EXPLORATION OF ORNAMENTAL FLORAS IN THE CAMPUS OF S.T. HINDU COLLEGE, NAGERCOIL, KANYAKIMARI DISTRICT, TAMILNADU, INDIA

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ABSTRACT

Most of the present day flowers have come from the wild progenitors, a few of which still exist in natural habitat. Ornamental flowers are highly promising and unutilized resources having tremendous and proven economic importance. Ornamental plants accompany people, since their birth to death and they co-exist with almost all happy events in life such as birthday celebrations, weddings, carrier progress etc. In addition, they form our best partners in our everyday life in the flats, offices, different public spaces, parks, gardens and elsewhere. An extensive floristic survey was conducted during the year 2015. Taxonomic identification, photographic documentation and ornamental characterization of each species with potential for use on floral art were recorded. The methodology used is based on observation method for the determination of flora. All the specimens collected were identified with the help of recent literature. The field expeditions of study area gave interesting results concerning floristic diversity.

Keywords: Ornamental flowers, domestication, floristic diversity and methodology.

1. INTRODUCTION

Ornamental flowers are highly promising and unutilized resources having tremendous and proven economic importance (Jenomics, 2014). Ornamental plants accompany people, since their birth to death and they co-exist with almost all happy events in life such as birthday celebrations, weddings, carrier progress etc. In addition, they form our best partners in our everyday life in the flats, offices, different public spaces, parks, gardens and elsewhere (Arora, 2013). They are an inseparable part of the culture of all nations and nationalities. This is the reason, why people since time immemorial have tried to improve or change flowers and other ornamental plants according to their imagination, dreams and practical aspects of planting.

2. MATERIALS AND METHODS

2.1. Floristic Survey

An extensive floristic survey was conducted during June - November 2015. Taxonomic identification, photographic documentation and ornamental characterization of each species with potential for use on floral art were recorded. The methodology used is based on observation method for the determination of flora. All the specimens collected were identified with the help of recent literature by local floras authored by Hooker (1972-1987), Gamble and Fischer, (1915-1935) and Henry et al., 1989.

3. RESULTS AND DISCUSSION

The field expeditions of study area gave interesting results concerning floristic diversity. A total of 108 plant species are present in this study area (Table -I). Among the species, dicots were distributed in 36 families with 74 species, monocots in 13 families with 28 species; pteridophytes are in 4 families with 4 species and gymnosperms in 2 families with 2 species, 22 plant species are wild, 72 species are significantly ornamental and 14 plant species are wild or cultivated. When the percentage distributions are calculated it is found that 68.5% of dicots, 25.09% of monocots, 3.7% of pteridophytes, 1.8% of gymnosperms are present. This profiling indicated that the maximum ornamentals are dicots following monocots gymnosperms, pteridophytes and cacti. Among the total identified plants, Acanthaceae is dominant family 14.28.

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The classification of the ornamental flora based on the diversity of its utilization indicating that the maximum 4 of the plant can be used as aquatic ornamentals followed by 22 species as...
ornamentals trees, 24 species as ornamental shrubs, 27 species as ornamental herbs, 16 species as ornamental succulents and cacti, 11 species as ornamental climbers. Regarding the habit wise distribution of identified plants, 22 species as trees, 48 species as herbs, 26 species as shrubs, 4 species as climbers and 8 species as succulents, 2 species can be used as ornamental foliage followed by 1 species as carpet bedding, 7 species as mixed borders, 6 species as bushy and upright foliage, 3 species used in topiary formations and also, 3 species are used as ornamental palms, 2 species ornamental ferns, 15 species are recommended for railway lines, 18 species are recommended for town roads, 2 species as dry wall, 3 species as topiary and 3 species as a roof gardening (Table 2-4).

Table 1. Number of plants and its family, habits in the study area.

| S.No. | Plant Names                  | Family         | Habits   | Wild/Cultivated |
|-------|------------------------------|----------------|----------|-----------------|
| 1*    | Adathoda vasica Nees.        | Acanthaceae    | S        | W               |
| 2.    | Allamanda cathartica L.      | Apocynaceae    | S        | C               |
| 3.    | Albizia julibrissin L.       | Mimosaceae     | T        | C               |
| 4.    | Aloe sps                     | Liliaceae      | Su       | C               |
| 5.    | Albizia lebbeck L.           | Mimosaceae     | T        | C               |
| 6.    | Alocasia amacrorhiza L.      | Araceae        | H        | C               |
| 7.    | Anthurium sps                | Araceae        | H        | C               |
| 8.    | Araucaria sps                | Araucariaceae  | T        | C               |
| 9.    | Aristolochia indica L.       | Aristolocaceae | H        | W               |
| 10.   | Asparagus racemosus Wild.    | Liliaceae      | CL       | C               |
| 11.   | Azadirachta indica A.Juss    | Meliaceae      | T        | C               |
| 12.   | Balsam impatiens Royle.      | Balsamnaceae   | H        | C               |
| 13.   | Barleria prionitis L.        | Acanthaceae    | H        | W               |
| 14.   | Beauveria curvata Lem.       | Agavaceae      | S        | C               |
| 15.   | Begonia floccifera L.        | Bignoniaceae   | H        | C               |
| 16.   | Bougainvillea spectabilis Wild. | Nyctaginaceae | CL       | C               |
| 17.   | Caesalpinia pulcherrima L.   | Caesalpiniaceae| S        | C               |
| 18.   | Caladium bicolor Vent.       | Araceae        | H        | C               |
| 19.   | Callistemon citrinus L.      | Myrtaceae      | T        | C               |
| 20.   | Calotropis gigantean L.      | Asclepiadaceae | S        | W               |
| 21.   | Caryota urens L.             | Arecaceae      | T        | W               |
| 22.   | Cassia biflora L.            | Caesalpiniaceae| S        | W               |
| 23.   | Cassia fistula L.            | Caesalpiniaceae| T        | C               |
| 24.   | Casuarina equisetifolia L.   | Casurinaceae   | T        | C               |
| 25.   | Catharanthus roseus L.       | Apocynaceae    | S        | C               |
| 26.   | Chlorophytum cosmonum Thumb. | Liliaceae      | H        | C               |
| 27.   | Cissus quadrangularis L.     | Vitaceae       | Su       | C               |
| 28.   | Clerodendrum speciosum L.    | Verbenaceae    | H        | C               |
| 29.   | Citoria ternatea L.          | Fabaceae       | CL       | C               |
| 30.   | Codiaeum variegatum L.       | Euphorbiaceae  | S        | C               |
| 31.   | Coleus amboinicus Lour.      | Lamiaceae      | H        | C               |
| 32.   | Coleus blumei Benth.         | Lamiaceae      | H        | C/W             |
| 33.   | Commelina benghalensis L.    | Commelinaceae  | H        | W               |
| 34.   | Cordyline sps                | Liliaceae      | S        | C               |
| 35.   | Crescentia cujete L.         | Bignoniaceae   | T        | C               |
| 36.   | Crinum amboinensis L.        | Amaryllidaceae | H        | C/W             |
| 37.   | Crinum powellii Baker.       | Amaryllidaceae | H        | C/W             |
| 38.   | Crossandra nilotica Oliv.    | Acanthaceae    | H        | C/W             |
| 39.   | Cystostegia grandiflora Roxb.| Asclepiadaceae | S        | C/W             |
| 40.   | Cycas revoluta L.            | Cycadaceae     | T        | C               |
| 41.   | Delonix regia Hook.          | Caesalpiniaceae| T        | C/W             |
| No. | Common Name                        | Scientific Name            | Family           | Status | Cultivation |
|-----|------------------------------------|-----------------------------|------------------|--------|-------------|
| 42.**| *Dieffenbachia picta* Schott.      | *Dieffenbachia picta* Schott. | Araceae          | S      | C/W         |
| 43.**| *Dracaena sps*                    | *Dracaena sps*              | Liliaceae        | S      | C           |
| 44.△| *Dryopteris sps*                   | *Dryopteris sps*            | Dryopteridaceae  | H      | C           |
| 45. | *Duranta plumeri* Jacq.            | *Duranta plumeri* Jacq.     | Verbenaceae      | S      | C           |
| 46.**| *Eichhornia crassipes* Solms.    | *Eichhornia crassipes* Solms. | Pontederiaceae  | H      | W           |
| 47.*| *Eranthemum tricolor* W.Bull       | *Eranthemum tricolor* W.Bull | Acanthaceae      | S      | C           |
| 48.*| *Euphoria antiquorum* L.           | *Euphoria antiquorum* L.    | Euphorbiaceae    | Su     | C           |
| 49.*| *Euphorbia heterophylla* L.        | *Euphorbia heterophylla* L. | Euphorbiaceae    | H      | W           |
| 50.*| *Euphorbia milli* Moul.            | *Euphorbia milli* Moul.     | Euphorbiaceae    | H      | C           |
| 51. | *Galphimia glauca* Bartl.          | *Galphimia glauca* Bartl.   | Malphuginaceae   | CL     | C           |
| 52.**| *Gomphrena globosa* L.            | *Gomphrena globosa* L.      | Amaranthaceae    | H      | W           |
| 53.*| *Hemigraphis alternate* Burm. (f)  | *Hemigraphis alternate* Burm. (f) | Acanthaceae | H      | C           |
| 54.*| *Hibiscus rosasinensis* L.        | *Hibiscus rosasinensis* L.  | Malvaceae        | S      | C/W         |
| 55.*| *Hibiscus schizopetalous* L.       | *Hibiscus schizopetalous* L. | Malvaceae        | S      | C           |
| 56.*| *Hibiscus tiliaceae*               | *Hibiscus tiliaceae*        | Malvaceae        | H      | C           |
| 57.*| *Hippodramum hybridum* L.          | *Hippodramum hybridum* L.   | Acanthaceae      | H      | C           |
| 58.*| *Ixora coccinea* L.                | *Ixora coccinea* L.         | Rubiaceae        | H      | C           |
| 59.*| *Jasminum sambac* L.               | *Jasminum sambac* L.        | Oleaceae         | H      | C           |
| 60.*| *Jatropha hystate* Jacq.           | *Jatropha hystate* Jacq.    | Acanthaceae      | S      | C           |
| 61.**| *Kalanchoe blossfeldiana* L.       | *Kalanchoe blossfeldiana* L. | Crassulaceae     | H      | C/W         |
| 62.*| *Kleinia grandiflora* L.           | *Kleinia grandiflora* L.    | Asteraceae       | H      | C           |
| 63.*| *Lantana camera* L.                | *Lantana camera* L.         | Verbenaceae      | H      | C/W         |
| 64.*| *Lawso niaineris* L.               | *Lawso niaineris* L.        | Lythraceae       | S      | C/W         |
| 65.△| *Microsorum pustulatum* Coper.     | *Microsorum pustulatum* Coper. | Polypodiaceae   | H      | C           |
| 66.*| *Mirabilis jalapa* L.              | *Mirabilis jalapa* L.       | Nyctaginaceae    | H      | C           |
| 67.*| *Mimulus ringens* L.               | *Mimulus ringens* L.        | Rubiaceae        | T      | W           |
| 68.**| *Mammillaria baumii* L.            | *Mammillaria baumii* L.     | Cactaceae        | Su     | C           |
| 69.*| *Morinda coriacea* L.              | *Morinda coriacea* L.       | Rubiaceae        | T      | W           |
| 70.*| *Muntingia calabura* L.            | *Muntingia calabura* L.     | Tiliaceae        | T      | C           |
| 71.*| *Musanga crenulata* L.             | *Musanga crenulata* L.      | Rubiaceae        | S      | C           |
| 72.*| *Nymphaea* sps                     | *Nymphaea* sps              | Nymphaeaceae     | H      | C           |
| 73.*| *Opuntia dillenii* L.              | *Opuntia dillenii* L.       | Opuntiaceae      | Su     | C           |
| 74.*| *Opuntia rhodantha* Mill.          | *Opuntia rhodantha* Mill.   | Opuntiaceae      | Su     | C           |
| 75.*| *Orthosiphon spiralis* Lour.       | *Orthosiphon spiralis* Lour. | Lamiaceae        | H      | C           |
| 76.*| *Oxalis corniculata* L.            | *Oxalis corniculata* L.     | Oxalidaceae      | H      | W           |
| 77.*| *Passiflora foetida* L.             | *Passiflora foetida* L.     | Passifloraceae   | CL     | W           |
| 78.*| *Peltophorum pterocarpum* Roxb.    | *Peltophorum pterocarpum* Roxb. | Fabaceae      | T      | W           |
| 79.**| *Phoenix* sps                      | *Phoenix* sps               | Palmae           | T      | C           |
| 80.**| *Pistia stratiotes* L.             | *Pistia stratiotes* L.      | Araceae          | S      | C           |
| 81.*| *Plumeriarubra* L.                 | *Plumeriarubra* L.          | Apocynaceae      | S      | C           |
| 82.*| *Podranea brycei* L.               | *Podranea brycei* L.        | Bignoniaceae     | H      | C           |
| 83.*| *Polyscias juliflora* L.           | *Polyscias juliflora* L.    | Acanthaceae      | T      | C           |
| 84.**| *Polyscias multiflora* Andre.      | *Polyscias multiflora* Andre. | Acanthaceae     | H      | C           |
| 85.*| *Quisqualis indica* L.             | *Quisqualis indica* L.      | Combretaceae     | S      | C           |
| 86.*| *Pongamia pinnata* L.              | *Pongamia pinnata* L.       | Fabaceae         | T      | W           |
| 87.**| *Rhoeo spathacea* (sw)             | *Rhoeo spathacea* (sw)      | Commelinaceae    | H      | C           |
| 88.*| *Ruellia tuberosa* L.              | *Ruellia tuberosa* L.       | Acanthaceae      | H      | W           |
| 89.*| *Ruelliat weediana* Griseb.        | *Ruelliat weediana* Griseb. | Acanthaceae      | H      | C           |
| 90.*| *Russelia equisetiformis* L.       | *Russelia equisetiformis* L. | Scrophulariaceae | H      | C           |
| 91. | *Salvinia molesta* L.              | *Salvinia molesta* L.       | Salvinaceae      | H      | C           |
| 92.△| *Sanseveria trifurcate* L.         | *Sanseveria trifurcate* L.  | Convulvulaceae   | H      | C           |
| 93.**| *Sanseveria roxburgiana* Schult.   | *Sanseveria roxburgiana* Schult. | Convulvulaceae | Su     | C           |
| 94.*| *saraca asoka* Roxb.               | *saraca asoka* Roxb.        | Fabaceae         | T      | C/W         |
| 95.△| *Selaginella* sps                   | *Selaginella* sps            | Selaginellaceae  | H      | C           |
Table 2. Cotyledons wise distribution

| Sl. No | Nature of the plant | No. of Plants | % |
|--------|---------------------|---------------|---|
| 1.     | Monocots            | 28            | 25.9 |
| 2.     | Dicots              | 74            | 68.5 |
| 3.     | Pteridophytes       | 4             | 3.7 |
| 4.     | Gymnosperms         | 2             | 1.8 |

H = Herb; * = Dicot; S = Shrub; ** = Monocot; T = Tree; P = Pteridophytes; Cl = Climber; G = Gymnosperms; W = Wild; C = Cultivated; Su = Succulent

Table 3. Characterization of the recorded flora according to the ornamental utilization

| S.No  | Ornamental Utility          | Name of the plants                                                                 |
|-------|----------------------------|-----------------------------------------------------------------------------------|
| 1.    | Aquatic ornamentals        | Trapanatans, Salviniamolesta, Nymphaea sps, Pistia stratiotes, Eichornia crassipes. |
| 2.    | Ornamental trees           | Azadirachta indica, Caryota urens, Araucaria sps, Cassia fistula, Cycas revoluta, Casuarina equisetifolia, Callistemon citrinus, Cressentiacujete, Delonix regia, Jacaranda mimosifolia, Thespisia populnea, Morinda coriea, Polyalthia longifolia, Pongamia pinatta, Peltophorus pterocarpum, Plumeria rubra, Muntingia calabura, Albizia julibrissin, Albizia lebbeck, Terminala catappa, Santalum album, Swietenia mahagoni (22) |
| 3.    | Ornamental shrubs          | Tectona grandis, Tecomaria capensis, Tecomasstans, Russeliea quisetiformis, Phoenix sps, Polyscia balfourana, Musaenda frondosa, Lantana camera, Lawsonia inermis, Jatrophaa stata, Ixora coccinea, Hibiscus schizopetalous, Hibiscus rosinensis, Hippestrum hybridum, Hemigraphis alternata, Eranthemum tricolor, Dracaena sps, Duranta plumeria, Dieffenbachia pictata, Calotropis gigantea, Dhlorophytm cosmosum, Cordylinesps, Cassia biflora, Adathoda vasica (24). |
| 4.    | Ornamental herbs           | Alacasia macrorhiza, Aristolochia indica, Barleria prionitis, Balsam impatiens, Begonia ficicera, Caladium bicolor, Catharanthus roseus, Commelinae benghalensis, Crinum powellii, Crinum amboinensis, Coleus blumei, Coleus amboinicus, Euphorbia heterophylla, Clerodendrum speciosum, Gomphrena globosa, Hippestrum hybridum, Keleinia grandiflora, Mirabilis jalada, Oxalis corniculata, Stylisangst hammatus, Rhoeoospa thacea, Rubelia tweediana, Rubelia tuberosa, Orthosiphon spiralis, Tridax procumbens, Setae seapurpurea, Sanseveria roxburghiana, Sanseveria trifuscosa. (27) |
| 5.    | Ornamental Hedge           | Polyalthia longifolia, Casuarina equisetifolia, Albizia lebbeck, Bougainvillea spectabilis, Delonixregia, Callistemon citrinus, Azadiracta indica, Jarcandrea mimosifolia, Pongamia pinatta, Muntingia calabura, Santalum album, Thespisia populnea, Hibiscus rosinensis, Tecomastans, Tecomaria capensis. (16) |
| 6.    | Ornamental                | Euphorbia antiquorum, Mamillaria baumii, Opuntia dilleni, Opuntia                  |
7. Ornamental climber
   Succulent & cacti: Allamanda carthartica, Asparagus race mosus, Cryptostegia grandiflora, Bougainvillea spectabilis, Clitoria ternatea, Cissus quadrangularis, Galphimia glauca, Jasminum sambac, Passiflora foetida, Quiqualis indica, Thunbergia giaerceta. 

8. Ornamental foliage
   Ornamental climber: Allamanda carthartica, Asparagus race mosus, Cryptostegia grandiflora, Bougainvillea spectabilis, Clitoria ternatea, Cissus quadrangularis, Galphimia glauca, Jasminum sambac, Passiflora foetida, Quiqualis indica, Thunbergia giaerceta. 

9. Carpet bedding
   Alocasia macrorhiza, Coleus blumei, Cordyline sps, Codiaeum variegatum, Caladium bicolour, Dieffenbachia picta, Dracenasps, Dryopteris sps, Chlorophytum comosum, Kleinia grandiflora, Phoenix sps, Microsorum pustulatum, Sanseveria trifusca, Sanseveria roxburgiana, Begonia flocifera, Asparagus racemosus, Cycasrevolouta, Setcreasea purpurea, Commelina benghalensis, Anthurium sps. 

10. Mixed Border
    Euphorbia heterophylla, Tecoma stans, Thunbergia giaerceta, Catharathus roseous, Crossandra nilotica, Caesalpinia pulcherrima, Tecomaria capensis. 

11. Trailers
    Setcreasea seapurpurea, Chlorophytum comosum. 

12. Bushy & upright foliage
    Aracucaria sps, Begonia flocifera, Cordyline sps, Dieffenbachia picta, Dracena sps, Setcreasea purpurea. 

13. Topiary
    Bougainvillea spectabilis, Clerodendrum speciosum, Durantap lummerri. 

14. Ornamental palms
    Cycasrevoluta, Phoenix, Caryotaurens. 

15. Ornamental ferns
    Microsorum pustutatum, Selaginella sps. 

16. Ornamental trees recommended for town roads
    Polyalthia longifolia, Saracaasoca, Delonix regia, Tecomastans, Thunbergia giaerceta, Catharathus roseous, Crossandra nilotica, Caesalpinia pulcherrima, Tecomaria capensis. 

17. Ornamental trees recommended for Railway line.
    Albizia lebeck, Peltophorump terocarpum, Terminalia catappa, Santalum alum, Swietenia mahagoni, Delonix regia, Cassia fistula, Pongamia pinnata, Thespesia populnea, Albizia julibrissin, Saracaasoca, Azadiracta indica, Polyalthia longifolia, Jacaranda mimosifolia, Crescentiacyete. 

18. Dry wall
    Oxalis corniculata, Selaginella sps. 

19. Hanging baketes
    Alocasia macrorhiza, Anthurium sps, Mamillaria baumii, Caladium bicolour, Chlorophytum comosum, Cissus quadrangularis, Commelina benghalensis, Dryopteris sps, Microsorum pustatalum. 

20. Roof gardening
    Bougainvillea spectabilis, Plumeriarubra, Passiflora foetida. 

Table 4. Habitat wise distribution of identified plants

| Sl. No | Habitat | No. of Plants |
|--------|---------|---------------|
| 1.     | Climber | 4             |
| 2.     | Succulent| 8             |
| 3.     | Shrub   | 26            |
| 4.     | Herb    | 48            |
| 5.     | Tree    | 22            |

Landscape gardening and bio-aesthetic planning is a recent trend to establish eco-friendly human habitats. Exploration of collection and conservation of wild and cultivated ornamental species is also one of the cultural methods to maintain the diversity of the species and conserve to endemic and endangered species of ornamental interest. There is a lot of significance in recent year for the ornamental species in the utilization of various kinds and is the income generation among poor also in the export market of India. Wild ornamental species are also the sources for the medicinal significance (Asati and Yadav, 2010) so the ornamental germplasm relatives are to be conserved. In the development for new hybrids, polyploidy mutation of ornamental interest it is essential to know ornamental species. The dynamic floriculture industry is constantly looking for new products, technology and market riches.
Over-exploitation by humans, both for direct consumption and also for botanical and horticulture value, also threatens wild ornamentals. Grassland reclamation programmes and overgrazing by cattle have had a debilitating effect on these wild species. Fragmentation of extensive habitats into small isolated patches can mean that they become too limited to maintain their plant populations. Fragmentation seems to reduce genetic variation and seedling vigour. Natural disasters have also played a role in species extinction. Even protected areas cannot be expected to safeguard plants from the effects of disasters such as volcanoes, fires, airborne pollutants, droughts and landslide.

This process is largely based on research and development and requires strong collaboration between many links of the production chain most modern scientific research in the field of new ornamental crops deals with the adaptability of new species to the environmental and the regulation of their life cycle or propagation systems. New ornamental products can be developed by researchers and breeders only in collaboration with efficient producers and satisfied consumers, linked together in mutually beneficial ways. It is very easy for the propagation of wild species by traditional propagation methods. The cost of domestication and maintenance of ornamental species is also very less in comparison. We hope this work will help the researches and people who are interested in ornamental plants.

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