

EXPLORATION OF WILD ORNAMENTAL FLORA OF MADUKKARAI HILLS OF SOUTHERN WESTERN GHATS, TAMIL NADU

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ABSTRACT

The present study identified 137-wild ornamental species belonging to 99- genera and 42- families with potential artistic ornamental value. The striking features and ornamental potential of most plants are its flowers, fruits and foliage were analyzed. The present study will help the researchers and people, who are interested horticultural, olericulture and agriculture.

Keywords: Madukkarai Hills, Flora, Vegetation, Ornamental, Tamil Nadu.

INTRODUCTION

Nature has given a wealth of wild flowers, they vary greatly in composition and density in marked contrast with domesticated plants (Raju, 1998). Wild plants are striking features of the land surface. They are very important in view of aesthetic and recreational value for human beings. Most of the present day flowers have come from the wild progenitors, a few of which still exist in natural habitat (Binu Thomas *et al.*, 2011). Through nature has given a wealth of wild flowers and ornamental plants many of them have been destroyed and several have become extinct and survival of many endangered by our exploitation by human beings (Arora, 1993).

The wild vegetation of Madukkarai Hills, region is blushed with rich and fascination, holds a large number of curious, botanically interesting, exquisite, economically important, rare, threatened and endemic plants. There are several ornamental plants which grow in nature in shade

or partial shade and these may gainfully employed as house plants in suitable conditions (Kapoor and Sharge, 1993). Ornamental plants are grown usually for the purpose of beauty for their fascinating foliage, flowers and pleasant smell (Swarup, 1988).

The objective of ornamental horticulture is the functional and aesthetic integration of people using plants and space as its main tools. The necessity of it in architecture is for positive control of the fast changing landscape for the future (Chin and Tay, 2006). Identification and exploration of wild ornamental species is one of the new areas of research and accounts wide spectrum of uses in environmental managements. In the absence of any such study from the Madukkarai Hills, the present study it an attempt to identify the wild ornamental potential plants from the study area.

MATERIALS AND METHODS

The methodologies and approaches for these wild ornamental plants enumeration was

followed as suggested by Jain and Rao (1977). An intensive field work was undertaken in different forest areas of the Madukkarai Hills of Tamil Nadu. With the objective to recognize native plants suitable for landscaping and floral art. We evaluated a large number of species. Sites of occurrence were identified through field explorations, indications of inhabitants and visits for the collection of herbaria. Taxonomic identification, photographic documentation and ornamental characterization of each species with potential for use on floral art (flowers or cut foliage) or landscaping (for gardens or pots) were recorded.

The methodology used is based on observation Method, key method for the determination of flora. The major forest areas of the study area are Ettimadai, Marapalam, Madukkarai, Myilkkal, Gandhi nagar, Kumuttipathi and Pathimalai. The extensive and intensive field trips were conducted during September 2010 to October 2013. All the specimens collected were identified with the help of recent literature by local floras authored by *Flora of the Presidency of Madras* (Gamble and Fischer, 1915 - 1936); *Flora of Tamil Nadu* (Nair and Henry, 1983; Henry *et al.*, 1987; 1989); *Flora of Coimbatore* (Chandrabose and Nair, 1988); *An Excursion flora of Central Tamil Nadu, India* (Matthew, 1991), Pteridophyte Flora of Nilgiris (Manickam and Irudayaraj, 2003), and also confirmed authentic herbarium specimen available at Madras Herbarium (MH), sBotanical Survey of India, Southern Circle, Coimbatore. The voucher specimens were deposited in the herbarium of Botany department (BHU), Bharathiar University, Coimbatore.

Topography of the study area

The present study was conducted in Madukkarai hills of Coimbatore district, Tamil Nadu, India, which located in part of Southern Western Ghats. It lies between 10.9° N 76.9°E at an average elevation of 311 metres (1020 feet). The total rainfall in the area is about 574.2 mm. The average humidity of the area ranges from 29% to 81% and the winds in the area are light to moderate during summer and winter. However, the speed of the wind increase during the end of

the summer season and the predominant wind direction is from south-west followed by north-west. The temperature varies in the range of 14.9° C to 37.8° C. Major forest areas of Madukkarai Hills are comes under Dry deciduous and Scrub spiny forests (Jayanthi *et al.*, 2011).

RESULTS AND DISCUSSION

The field expeditions of Madukkarai Hills of wild vegetations gave interesting results concerning floristic diversity. A total of 132-Angiosperm and 5-Pteridophytic species are present in this region. In the present study enlisted a total number of 137-wild ornamental potential plant species under the 42-families belongs to 99- genera. Out of the 137- plants, some of them are tabulated alphabetically with botanical name, habit, mode of their aesthetic ornamental utility (Table: 1). There is a lot of significance in recent years for the ornamental species in the utilization of various kinds and in the income generation among poor also in the export market of India.

The most of the dominant families are Convolvulaceae with 18- species, followed by Fabaceae with 10-species, Poaceae, Asclepiadaceae each 7-species and Malvaceae, Acanthaceae each 5-species. Dicots were the most specious groups distributed in 33-families with 113- species, monocots in 4-families with 19-species and Pteridophytes are in 5- families with 5-species.

Based on habit classification of the enumerated ornamental plants, maximum numbers of species were 42-belongs to herbs, followed by 25- shrubs, 23- trees, 29-Creeper and climbers, 11 grasses, 6-lianas and single epiphyte (Fig- 1). There is still scope for some special type of plants bearing attractive tiny flowers for gardening in urban areas, inside houses, offices, banks, hospitals, hotels and other buildings with ornamental plants have become very popular due to lack of open space.

The present study collected 20-wild ornamental endemics plants (Fig-2 & 3) in Madukkarai Hills of the Southern Western Ghats *viz.*, *Acalypha alnifolia* Klein *ex* Willd., *Argyreia pomacea*

(Roxb.) Choisy, *Asparagus fysonii* Macbr., *Barleria acuminata* Neres., *Barleria buxifolia* L., *Caralluma diffusa* (Wight) N. E. Br., *Caralluma indica* (W.&A.) N.E.Br., *Cristisonia bicolor* (Gard.) Livera, *Dolichandrone atrobireae* (Heyne ex Roth.) Spreng., *Grewia heterotricha* Mast., *Indigofera trita* L.f. var. *scabra*, *Indigofera uniflora* (Roxb.), *Ipomoea cuneata* Jacq., *Jasminum malabaricum* Wight., *Moringa concanensis* Nimmo., *Pterolobium hexapetalum* (Roth.) Sant., *Sesamum laciniatum* Klein ex Willd. and *Striga densiflora* Benth.

Figure 1. Number of Ornamental Plants enumerated based on its Habit

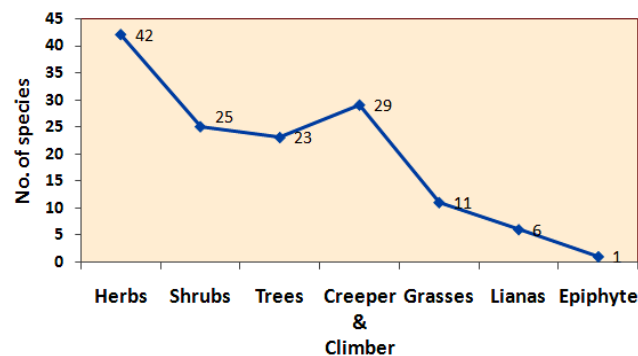


Table 1: Characterization of the recorded flora according to the ornamental utilization

S. No.	Habit	Ornamental utility	Botanical Name
1.	Trees	Avenue plants, Public gardens and Pleasure garden.	<i>Acacia nilotica</i> , <i>Aegle marmelos</i> , <i>Atalantia monophylla</i> , <i>Bauhinia purpurea</i> , <i>Bauhinia racemosa</i> , <i>Butea monosperma</i> , <i>Cassia fistula</i> , <i>Cassia siamea</i> , <i>Commiphora caudata</i> , <i>Delonix regia</i> , <i>Dichrostachys cinerea</i> , <i>Dolichandron falcata</i> , <i>Dolichandrone atrovirens</i> , <i>Ficus benghalensis</i> , <i>Ficus religiosa</i> , <i>Ficus racemosa</i> , <i>Gyrocarpus asiaticus</i> , <i>Melia azedarach</i> , <i>Nyctanthes arbor-tristis</i> , <i>Samanea saman</i> , <i>Spathodea campanulata</i> , <i>Strychnos nux-vomica</i> , <i>Strychnos potatorum</i> .
2.	Grasses and sedges	Lawns and bouquets.	<i>Chloris virgata</i> , <i>Chloris inflata</i> , <i>Cymbopogon coloratus</i> , <i>Cynodon dactylon</i> , <i>Cyperus rotundus</i> , <i>Cyperus exaltatus</i> , <i>Eragrostiella bifaria</i> , <i>Fimbristylis argentea</i> , <i>Heteropogon contortus</i> , <i>Panicum maximum</i> , <i>Panicum curviflorum</i>
3.	Succulents	Indoor plants	<i>Caralluma adscendens</i> , <i>Caralluma diffusa</i> , <i>Caralluma bicolor</i> , <i>Caralluma indica</i> , <i>Portulaca pilosa</i> , <i>Sansevieria roxburghiana</i> , <i>Sarcostemma acidum</i> <i>Talinum portulacatum</i> .
4.	Creepers and climbers	House hold creepers	<i>Aristolochia indica</i> , <i>Aristolochia tagala</i> , <i>Canavalia gladiata</i> , <i>Capparis zeylanica</i> , <i>Cissus quadrangularis</i> , <i>Cissus setosa</i> , <i>Clitoria ternatea</i> , <i>Cuscuta chinensis</i> , <i>Gloriosa superba</i> , <i>Hemidesmus indicus</i> , <i>Ipomoea cairica</i> , <i>Ipomoea coccinea</i> , <i>Ipomoea cuneata</i> , <i>Ipomoea ericarpa</i> , <i>Ipomoea indica</i> , <i>Ipomoea nil</i> , <i>Ipomoea obscura</i> , <i>Ipomoea pes-trigridis</i> , <i>Ipomoea sepiaria</i> , <i>Ipomoea staphylina</i> , <i>Ipomoea wightii</i> , <i>Ipomoea quamoclit</i> , <i>Merremia aegyptia</i> , <i>Oxystelma esculentum</i> , <i>Passiflora foetida</i> , <i>Rivea hypocrateriformis</i> <i>Thumbergia fragrans</i> .

Table 1: Characterization of the recorded flora according to the ornamental utilization

S. No.	Habit	Ornamental utility	Botanical Name
5.	Lianas	Lianas	<i>Argyrea sericea</i> , <i>Argyreia pilosa</i> , <i>Capparis grandis</i> , <i>Gymnema sylvestre</i> , <i>Jasminum flexile</i> , <i>Jasminum malabaricum</i> ,
6.	Herbaceous	Gardens, parks	<i>Anisochilus carnosus</i> , <i>Aristolochia indica</i> , <i>Claemistra klenii</i> , <i>Cleome monophylla</i> , <i>Cristisonia bicolor</i> , <i>Curculigo orchioides</i> , <i>Desmodium heterocarpon</i> , <i>Heliotropium marifolium</i> , <i>Hibiscus ovalifolius</i> , <i>Indigofera linnaei</i> , <i>Sansevieria roxburghiana</i> , <i>Scilla hyacinthina</i> , <i>Sesamum laciniatum</i> , <i>Sesamum orientale</i> , <i>Stachytarpheta jamaicensis</i> , <i>Striga asiatica</i> , <i>Theprosia purpurea</i> , <i>Vicoa indica</i> .
7.	Herbaceous	Bio-Fencing	<i>Abutilon hirtum</i> , <i>Anisomeles malabarica</i> , <i>Asystasia gangetica</i> , <i>Barleria cuspidata</i> , <i>Barleria prionotis</i> , <i>Biophytum sensitivum</i> , <i>Cereus pterogonus</i> , <i>Crotalaria verrucosa</i> , <i>Evolvulus alsinoides</i> , <i>Ipomoea staphylina</i> , <i>Oxalis corniculata</i> , <i>Passiflora foetida</i> , <i>Pavonia zeylanica</i> , <i>Sansevieria roxburghiana</i> , <i>Sida rhombifolia</i> .
8.	Aquatic	Indoor & outdoor	<i>Bacopa monnieri</i> , <i>Ipomoea aquatica</i> , <i>Oxystelma esculentum</i> .
9.	Shrubs	Gardens	<i>Asparagus fysonii</i> , <i>Asparagus racemosus</i> , <i>Barleria buxifolia</i> , <i>Bauhinia racemosa</i> , <i>Capparis zeylanica</i> , <i>Carissa carandas</i> , <i>Caesalpinia pulcherrima</i> , <i>Cassia auriculata</i> , <i>Crotalaria laburnifolia</i> , <i>Crotalaria retusa</i> , <i>Dodonea viscosa</i> , <i>Erythroxylon monogynum</i> , <i>Grewia heterotricha</i> , <i>Grewia rhamnifolia</i> , <i>Grewia tiliifolia</i> , <i>Lantana camara</i> , <i>Lawsonia inermis</i> , <i>Murraya paniculata</i> , <i>Opuntia stricta</i> , <i>Pterolobium hexapetalum</i> , <i>Solanum trilobatum</i> , <i>Tarenna asiatica</i> , <i>Tecoma stans</i> , <i>Thevetia peruviana</i> , <i>Urena lobata</i> .
10	Orchids	Indoor plants	<i>Vanda spathulata</i> , <i>Eulophia epidendrea</i> .
11	Ferns	Indoor plants & Gardens	<i>Actiniopteris radiata</i> , <i>Adiantum incisum</i> , <i>Cheilanthes swartzii</i> , <i>Marsilea minuta</i> ,

Among *Gloriosa superba* L., is one of the critically endangered species in the study and *Choloroxylon swietenia* DC., is the endemic vulnerable category (Sasidaran, 2004; Prabhu *et al.*, 2012) (Manjushwath, 2014 and Bhavana *et al.*, 2014). Cultivation of these species may be beneficial, both commercially and to help conserve rare, vulnerable, endangered endemic plant species.

The classification of the ornamental flora based on the diversity of its utilization, indicating that the maximum (71-species) of the plants can be used as public gardens followed by 23-species used as avenue plants, 54-species used in decorative utility in parks and gardens and 40-species as hedges. The dynamic floriculture industry is constantly looking for new products, technologies and market niches. The cost of domestication and maintenance of wild

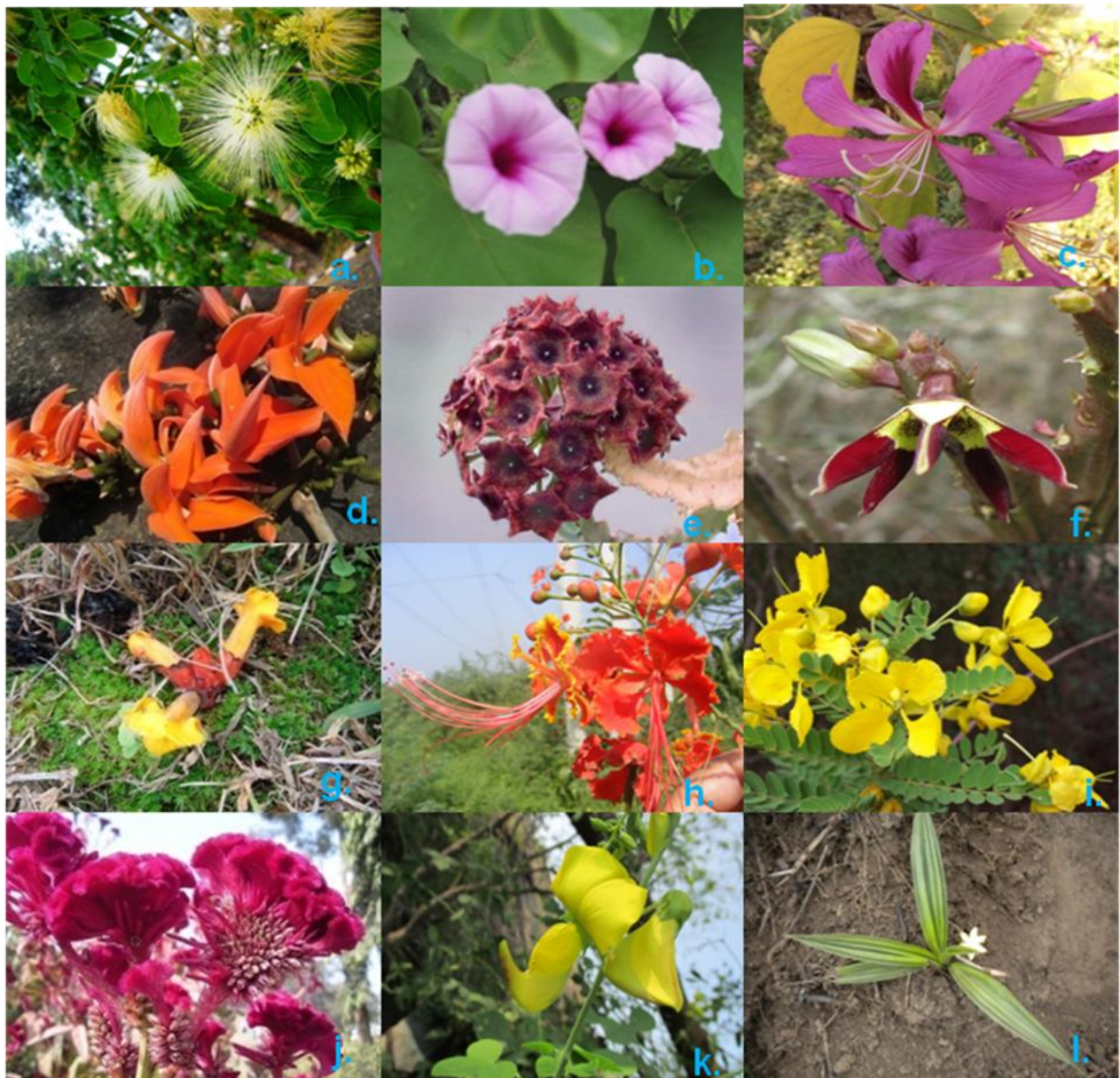
ornamental species is also very less in comparison (Rajagopal Reddy *et al.*, 2012).

The totals of 132-flowering plants were recorded during the period of 2010-2013. The most dominance of strict flower color Yellow color rank first with 31-species. This is followed by Green-21, Pink-20, White-19, Red-12, Purple-11, Orange-6, Blue and Cream each -5 and Magenta-

2 (Fig.4). 5- Pteridophytic plants are observed. This foliage was very attracting.

During June-September, it was remarkably bright on the forest floor and all the herbs were still very small. Whole year - 29, autumn - 27, winter -23, summer – 38 and spring -37. Observations on the phenology of the plants revealed that maximum number of species (60 sps) complete their

Figure-2. Pictorial of Wild Ornamental Plants.



a. Albizzia lebeck, b. Bauhinia racemosa, c. Butea monosperma, d. Argyrea pomacea, e. Caralluma diffusa, f. Caralluma bicolor, g. Cristisonia bicolor, h. Caesalpinia pulcherrima, i. Cassia auriculata, j. Celosia argentea var. cristata, k. Crotalaria laburnifolia, l. Curculigo orchiodes

reproductive cycle between Aug. - Dec.

Wild ornamental species are also the sources for the medicinal significance (Asati and Yadav 2010). Out of 124-plant species, 64 wild ornamental plants were identified used for skin diseases, cuts and wounds, cough and cold,

diuretic, fever, antidiabetic, respiratory troubles, hair loss, ear problems, toothache, night blindness, memory power, eye problems and bile complaints.

Ornamental plants play an important role in environmental planning of urban and rural areas

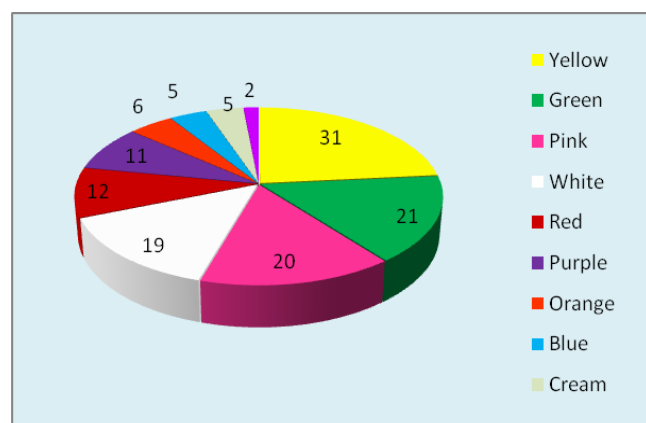
Figure-3. Pictorial of Wild Ornamental Plants.



a. Dodonea viscosa, b. Gloriosa superba, c. Ipomoea cairica, d. Oxystelma esculentum, e. Rivea hypocrateriformis, f. Opuntia stricta, g. Striga asiatica, h. Sansevieria roxburghiana, i. Vanda spathulata, j. Actiniopteris radiata, k. Adiantum incisum, l. Cheilanthes swartzii.

for abatement of pollution, social and rural forestry, wasteland development, afforestation, and landscaping of outdoor and indoor spaces. Landscape gardening and bio-aesthetic planning is a recent trend to establish eco-friendly human habitats.

Figure 4. Analysis of colors of flowers in the study area



The outcome of the present study will help the researchers and people who are interested horticultural, olericulture and agriculture. It is also suggested that exploration, collection and conservation of wild ornamental species is also one of the alternate method to maintain the diversity of the species and conserve the rare, endemic and endangered species of ornamental interest.

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