ABSTRACT

India is one of the twelve mega-biodiversity countries in the world, which has very rich floral vegetation with variety of plants of high economic value including plants of medicinal importance. Present survey was conducted in the plant species (Trees and Shrubs) growing in their natural habitats like grounds, roadsides, open land, home gardens. Plant specimens were collected (depending upon their availability) from the area under investigation. These specimens were identified and photographed. Maximum plants have been photographed in their natural habitat whereas others in the laboratory conditions. The present study site had a high species diversity for both tree and shrub species. Probably, the high species diversity for trees and shrubs could be attributed to the many tributaries and streams that empty rich organic content and mineral resources utilized by the species for growth and production. It is therefore recommended that measures to foster partnership between the community and other stakeholders in natural resources conservation in the areas should be encouraged to ensure sustainable natural resources management in the areas.

Keywords: Survey, Marungoor, Kanyakumari.

1. INTRODUCTION

Nature has blessed India with a wealth of medicinal plants, thus being designated as “Medicinal Garden of the World” (1). Since ancient times human health was taken care through traditional plant medicines (2, 3). Indian floral diversity may be due to variety of habitats and variable environmental and geographical conditions (4). Studies of forest flora provide useful information on several aspects related to species diversity like dominant families, life-form status etc. The most dominant life form was trees (36.9%), followed by shrubs (22.7%), grasses (17.1%), herbs (13.6%) climbers (8.5%) and sedges (1.1%) (5). Vegetative survey of Knuckles valley recorded a total of 204 flowering plant species in 70 families. Eighty-nine (44%) species are endemic to Sri Lanka, while 39 (20%) are nationally threatened. Among them 148 trees, shrub species identified are 74 (50%) have not been recorded during previous floral surveys of the Knuckles forest reserve, while 115 (78%) are common to the lowland rain forests of southwestern Sri Lanka (6).

2. MATERIALS AND METHODS

2.1. Description of the study area

The present study was carried out in Marungoor Panchayat and Agastheeswaram Taluk of Kanyakumari District. Marungoor, is a panchayat town near Suchindrum in Kanyakumari district in the state of Tamil Nadu. The place sprawls over an area of about 10 km². Suchindram is about five km south-west of Marungoor. As of 2001 India census, Marungur had a population of 10,096 and most of them are farmers. Males constitute 49% of the population and females 51%. Marungur has an average literacy rate of 82%, higher than the national average of 59.5%. Male literacy is 85%, and female literacy is 80%. The annual rainfall of this area is low when compared to other areas of the Kanyakumari District. Its latitude and longitude are 8.23738 and 77.33989 respectively.

2.2. Floristic survey

Present survey was conducted in the plant species (Trees and Shrubs) growing in their natural habitats like grounds, roadsides, open land, home gardens. Plant specimens were collected (depending upon their availability) from the area under investigation. These specimens were identified and photographed. Maximum plants have been photographed in their natural habitat whereas others in the laboratory conditions. All species have been designated to their corresponding families. Plant species were also differentiated on the basis of their habitat. Herbarium sheets were prepared and documented. Identification was done with the help of different floras Gamble and Fischer (7), Mathew (8), Nair and Henry (9).

3. RESULTS AND DISCUSSION

Total 78 plant species belonging to 43 families and 70 genera were recorded from the study site (Table 1). The most dominant life form was

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shrub (57.5%) followed by trees, (30.8%), and climber (8.97%), herb (2.6%) (Table 2). Out of 78 plants, 75 were angiosperms and three gymnosperms. The contribution of dicotyledons was 89.74% and monocotyledons 10.25% (Table 3). Apocynaceae was the most dominant family with 6 species and 5 genera and other main contributing families were Euphorbiaceae (4 genera and 5 species), Annonaceae (1 genera and 3 species) Bignoniaceae (3 genera and 3 species), Caesalpiniaceae (2 genera and 4 species), Rubiaceae (4 genera and 4 species), Verbenaceae (3 genera and 3 species) (Table 6). Families Araceae, Moraceae, Ulmaceae, Santalaceae, Rosaceae, Punicaceae, Moringaceae, Muntingiaceae, Oxalidaceae, Plantaginaceae, Ranunculaceae, Rhizophoraceae, Sterculiaceae etc., had only one species each (Table 7). In the study area, most dominant life form was shrub generally; the high diversity of shrub is associated with undisturbed tropical areas.

### Table 1. List of plant species recorded from the study area.

| S. No. | Botanical Name | Family          | Habit   | Wild / Ornamental / Cultivated |
|--------|----------------|-----------------|---------|-------------------------------|
| 1.     | Acalyphahispida Burm. f | Euphorbiaceae    | Shrub   | Ornamental                     |
| 2.     | Acantholippiaseriphioides (A. Gray) | Verbenaceae     | Shrub   | Ornamental                     |
| 3.     | Achrussapota L. | Sapotaceae      | Tree    | Cultivated                     |
| 4.     | Adeniumobesum (forssk). Roem. &Schult | Apocynaceae | Shrub   | Ornamental                     |
| 5.     | Adhathodavasica Nees. | Acanthaceae      | Shrub   | Wild                           |
| 6.     | Allamandacathartica L. | Annonaceae     | Shrub   | Cultivated                     |
| 7.     | Anacardiumoccidentale L. | Annonaceae | Shrub   | Cultivated                     |
| 8.     | Annonamuricata L. | Annonaceae      | Shrub   | Cultivated                     |
| 9.     | Annonareticulata L. | Annonaceae      | Shrub   | Cultivated                     |
| 10.    | Annonasquamosa L. | Annonaceae      | Shrub   | Cultivated                     |
| 11.    | Aracauriasp. | Aracauriaceae   | Shrub   | Ornamental                     |
| 12.    | Argyreia nervosa (Burm. f.) Bojer | Convolvulaceae | Climber | Wild                           |
| 13.    | Averrhoaoblimbi L. | Oxalidaceae    | Tree    | Cultivated                     |
| 14.    | Bauhinia vahliiwt&Aron | Caesalpiniaceae | Shrub   | Wild                           |
| 15.    | Borassusflabellifer L. | Arecaceae      | Tree    | Wild                           |
| 16.    | Calotropis gigantea (Ait.) R. Br. | Asclepiadaceae | Shrub   | Wild                           |
| 17.    | Carallia braeheata (Lour) merr. | Rhizophoraceae | Shrub   | Wild                           |
| 18.    | Carica papaya L. | Caricaceae      | Tree    | Cultivated                     |
| 19.    | Cassia acacia L. | Caesalpinaceae  | Shrub   | Wild                           |
| 20.    | Cassia alata L. | Caesalpinaceae  | Shrub   | Wild                           |
| 21.    | Cassia auriculata Linn. | Caesalpinaceae | Shrub   | Wild                           |
| 22.    | Citrus medica L. | Rutaceae        | Shrub   | Cultivated                     |
| 23.    | Clematis recta L. | Ranunculaceae   | Climber | Ornamental                     |
| 24.    | Cocculusnicifera L. | Arecaceae      | Tree    | Cultivated                     |
| 25.    | Colocasia sps.  | Araceae         | Shrub   | Wild                           |
| 26.    | Crataevamagna (Lour.) Dc. | Capparidaceae | Tree    | Wild                           |
| 27.    | Cryptostegiagrandiflora R.Br. | Apocynaceae    | Shrub   | Ornamental                     |
| 28.    | Cycas revolute Thunb. | Cycadaceae    | Tree    | Ornamental                     |
| 29.    | Dichrostachys cinereawight et Arn. | Mimosaceae | Shrub   | Wild                           |
| 30.    | Dodonaea viscosa Jacq | Rutaceae      | Shrub   | Wild                           |
| 31.    | Duranta erecta L. | Verbenaceae    | Shrub   | Ornamental                     |
| 32.    | Ficuscarica L. | Moraceae        | Tree    | Cultivated                     |
| 33.    | Flacourtiajangomas (Lour.) Rarusch | Flacourtiaceae | Tree    | Cultivated                     |
| 34.    | Gliricidia sepium (Jacq.) Kunth ex walp | Fabaceae    | Shrub   | Wild                           |
| 35.    | Hibiscus mutabilis L. | Malvaceae      | Tree    | Ornamental                     |
| 36.    | Hibiscus rosalinensis L. | Malvaceae    | Shrub   | Ornamental                     |
| 37.    | Ixora cocinea L. | Rubiaceae      | Shrub   | Ornamental                     |
| 38.    | Jatropha gossypifolia L. | Euphorbiaceae | Shrub   | Wild                           |
| 39.    | Jatropha integrimma Jacq. | Euphorbiaceae | Shrub   | Ornamental                     |
| 40.    | Klienhofia hospita L. | Sterculiaceae | Tree    | Wild                           |
| 41.    | Kopsiafruticosa A.D.C | Apocynaceae    | Shrub   | Ornamental                     |
44. **Lagerstroemiaindica** L. Lythraceae Shrub Ornamental
45. **Lantana camara** Linn. Verbenaceae Shrub Ornamental
46. **Mangifera indica** L. Anacardiaceae Tree Cultivated
47. **Melastomamalabathricum** (L.) smith Melastomaceae Shrub Ornamental
48. **Millingtonia hortensis** L. Bignoniaceae Tree Ornamental
49. **Moringa oleifera** Lam. Moringaceae Tree Cultivated
50. **Moullava spicata** (Dalzell) Nicolson Fabaceae Climber Wild
51. **Muntingiacalabura** L. Muntinginaceae Tree Wild
52. **Musa paradisiaca** L. Musaceae Shrub Cultivated
53. **Mussand erythrophylla** (Schumdch) Rubiaceae Shrub Ornamental
54. **Myristica fragrans** Hoult Myrtaceae Tree Wild
55. **Nyctanthus arboretristis** L. Nyctaginaceae Shrub Wild
56. **Oxystelma secomone** L. Asclepiadaceae Climber Wild
57. **Phyllanthus emblica** L. Euphorbiaceae Tree Wild
58. **Pisonia alba** span. Nyctaginaceae Shrub Ornamental
59. **Plumeria pudica** Jacq Apocynaceae Shrub Ornamental
60. **Plumeria rubra** L. Apocynaceae Shrub Ornamental
61. **Podraneacarosaliana** (Tanf.) Bignoniaceae Tree Ornamental
62. **Pouteria campechiana** (kunth) Baehni Sapotaceae Tree Cultivated
63. **Psidium guajava** L. Myrtaceae Tree Cultivated
64. **Punicagranatum** L. Punicaceae Shrub Cultivated
65. **Quisqualis indica** L. Combretaceae Climber Ornamental
66. **Ravanalamadacascariensis** Sonn. Musaceae Tree Ornamental
67. **Rhondeletia calophylla** Standl. Rubiaceae Shrub Wild
68. **Ricinus communis** L. Euphorbiaceae Shrub Wild
69. **Rosa** sps Rosaceae Shrub Wild
70. **Santalum album** L. Santalaceae Tree Cultivated
71. **Syzygium samarangens** (Blume) Merr. & Perry Myrtaceae Shrub Wild
72. **Syzygium jambolanum** L. Myrtaceae Tree Wild
73. **Tecomastans** L. Bignoniaceae Tree Ornamental
74. **Thuja occidentalis** L. Cupressaceae Tree Ornamental
75. **Thunbergia grandiflora** Roxb Acanthaceae Shrub Ornamental
76. **Torenia falconerii** L. Plantaginaceae Shrub Ornamental
77. **Trema orientalis** (L.) Blume Ulmaceae Shrub Wild
78. **Table 2. Habit wise distribution of plant species in the study area.**

| Habits          | No. of species | Percentage |
|-----------------|----------------|------------|
| Climber         | 7              | 8.97%      |
| Shrub           | 44             | 56.41%     |
| Trees           | 27             | 34.61%     |

| S. No. | Presence of cotyledonous plants | No. of Plants | Percentage |
|--------|---------------------------------|---------------|------------|
| 1.     | Dicot                           | 70            | 89.74%     |
| 2.     | Monocot                         | 8             | 10.25%     |

| Nature of plants | No. of species | Percentage |
|------------------|---------------|------------|
| Wild             | 27            | 35.52%     |
| Cultivated       | 19            | 24.35%     |
| Ornamental       | 32            | 42.10%     |

| Table 5. Economic uses of plants |
|----------------------------------|
| Edible Fruit Timber Oil Medicinal | Yield | Yield | Yield | Used |
|--------|-------|-------|-------|-------|
| 5      | 4     | 4     | 3     | 7     |

| Table 6. Dominant families observed during the study period |
|----------------------------------|
| S. No | Families       | No. of plants |
|-------|----------------|---------------|
| 1     | Apocynaceae    | 5             |
| 2     | Euphorbiaceae  | 4             |
| 3     | Rubiaceae      | 4             |
| 4     | Bignoniaceae   | 3             |
| 5     | Verbenaceae    | 3             |
| 6     | Annonaceae     | 3             |
| 7     | Acanthaceae    | 2             |
| 8     | Anacardiaceae  | 2             |
| 9     | Arecaceae      | 2             |
| 10    | Asclepidaceae  | 2             |
| 11    | Caesalpinaceae | 2             |
| 12    | Combretaceae   | 2             |
| 13    | Fabaceae       | 2             |
Plants like Anacardium occidentale, Mangifera indica, Adhathoda vasica, Calotropis procera, Millingtonia hortensis, Tecoma stans, Cassia auriculata, Quisqualis indica, Phyllanthus emblica, Ricinus communis, Hibiscus rosasinensis, Ficus carica, Moringa oleifera, Musa paradisiaca, Rosa sps, Ixora cocinea, Lantana camara are recommended in the study area. Dominance of Apocynaceae shows that these areas are nutrient deficient especially nitrogen. Among the plant species, 27 were wild / naturalized, 19 are cultivated and 32 are ornamental (Table 4). The most diverse families in the study area include Apocynaceae, Euphorbiaceae, Rubiaceae, Bignoniaceae. Some number of exotic florals was reported from the study area which includes Annona squamosa, Psidium guajava, Punica granatum, Lantana camara.

Most plant species in the study area are considerable ecological and economic importance and useful as bioresources to wild fauna and human beings. Of the total 27 wild / naturalized plant species, most are useful as edible fruits, timbers, fuel wood etc (Table 5). Ecologically, the non woody species provide fleshy fruit resources to faunas indicating the extent of the faunal dependence of plants for various ecological processes. Some of the wild / naturalized edible fruits trees are Annonasquamosa, Annona muricata, Annona reticulata, Anacardium occidentale, Mangifera indica, Ficus carica, Cocos nucifera, Musa paradisiaca, Carica papaya, Pouteria campechiana, Averrhoa blimbi, Borassus flabellifer, Terminalia catappa, Achras sapota. Growing medicinal plants is a great way to ensure good health. These plants are recommended for their wide range of health benefits and basic healing properties. The medicinally important species are Adhathoda vasica, Annona muricata, Annona reticulata, Annona squamosa, Carica papaya, ficus carica, Myristica fragrans. Timber yielding plants like Borassus flabellifer, Cocos nucifera, Mangifera indica, Santalum album and oil yielding plants are Cocos nucifera, Ricinus communis, Borassus flabellifer. There are 14 fruit yielding trees, 7 medicinal plants, 5 edible trees, 4 timber yielding trees and 3 oil yielding trees.

The Apocynaceae were observed to be the most prevalent family. This may be due to their fast germination ability, associated with symbiotic properties which have enabled species to easily establish within habitat types. This finding was in line with the works of Deka et al. (10), on vegetative assessment of tree species and shrubs indicating that legumes were the prominent species recorded in the study area. Moraceae, Meliaceae and Papilionaceae also their ability to produce numerous seeds which was eventually establish at suitable sites. This result was confirmed by Khan et al. (11) while working on regeneration and survival of tree seedlings in tropical forests. The reasons for the low number of species observed in some families could be attributed to diseases and browsing by

| Sl. No. | Family       | Genus | Species |
|--------|--------------|-------|---------|
| 43     | Verbenaceae  | 3     | 3       |
| 42     | Ulmaceae     | 1     | 1       |
| 41     | Sterculiaceae| 1     | 1       |
| 40     | Sapotaceae   | 2     | 2       |
| 39     | Santalaceae  | 1     | 1       |
| 38     | Rutaceae     | 2     | 2       |
| 37     | Rubiaceae    | 4     | 4       |
| 36     | Rhizophoraceae| 1    | 1       |
| 35     | Rosaceae     | 1     | 1       |
| 34     | Plantaginaceae| 1    | 1       |
| 33     | Punicea      | 1     | 1       |
| 32     | Oxalidaceae  | 1     | 1       |
| 31     | Nyctaginaceae| 2     | 2       |
| 30     | Myrtaceae    | 2     | 2       |
| 29     | Myrtaceae    | 3     | 3       |
| 28     | Musaceae     | 2     | 2       |
| 27     | Muntingiaceae| 1     | 1       |
| 26     | Moringaceae  | 1     | 1       |
| 25     | Moraceae     | 1     | 1       |
| 24     | Mimosaceae   | 1     | 1       |
| 23     | Melastomaceae| 1     | 1       |
| 22     | Malphigia    | 1     | 1       |
| 21     | Malvaceae    | 1     | 1       |
| 20     | Lythraceae   | 1     | 1       |
| 19     | Flacourtiaceae| 1   | 1       |
| 18     | Fabaceae     | 2     | 2       |
| 17     | Euphorbiaceae| 4     | 5       |
| 16     | Cupressaceae | 1     | 1       |
| 15     | Combretaceae | 2     | 2       |
| 14     | Convolvulaceae| 1  | 1       |
| 13     | Capparidaceae| 1     | 1       |
| 12     | Caesalpinaceae| 2   | 4       |
| 11     | Caricaceae   | 1     | 1       |
| 10     | Bignoniaceae | 3     | 3       |
| 9      | Caricaceae   | 1     | 1       |
| 8      | Asclepiadaceae| 2   | 2       |
| 7      | Areceae      | 2     | 2       |
| 6      | Araceae      | 1     | 1       |
| 5      | Aracariaceae | 1     | 1       |
| 4      | Apocynaceae  | 5     | 6       |
| 3      | Annonaceae   | 1     | 3       |
| 2      | Annonaceae   | 2     | 2       |
| 1      | Acanthaceae  | 2     | 2       |

Table 7. Family wise distribution of plant species in the study area

Plants like Anacardium occidentale, Mangifera indica, Adhathoda vasica, Calotropis procera, Millingtonia hortensis, Tecoma stans, Cassia auriculata, Quisqualis indica, Phyllanthus emblica, Ricinus communis, Hibiscus rosasinensis, Ficus carica, Moringa oleifera, Musa paradisiaca, Rosa sps, Ixora cocinea, Lantana camara are recommended in the study area. Dominance of Apocynaceae shows that these areas are nutrient deficient especially nitrogen. Among the plant species, 27 were wild / naturalized, 19 are cultivated and 32 are ornamental (Table 4). The most diverse families in the study area include Apocynaceae, Euphorbiaceae, Rubiaceae, Bignoniaceae. Some number of exotic florals was reported from the study area which includes Annona squamosa, Psidium guajava, Punica granatum, Lantana camara.

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herbivores which resulted in poor growth and establishment and perhaps seeds need scarification treatment before germination. Similar results were reported by Coley and Barone (12) on herbivory and plant defences on herbivores. The low number of species could also be attributed to anthropogenic activities which affected species growth and production. Similar findings have been reported by Sumina (13) on plant communities on anthropogenically disturbed sites in Chukotka Peninsula.

The present study site had a high species diversity for both tree and shrub species. Probably, the high species diversity for trees and shrubs could be attributed to the many tributaries and streams that empty rich organic content and mineral resources utilized by the species for growth and production. Giliba et al. (14) reported similar findings on woodland of Bereku Forest Reserve in Tanzania. Some of the rare trees and shrubs species in the area observed during survey, such as Crataeva magna, Averrhoa blimbi, Borassus flabellifer, Clematis recta, Hibiscus mutabilis, Klenhofia hospita, Moullava speicata, Oxystelma secamone, Pouteria compechiana etc.,

The dominance of this family could be as a result of habitat adaptation and favourable environmental conditions which encourage pollination, dispersal and eventual establishment of species. Similar situations were reported by Pausas and Austin (15) on species richness in relation to environment. Austin et al (16) found that edaphic parameter (soil nutrients) played a major role in species richness and establishment in an ecosystem. The reasons for the poor establishment of some families which showed lowest species may be attributed to competition for nutrients, limited light by canopy trees and destruction of undergrowth during tree snapped and logged on the forest floor. Egbe et al. (17) mentioned similar reports in a disturbed and natural regeneration forest in Korup National Park and Coley and Barone (12) also recorded anthropogenic activities affecting growth and distribution of species.

4. CONCLUSION

Human activities including unsustainable resources exploitation in communities has greatly depleted the resources base of the community forest. However, tree species had the highest population density in the study area followed by the shrubs species. It is therefore recommended that measures to foster partnership between the community and other stakeholders in natural resources conservation in the areas should be encouraged to ensure sustainable natural resources management in the areas. Furthermore, public enlightenment on the need for sustainable natural resources exploitation should be intensified in the area to raise the level of awareness of the locals; also there is need for the provision of alternative means of livelihood for the local populace to reduce their rate of dependence on the available resources of the forest. Finally, afforestation and re-afforestation programs should be timely carried out to rehabilitate the degraded ecosystem.

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