Diversity of Tree Species in the District Science Centre Campus, Tirunelveli, Tamil Nadu

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Abstract
District Science Centre campus is not only a green lung for Tirunelveli City, but also aimed to create awareness about the biodiversity among the public. District Science Centre is committed towards developing a green campus, and established a Garden in achieving the commitment. It is the centre for higher learning, being both recreational and educative role; it will continually host a human population consisting of students and common public. The present study focused on tree diversity and their abundance in District Science Centre, Tirunelveli, Tamil Nadu, India. An extensive floristic survey was conducted in 2019. The results of tree diversity in District Science Centre campus showed 80 tree species. Among 80 species confined in 34 families and 68 genera, Polyalthia longifolia was the most dominant and frequent species in the study area. A total of 75 tree species represented by dicot and belong to 63 genera and 32 families were recorded. Out of the identified species, 5 tree species are monocot and belongs to 5 genera and 2 families. In the present study 14 families reported with only one species, 13 families represented by more than 2 species. During the study several anthropogenic activities exploited the tree population in the campus. Still Campus area is was still quite barren, so the entire campus should be lush greenery by new initiative on garden development.

Introduction
Planting indigenous tree species and mixing with several other species significantly improve the conservation of biodiversity. Numerous scientific publications are offered the justification for biodiversity conservation (Frankham et al., 2002; Pregernig, 2006). The number of ecological niches in an ecosystem can be increased by growing a higher number and diversity of tree species. This has been sequentially enhanced the associated species...
such as understory plants (Kanowaski et al., 2003) and animals (Wunderle, 1997). Therefore, growing diversity of many tree species on a location not only conserves numerous trees but also other organisms (Markku, 2008).

Oldfield et al., (1998) reported that ten percent of all trees in the world are threatened with extinction. In situ conservation methods are more suitable and successful for conservation of rare, vulnerable, threatened species to reduce extinction. There is a increasing awareness that conservation efforts outside the ecosystem (ex situ conservation) are essential for species survival (Kramer et al., 2011; Oldfield and Newton, 2012; Pritchard et al., 2012). In situ conservation methods are not viable for those tree species with a little population size or edging with threat. Ex situ conservation method is the only alternative to avoid its immediate extinction (McNamara, 2011; Ma et al., 2013). Since 1980s, the botanical garden plays a vital role in the field of ex situ conservation (Bramwell et al., 1987; Falk, 1987; Falk and Holsinger, 1991; Guerrant et al., 2004). The gardens grown in the urban environment also play vital role in conservation of trees. Trees are our wealth on planet earth. Trees represented in all vascular plants such as tree fern, Gymnosperms include cycads, conifers etc. and Angiosperms include all flowering trees. In a city the streets, parks, playgrounds and backyards of the home are lined with trees that create a peaceful, aesthetically pleasing environment. Being District Science Centre, Tirunelveli, is a government and non-profit organization can be effective to excite better involvement by gardens in plant conservation. The objective of this study was to evaluate the diversity of tree species in District Science Centre, Tirunelveli, Tamil Nadu, India. The District Science Centre campus consists of a diversity of plants and the perusal of literature reveals that there is no published record on the flora of this campus which represents an interesting floristic composition.

Study Area
District Science Centre
The District Science Centre (DSC) was opened to the public on 27th February 1987. It is started with a gallery on "Treasures from Ocean" and a Science Park. It is located near the Collector Office, Kokkirakulam, Tirunelveli Corporation area. It has lot of exhibits, science working models and many displays to gain knowledge. Before long the Center got one of the most well known Centre in National Council of Science Museums (NCSM) due to the tremendous support from the local community. National Council of Science Museums, Government of India is the controlling authority of the centre. Popularize science and technology among public and to supplement science education in schools and colleges to foster a spirit of scientific enquiry among the students is major objective of the centre. The beautiful architectural main building of the centre locates in the middle of the campus. Many outreach programmes such as rural science camp, workshops, seminars, science quizzes, science fair vacation hobby courses etc., are regularly organized.

Methodology
During the course of present study, regular field trips were carried out to the area in 2019 in different seasons to explore the various tree species. Standard methodology was used to elicit the knowledge of trees. All the relevant information of each tree species was recorded in an index card. The plants specimens collected were processed at the laboratory of Botany, Rani Anna Govt. Arts College for Women, Gandhi Nagar and identified with the help of available literature. The identification of plants was done using The Flora of Tamil Nadu Carnatic by K.M. Mathew (1983-1988), Flora of Tamil Nadu, India by A.N. Henry et al., (1987), Flowering Plants of Chittoor District, Andhra Pradesh, India by Madhavacheetty et al., (2008), Tropical Garden Plants by Bimal Das Chowdhury et al., (1991) and Flora of Presidency of Madras by Gamble (1915 – 1936). The families and nomenclatures are arranged according to online Tropicos database 3.0.2, Missouri Botanical Garden, 2020.

Results and Discussion
On the basis of field survey conducted in The District Science Centre campus area, 80 tree species were collected and identified. They belong to 68 genera and 29 families. Out of the identified tree species 75 are dicot and belong to 63 genera and 27 families; 5 tree species are monocot and belongs to 5 genera and 2 families (Table 1). Among the dicots, 53 species are Polypetalae and family Fabaceae is the most dominant with 16 genera and 20 species. In Gamopetalae 15 genera covering 15 species are
recorded and Bignoniaceae is the most dominant family. In Monochlamydeae 7 species covering 4 genera are recorded and Euphorbiaceae is the most dominant family. In the present study 15 families reported with only one species, 9 families represented by more than 2 species. Present study recorded 12 fruit yielding trees, 9 medicinal trees, 26 ornamental trees, 29 timber value trees and 1 fibre yielding tree. The total number of trees observed during the period of study was 338.

Polyalthia is the dominant species followed by Lagerstomia species. Many introduced tree species like Lagerstomia flos-reginae, L. reiginae, Parkia bigalandulosa, Sterculia foetida also recorded in the study area. The timber yielding trees like Dalbergia sissoo, Acacia auriculiformis, Tectona grandis, Neolamarckia cadamba, Casuarina littorea also recorded. The two scared trees Aegle marmelos, Couroupita guianensis was observed. The fruit yielding tree like Syzigium cumini, Mangifera indica, Carica papaya etc. are also observed. Neolamarckia cadamba, Madhuca longifolia, Alstonia scholaris, Ficus religiosa, F. racemosa, Millingtonia hortensis, Erythrina variegata are huge trees in the campus. Some tall trees like Cassine paniculata are now in the shrub state.

Two endanger tree Saraca asoca also grown in the study area. This small tree has become threatened in some parts of its range mainly through the loss of its habitat and overexploitation for medicinal use. Considering the conservation need of this species, it has been listed under the threat category of ‘Vulnerable’ by International Union for Conservation of Nature (IUCN, 2013) and ‘Endangered’ by Conservation Assessment and Management Prioritisation (CAMP, 2001). Santalum album is another IUCN listed vulnerable species (The IUCN Red List of Threatened Species 2019). Pterocarpus santalinus (Red sanders) is listed as an endangered plant species on the IUCN red data list as a result of the exploitation of its wood and essential oil. Holarrhena pubescens and Couroupita guianensis are classified as ‘Least Concern’ in the IUCN Red List of Threatened Species 2013.

The number of viable tree saplings grown under the shade of the tree is a crucial aspect within the study of biodiversity. They might determine the regeneration of new plants in the study area. Additionally, it plays a crucial role in carbon trapping and sequestration. The previous reports suggested that the dense young tree saplings trap more carbon from the atmosphere than the mature trees. Thus the germination of seeds and associated survival of the saplings is a positive indicator of the healthy ecosystem. Moreover, it also provides information about the ability of plant species to adapt, compete and grow in several climates. The campus was recorded many tree saplings of Cassia fistula and Millingtonia hortensis. Less number of tree saplings was recorded for Holarrhena pubescens. The most remarkable tree species in this area of study includes Delinia indica, Saraca asoca, Holarrhena pubescens and Sterculia foetida.

Flowering phenology
Summer flowering species such as Azadirachta indica, Lannea coromandelica, Erythrina variegata, Cassia fistula, Moringa pterygosperma and Delonix regia are initiate flower buds on foliated shoots during the hot-dry period (March–June). For these species probable flowering cue increasing day length/temperature. South west monsoon rainy flowering species such as Syzygium cumini, Eucalyptus globules, Peltophorum pterocarpum, Mangifera indica, Averrhoa carambola are initiate flower buds on foliated shoots during the warm-wet period (June–August). The first significant rains after the summer may act as flowering cue for these species. Autumn flowering species such as Malpighia emarginata, Bauhinia purpurea, Bauhinia variegata initiate flower buds on shoots with mature leaves (September–December) during the period of decreasing day length. In such species, the frequent rain and less photoperiod may signal the flowering. Dry-season flowering species such as Terminalia catappa, Dalbergias sissoo, Hardwickia binata, Leucaena leucocephala, Parkia bigelandulosa, Lagersroemia indica, initiation of flowering occur on twigs during cool dry season (December–March), soon after sporadic winter rains.

Characteristic tree species with large branches are nurtured and given preferences by the management to create picnic/play spaces for tourist. Routine weeding of the gardens ensured only desired trees are allowed to thrive while naturally regenerated seedlings are removed for easy human movement
and excellent scenic view. This is in line with the report of Agarwala et al., (2016) who asserted that tree species populations and regeneration is impacted by purpose and level of human use in India.

Table 1: List of trees available in the campus

| S. No | Name of Species            | Family            | Economical importance | Reference                   | Voucher number |
|-------|----------------------------|-------------------|------------------------|-----------------------------|----------------|
| 1.    | *Lannea coromandelica*     | Anacardiaceae     | Timber                 | Flo. Pts. Chittoor          | RAC 367,       |
|       | (Houtt.) Mann.             |                   |                        | District A P. 76, 2008.     | RAC 401        |
| 2.    | *Mangifera indica* L.     | Anacardiaceae     | Fruit, Timber          | Fl. Pres. Madras            | RAC 371        |
|       |                           |                   |                        | 1:259. 1918.                |                |
| 3.    | *Polyalthia longifolia*   | Annonaceae        | Ornamental             | Flo. Pts. Chittoor          | RAC 302        |
|       | (Sonner.) Thw.             |                   |                        | District A P. 17, 2008.     |                |
| 4.    | *Polyalthia longifolia*   | Annonaceae        | Ornamental             | Flo. Pts. Chittoor          | RAC 248        |
|       | Hook. &Thoms. var. pendula|                   |                        | District A P. 17, 2008.     |                |
| 5.    | *Alstonia scholaris*      | Apocynaceae       | Medicinal              | Flo. Pts. Chittoor          | RAC 360        |
|       | (L.) R. Br.               |                   |                        | District A P. 196, 2008.    |                |
| 6.    | *Holarrhena pubescens*    | Apocynaceae       | Medicinal              | Flo. Pts. Chittoor          | RAC 263        |
|       | (Buch.-Ham.) Wall. ex G. Don|                 |                        | District A P. 198, 2008.    |                |
| 7.    | *Borassus flabellifer* L. | Arecaeeae         | Timber                 | Flo. Tamil Nadu             | RAC 379        |
|       |                           |                   |                        | Carnatic 3:1670. 1983       |                |
| 8.    | *Caryota urens* L.        | Arecaeeae         | Ornamental             | Flo. Pts. Chittoor RAC 346  | RAC 288        |
|       |                           |                   |                        | District A P. 366. 2008.    |                |
| 9.    | *Cocos nucifera* L.       | Arecaeeae         | Fruit                  | Flo. Pts. Chittoor RAC 402  | RAC 300        |
|       |                           |                   |                        | District A P. 367, 2008.    |                |
| 10.   | *Millingtonia* hortensis L.f.| Bignoniaceae     | Ornamental             | Flo. Pts. Chittoor          | RAC 293        |
|       |                           |                   |                        | District A P. 245, 2008.    |                |
| 11.   | *Spathodea* campanulata P. Beauv.| Bignoniaceae | Ornamental             | Flo. Pts. Chittoor          | RAC 323,       |
|       |                           |                   |                        | District A P. 246, 2008.    | RAC 354        |
| 12.   | *Tabebuia rosea* (Bertol.) DC. | Bignoniaceae     | Ornamental             | Flo. Pts. Chittoor          | RAC 354        |
|       |                           |                   |                        | District A P. 247, 2008.    |                |
| 13.   | *Tecoma stans* (L.) Kunth. | Bignoniaceae     | Ornamental             | Flo. Pts. Chittoor          | RAC 388        |
|       |                           |                   |                        | District A P. 248, 2008.    |                |
| 14.   | *Ceiba pentandra* (L.) Gaerten | Bombacaceae      | Fibre                  | Flo. Tamil Nadu             | RAC 306        |
|       |                           |                   |                        | Carnatic 3: 1983            |                |
| 15.   | *Cordia dichotoma* Forst. F.| Boraginaceae     | Timber                 | Flo. Pts. Chittoor          | RAC 340        |
|       |                           |                   |                        | District A P. 216, 2008.    |                |
| 16.   | *Carica papaya* L.        | Caricaceae        | Fruit                  | Flo. Pts. Chittoor          | RAC 279        |
|       |                           |                   |                        | District A P. 136, 2008.    |                |
| 17.   | *Casuarina littorea* L.    | Casuarinaceae     | Ornamental             | Flo. Pts. Chittoor          | RAC 261        |
|       |                           |                   |                        | District A P. 335, 2008.    |                |
| 18.   | *Cassine glauca* Kuntze     | Celastraceae      | Timber                 | Flo. Pts. Chittoor          | RAC 323        |
|       |                           |                   |                        | District A P. 125, 2008.    |                |
| 19.   | *Terminalia arjuna* (Roxb. ex DC.) Wt. &Arn. | Combretaceae   | Medicinal              | Flo. Pts. Chittoor          | RAC 233        |
|       |                           |                   |                        | District A P. 126, 2008.    |                |
| 20.   | *Terminalia catappa* L.    | Combretaceae      | Timber                 | Flo. Pts. Chittoor          | RAC 233        |
|       |                           |                   |                        | District A P. 126, 2008.    |                |
| No. | Species Name                        | Family          | Type            | Location Details                  |
|-----|-------------------------------------|-----------------|-----------------|----------------------------------|
| 21  | *Dillenia indica* L.               | Deliniaceae     | Ornamental      | Flo. Pts. Chittoor, District A P. 14, 2008. RAC 223 |
| 22  | *Phyllanthus acidus* (L.) Skeels.  | Euphorbiaceae   | Fruit           | Flo. Pts. Chittoor, District A P. 321, 2008. RAC 342 |
| 23  | *Phyllanthus emblica* L.           | Euphorbiaceae   | Fruit           | Flo. Pts. Chittoor, District A P. 322, 2008. RAC 364 |
| 24  | *Acacia auriculiformis* A.Cunn. ex Benth. | Fabaceae   | Ornamental      | Flo. Pts. Chittoor, District A P. 114. 2008. RAC 203 |
| 25  | *Adenanthera pavonina* L.          | Fabaceae        | Timber          | Flo. Pts. Chittoor, District A P. 116, 2008. RAC 243, 399 |
| 26  | *Albizia lebbeck* (L.) Benth.      | Fabaceae        | Timber          | Fl. Pres. Madras 1:432, 1919. RAC 332 |
| 27  | *Bauhinia purpurea* L.             | Fabaceae        | Ornamental      | Flo. Pts. Chittoor, District A P. 106, 2008. RAC 283 |
| 28  | *Bauhinia variegata* L.            | Fabaceae        | Ornamental      | Flo. Pts. Chittoor, District A P. 107, 2008. RAC 315 |
| 29  | *Cassia fistula* L.                | Fabaceae        | Ornamental      | Fl. Tamil Nadu Carnatic 3:499. RAC 289 |
| 30  | *Cassia javanica* L.               | Fabaceae        | Ornamental      | Flo. Pts. Chittoor, District A P. 109, 2008. RAC 231 |
| 31  | *Cassia siamea* Lam.               | Fabaceae        | Ornamental      | Fl. Pres. Madras 1:285, 1957. RAC 215, 377 |
| 32  | *Dalbergia sissoo* Roxb.           | Fabaceae        | Timber          | Fl. Pres. Madras 383, 1918. RAC 259 |
| 33  | *Delonix regia* (Boj. ex Hook.) Rafin | Fabaceae   | Ornamental      | Flo. Pres. Madras 1:280, 1957. RAC 295 |
| 34  | *Erythrina variegata* L.           | Fabaceae        | Ornamental      | Flo. Pts. Chittoor, District A P. 90, 2008. RAC 358 |
| 35  | *Hardwickia binata* Roxb.          | Fabaceae        | Timber          | Fl. Pres. Madras 1:412, 1919. RAC 286 |
| 36  | *Leucaena leucocephala* (Lam.) de Wit | Fabaceae   | Timber          | Flo. Pts. Chittoor, District A P. 118, 2008. RAC 374 |
| 37  | *Parkia biglandulosa* Wt. &Arn.    | Fabaceae        | Ornamental      | Flo. Pts. Chittoor, District A P. 119, 2008. RAC 256 |
| 38  | *Peltophorum pterocarpum* (DC.) Baker ex Heyne | Fabaceae   | Ornamental      | Flo. Pts. Chittoor, District A P. 112, 2008. RAC 313, 362, 200 |
| 39  | *Pithecellobium dulce* (Roxb.) Benth. | Fabaceae   | Fruit           | Flo. Pts. Chittoor, District A P. 119, 2008. RAC 383 |
| 40  | *Pongamia pinnata* (L.) Pier.      | Fabaceae        | Timber, Medicinal | Flo. Pts. Chittoor, District A P. 97, 2008. RAC 212, 333 |
| 41  | *Pterocarpus santalinus* L.f.      | Fabaceae        | Timber          | Flo. Pts. Chittoor, District A P. 98, 2008. RAC 319 |
| 42  | *Saraca asoca* (Roxb.) Wilde       | Fabaceae        | Medicinal       | Flo. Pts. Chittoor, District A P. 113, 2008. RAC 271 |
| 43  | *Tamarindus indica* L.             | Fabaceae        | Fruit           | Flo. Pts. Chittoor, District A P. 113, 2008. RAC 272 |
| 44  | *Tectona grandis* L.f.             | Lamiaceae       | Timber          | Flo. Pts. Chittoor, District A P. 270, 2008. RAC 355 |
| 45  | *Vitex altissima* L.f.             | Lamiaceae       | Medicinal       | Flo. Pts. Chittoor, District A P. 270, 2008. RAC 226 |
| No. | Scientific Name | Family         | Type            | Location                          | Accession No. |
|-----|----------------|----------------|-----------------|-----------------------------------|---------------|
| 46  | Couroupita guianensis Aubl. | Lecythidaceae | Medicinal       | District A P. 271, 2008.          | RAC 350       |
| 47  | Lagerstroemia indica L. | Lythraceae    | Ornamental      | District A P. 129, 2008.          | RAC 210,      |
| 48  | Lagerstroemia parviflora Roxb. | Lythraceae | Ornamental      | District A P. 132, 2008.          | RAC 359       |
| 49  | Lagerstroemia reginiae Roxb. | Lythraceae    | Ornamental      | District A P. 132, 2008.          | RAC 301       |
| 50  | Malpighia emarginata DC. | Malphigiaceae | Ornamental      | Flo. Pts. Chittoor                 | RAC 328       |
| 51  | Grewia tilifolia Vahl. | Malvaceae     | Timber          | Flo. Pts. Chittoor District A P. 50, 2008. | RAC 321       |
| 52  | Guazuma ulmifolia Lam | Malvaceae     | Timber          | Flo. Pts. Chittoor District A P. 45, 2008. | RAC 356       |
| 53  | Pterospermum acerifolium Roxb. | Malvaceae | Timber          | Flo. Pts. Chittoor District A P. 321, 2008. | RAC 347       |
| 54  | Sterculia foetida L. | Malvaceae     | Ornamental      | Flo. Pts. Chittoor District A P. 47, 2008. | RAC 318       |
| 55  | Thespesia populnea (L.) Soland. ex Correa. | Malvaceae | Timber          | Flo. Pts. Chittoor District A P. 43, 2008. | RAC 208       |
| 56  | Azadirachta indica A. Juss | Meliaceae    | Timber, Medicinal | Fl. Pres. Madras 1:177. 1915       | RAC 268       |
| 57  | Swietenia mahagonia (L.) Jacq. | Meliaceae    | Timber          | Flo. Pts. Chittoor District A P. 64, 2008. | RAC 335       |
| 58  | Ficus religiosa L. | Moraceae      | Timber          | Fl. Pres. Madras 3:1368; 1919. 1919. | RAC 284       |
| 59  | Ficus benghalensis L. | Moraceae      | Timber          | Fl. Pres. Madras 1361,1928         | RAC 273,      |
| 60  | Ficus racemosa L. | Moraceae      | Timber          | Flo. Pts. Chittoor District A P. 333, 2008. | RAC 246       |
| 61  | Morus alba L. | Moraceae      | Timber          | Flo. Pts. Chittoor District A P. 334, 2008. | RAC 311       |
| 62  | Moringa pterygo-sperma Gaertn | Moringaceae  | Vegetable       | Flo. Pts. Chittoor District A P. 77, 2008. | RAC 207       |
| 63  | Ensete superbum (Roxb.) Cheesman | Musaceae  | Ornamental      | Flo. Pts. Chittoor District A P. 345, 2008. | RAC 344       |
| 64  | Ravenala madagas -carensis Sonner. | Musaceae  | Ornamental      | Flo. Pts. Chittoor District A P. 346, 2008. | RAC 220       |
| 65  | Callistemon citrinus (Curtis) Skeels | Myrtaceae | Ornamental      | Flo. Pts. Chittoor District A P. 127, 2008. | RAC 251       |
| 66  | Eucalyptus globules Labill. | Myrtaceae     | Medicinal       | Flo. Pts. Chittoor District A P. 128, 2008. | RAC 317       |
| 67  | Psidium guajava L. | Myrtaceae     | Fruit           | Flo. Pts. Chittoor District A P. 321, 2008. | RAC 276       |
| 68  | Syzygium cumini (L.) Skeels | Myrtaceae   | Fruit           | Flo. Pts. Chittoor District A P. 47, 2008. | RAC 361,      |
| 69  | Averrhoa carambola L. | Oxalidaceae   | Fruit           | Flo. Pts. Chittoor District A P. 55, 2008. | RAC 378       |
| 70  | Ziziphus mauri | Rhamnaceae    | Fruit           | Fl. Tamil Nadu Carnatic RAC 308.   | RAC 308       |
The present study recorded many man-made activities that are not favourable to conserve the available vegetation in the campus. Cutting of branches of trees, plastic bags and plastic bottle thrown around the vegetated area of the campus are supported the unpleasant anthropogenic activities. The following measures should be taken in the campus to maintain and enrich the biodiversity.

- The pruning or cutting of branches should be avoided during the summer season. This promotes bird populations and insect diversity in the campus.
- A green house should be constructed to maintain the tree saplings.
- A separate model star garden is an immediate need of the hour.
- Planting endemic and endangered trees should be given more importance.

Role of Gardens in Conservation
The present study reveals the District Science Centre is one of the most suitable areas to conserve important tree species. Presently the garden in DSC critically contributes to conservation of biodiversity. Tree conservation should include in all aspects of garden operations and activities. Gardens can work more collaboratively by establishing or joining a hub of conservation action. The participation of non-traditional gardens in tree conservation and provides an exponential increase in the number of threatened trees protected. These gardens can collaborate with leading gardens by volunteering to grow threatened tree species. Empowering smaller gardens it is particularly important for the global garden community to build capacity for tree conservation in biodiversity (Nicole et al., 2015).

Suggestions
The Distract Science Centre, Tirunelveli is known for its Science related programmes and training camps. The entire campus is planted with a variety of trees. It is a valuable asset. It provides space for people to engage in recreational activities. People from the local area regularly visit this centre, thus provides space to interact with each other and meet new people. It will be more informative, if more interpretation panels are setup at many locations giving data of the fauna and flora throughout the campus. This will able to produce awareness among the visitors towards the conservation of flora and fauna. In near future the entire campus to be converts into an ecological laboratory.

- Still Campus area is not fully used for the garden making, so the entire campus should be utilized

| No. | Species Name               | Family   | Use          | Reference 1 | Reference 2 |
|-----|---------------------------|----------|--------------|-------------|-------------|
| 71  | Morinda pubescens         | Rubiaceae| Timber, Medicinal | 3:271. 1983. | RAC 236,    |
|     | J.E. Smith                |          | Fl. Pres. Madras | 651, 1921;  | RAC 330     |
| 72  | Neolamarckia cada-mba      | Rubiaceae| Timber       | District A P. 160, 2008. | RAC 303     |
|     | (Roxb.) Boss.             |          | Flo. Pts. Chittoor |             |             |
| 73  | Aegle marmelos            | Rutaceae | Medicinal    | Fl. Tamil Nadu Carnatic 101,1982. | RAC 309     |
|     | (L.) Correa.              |          |              |             |             |
| 74  | Murraya koenigii          | Rutaceae | Food preparation | Flo. Pts. Chittoor | RAC 352     |
|     | (L.) Spreng.              |          | Flo. Pts. Chittoor |             |             |
| 75  | Murraya paniculata        | Rutaceae | Timber        | District A P. 58, 2008. | RAC 298     |
|     | (L.) Jack.                |          | Flo. Pts. Chittoor |             |             |
| 76  | Santalum album L.         | Santalaceae| Timber, Medicinal | Flo. Pts. Chittoor | RAC 253     |
|     |                           |          | Flo. Pts. Chittoor |             |             |
| 77  | Madhuca longifolia        | Sapotaceae| Timber, Medicinal | Fl. Pres. Madras 2 : 536. 1957. | RAC 385     |
|     | (Koen.) Macbr.            |          |               |             |             |
| 78  | Manilkara zapota          | Sapotaceae| Fruit        | Flo. Pts. Chittoor | RAC 337     |
|     | (L.) P. Royen             |          | Flo. Pts. Chittoor |             |             |
| 79  | Mimusops elengi           | Sapotaceae| Medicinal    | Flo. Pts. Chittoor | RAC 265     |
|     | L.                       |          | Flo. Pts. Chittoor |             |             |
| 80  | Ailanthus excelsus        | Simaroubaceae| Timber       | Flo. Pts. Chittoor | RAC 325,    |
|     | Roxb.                     |          | District A P. 60, 2008. |             | RAC 381     |
for the garden development.

- Government should appoint gardener and a Botanist for maintenance of the garden.
- Growing Gymnospermous trees give more attraction
- Naming of trees give more exposure on medicinal plants to the students and visitors.

At present, diversity and number of plants in an ecosystem is degraded at an exponential rate. This reduction in the diversity of flora is directly associated decrease in ecosystem services (Gao Chen and Weibang, 2018). Recently, the increasing agricultural and forestry practices cause over-harvesting and over-exploitation of vegetation, rapid increasing urbanization, various serious environmental pollution, change in land use pattern, invasion of alien species, and world climate change due to the numerous anthropogenic activities, encompass tremendous pressure on vascular plants. This resulted in a third of the world's 300,000 - 450,000 vascular plant species face extinction (Pitman and Jørgensen, 2002; Ren and Duan, 2017).

Hence, there is a greater need to widen integrative conservation approaches to conserve the rare and vulnerable plant species in the natural habitats (Li and Pritchard, 2009) and therefore our approaches on the plant conservation should be an integrative. Gardens in the scientific institutions offer their resources to the study and conservation of plants, as well as making the world's plant species diversity known to the public.

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Conflict of Interest
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