i> Cav.	Malvaceae	Bark & fruits
<i>Ventilago maderaspatana</i> Gaertn.	Rhamnaceae	Bark
<i>Vitex altissima</i> L.f.	Verbenaceae	Bark
<i>V. negundo</i> L.	Verbenaceae	Bark
<i>Wrightia tinctoria</i> R.Br.	Apocynaceae	Leaves

Table 4 : Gum and resin yielding plant sources of Mamandur forest

Plant name	Family
<i>Acacia arabica</i> (Lam)Willd	Mimosaceae
<i>A. chundra</i> (Rottl)Willd	Mimosaceae
<i>A. leucophloea</i> (Roxb)Willd	Mimosaceae
<i>A. nilotica</i> L. Willd.ex Del	Mimosaceae
<i>Anogeissus latifolia</i> (Roxb.ex.Dc)Wall.Ex.Guill	Combretaceae
<i>Boswellia ovalifoliolata</i> Bal & Henry	Burseraceae
<i>Butea monosperma</i> (Lam). Taub	Fabaceae
<i>Cochlospermum religiosum</i> (L.) Alston	Cochlospermaceae
<i>Commiphora caudata</i> (Wt & Arn.)Engl	Burseraceae
<i>Cyamopsis tetragonoloba</i> Taub	Fabaceae
<i>Gardenia gummifera</i> L.f	Rubiaceae
<i>Hardwickia binata</i> Roxb	Caesalpiniaceae
<i>Lansea coromandelica</i> (Houtt)Merr	Anacardiaceae
<i>Macaranga peltata</i> (Roxb) Muell-Arg	Euphorbiaceae
<i>Pterocarpus marsupium</i> Roxb.	Fabaceae
<i>Shorea robusta</i> Gaertn.	Dipterocarpaceae
<i>S. talura</i> Roxb	Dipterocarpaceae
<i>Sterculia urens</i> Roxb	Sterculiaceae
<i>Ziziphus jujuba</i> Lam	Rhamnaceae

Table 5 : Oil yielding plant taxa of Mamandur forest

Plant Name	Family
<i>Anacardium occidentale</i> L.	Anacardiaceae
<i>Atylosia scarabaeoides</i> (L.)Benth.	Fabaceae
<i>Azadirachta indica</i> A. Juss.	Meliaceae
<i>Bassia longifolia</i> L.	Anacardiaceae
<i>Canavalia virosa</i> Wt. & Arn.	Fabaceae
<i>Hiptage benghalensis</i> (L.)Kurz.	Malpighiaceae
<i>H. madablota</i> Gaertn.	Malpighiaceae
<i>Jatropha curcas</i> L.	Euphorbiaceae
<i>J. gossypifolia</i> L.	Euphorbiaceae
<i>Macroptilium atropurpureum</i> D.C.Urban	Fabaceae
<i>Phaseolus aconitifolius</i> Jacq.	Fabaceae
<i>Pongamia pinnata</i> L.	Fabaceae
<i>Rhynchosia cana</i> D.C.	Fabaceae
<i>R. minima</i> (L.)D.C.	Fabaceae
<i>Sesamum alatum</i> Thonn	Pedaliaceae
<i>Tinospora cordifolia</i> Miers.	Menispermaceae

Table 6 : Medicinal plants used by the tribals and villagers from Mamandur forest

Plant name	Family	Part	Uses
<i>Abrus precatorius</i> L.	Fabaceae	Roots & leaves	Cough & cold
<i>Argemone mexicana</i> L.	Papaveraceae	Leaves	Leucoderma
<i>Azadirachta indica</i> A. Juss.	Meliaceae	Leaves	Ulcers & wounds
<i>Centella asiatica</i> Urban.	Apiaceae	Leaves	Memory
<i>Ceropegia bulbosa</i> Roxb.	Asclepiadaceae	Leaves	Dysentery & diarrhoea
<i>Cissampelos pareira</i> L.	Menispermaceae	Leaves	Itching
<i>Clematis gouriana</i> Roxb.	Ranunculaceae	Leaves and stem	Killing of lice
<i>Cocculus hirsutus</i> Diels.	Menispermaceae	Root & leaves	Eczema
<i>Corallocarpus epigaeus</i> Hk.f.	Cucurbitaceae	Root	Rheumatism
<i>Decalepis hamiltonii</i> W.& A.	Asclepiadaceae	Root	Cooling agent
<i>Dillenia indica</i> L.	Dilleniaceae	Fruit	Abdominal pains
<i>Dioscorea oppositifolia</i> L.	Dioscoreaceae	Tubers	Snake bite
<i>Lippia nodiflora</i> Mich.	Verbenaceae	Leaves	Anti bacterial
<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Root	Skin diseases
<i>Santalum album</i> L.	Santalaceae	Oil	Gonorrhoea
<i>Tinospora cordifolia</i> Miers.	Menispermaceae	Stem bark & root	Dysentery

Table 7 : Endemic and endangered plant species of Mamandur forest

Plant name	Family	Part	Uses
<i>Boswellia ovalifoliolata</i> Bal. & Henry	Burseraceae	Gum	Rheumatism
<i>Cycas beddomei</i> L.	Cycadaceae	Starch	Dysentery
<i>Decaschistia cuddapahensis</i> T.K.Paul & Nayar	Malvaceae	Plant	Stomach ulcer
<i>Indigofera barberi</i> Gamble	Fabaceae	Plant	Hydroceal
<i>Leucas lavanduliifolia</i> (Rees) Chand	Labiatae	Leaves	Nervous disorder
<i>Pimpinella tirupatiensis</i> Bal. & Sub.	Umbelliferae	Tuber	Asthma
<i>Pterocarpus santalinus</i> L.f.	Fabaceae	Bark	Asthma
<i>Rhynchosia beddomei</i> Baker	Fabaceae	Leaves	Diabetes
<i>Shorea tumbagaia</i> Roxb.	Dipterocarpaceae	Bark	Diabetes
<i>Syzigium alternifolium</i> Wt. Walp.	Myrtaceae	Bark	Diabetes
<i>Terminalia pallida</i> Brandis	Combretaceae	Fruit	Diabetes
<i>Waltheria indica</i> L.	Sterculiaceae	Plant	Bites of dogs

water fall region near this grove. High degree of diversity has been found in the size, colour and taste of fruits of *Syzygium jambolanaum* and *Embllica officinalis*. There are numbers of under utilized plant species which have an important role to play as new promising crops in lesser farming situations. In the name of modernization and for easy access to vehicles to the Tirumala hills, the forest is poaching and cutting the trees ruthlessly. Creating awareness for conservation of known useful taxa and proper exploitation of under-utilized plant species is inevitable. Accumulation of resource base information and domestication of new plants are necessary for the future use in order to meet the ever increasing requirements of growing human population and maintain the species diversity along with strategies for conservation of biodiversity and sustainable utilization of phyto resources of Mamandur forest for ecological balance and environmental stability.

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