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DOCUMENTATION URBAN TREES IN SHIVAMOGGA, KARNATAKA

Dr. Ramesh B H[1]

[1]Department of Botany, Govt. First Grade College, Bapujinagra Shivamogga-577201, India.

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ABSTRACTS

Many of the world's major cities have implemented tree planting programs based on assumed environmental and social benefits of urban forests. Urban trees serve many useful functions such as climate change mitigation by carbon sequestration, air quality improvement by air pollution abatement, biodiversity conservation and source of ecosystem goods to urban inhabitants. They also have aesthetic, socio-religious and recreational value in urban contexts. In spite of the importance, they have not received much scientific attention. In this work, aimed to documentation and identification of trees. A survey was conducted during Dec-2022 to Decmber-2023. This paper investigates the diversity of tree species growing both within the built environment as well as road-side avenues in the seaside town of Shivamogga which is the administrative headquarters of Shivamogga district of Karnataka. The preliminary study of tree flora of Shivamogga comprises of about 89 species in which majority are indigenous species and few others involve exotic and introduced species. The dominant genera are Ficus, Terminalia, Artocarpus and Syzygium.The dominant species are Pongamia pinnata ,Alstonia scholaris, Thespesia populnea, Terminalia catappa, Spathodia campanulata ,Ficus religiosa and Bauhinia purpurea. The tree diversity represents a good assemblage of different utility categories such as wild and cultivated fruit yielding trees, shade and ornamental trees, sacred and religious trees, etc. Besides the high proportion of older trees of Rain tree and Ficus, presence of wild fruit yielding trees like Artocarpus incisus and Spondias pinnata, large sized sacred trees such as Ficus religiosa and F. benghalensis, rare medicinal species such as Garcinia indica, Saraca asoca, Terminalia bellirica, etc., are some of the notable features of the urban tree flora of Shivamogga.

Key wards: Survey, Documentation, Urban trees,

1. INTRODUCTION

Rapid urbanization is destroying natural ecosystems and degrading the environmental quality of towns and cities (Folke et al., 1997, Gregg et al., 2003, Alberti, 2004 and Marzluff, 2004). Many cities have been experiencing unprecedented growth, accompanied by severe environmental degradation (e.g. noise, carbon pollution, soil erosion, habitat loss, and species extirpation(Zipperer et al., 2011, Vesely, 2007, Young, 2010). Urban trees in parks, yards, streets, and remnant parcels have been features of urban design and landscape architecture for centuries (Arnold, 1980), and are still integral components of civic spaces that are well-recognized for their public value.Presently,50% of total global population live in cities which occupy only 3% of the land are and it is expected that the urban population will further riseto67% in the next 50 years (Grimm et al., 2008). This kind of rapid urbanization is bringing complex changes to ecology, economy and society at local, regional, and global scales (De Fries and Pandey, 2010). Conservation and restoration of urban green spaces comprising of urban trees and forests are one important aspect of improving the environmental quality of urban areas. The term 'urban trees' generally includes trees growing both within the built environment as well as road-side avenues and public places in urban systems. In spite of their eco-sociological importance, urban trees have not received much scientific attention in India. There are only a few detailed studies on the urban trees of cities like Bangalore (Sudha and Ravindranath, 2000, Nagendra and Gopal, 2010), karwar (Shivanand et al., 2012) Chandigarh(Kohli et al., 1994) and Nagpur (Gupta et al.,2008).We have initiated a study of the urban trees of Shivamogga, Karnataka and the preliminary data on the species diversity of urban trees of this town is presented in this paper.

2. STUDY AREA AND METHODOLOGY

Study area

We selected Shivamogga which is located almost in central part of Karnataka, occupies an areas of 1058,000 hectares, it lies between 74°38'-76^{0}04 East latitude and 13^{0}27'-14°39'north longitude. 20 of the major roads of Shivamogga town, which together cover the different locations of the town, were selected for tree enumeration. All plants having an approximate girth of more than 15 cm. were considered as trees. All such trees visible on either side of the entire length of the selected roads were noted and their numbers counted, while walking from one end of the road to the other. They included trees occurring on road sides, parks and also inside the compounds of both public and private buildings. Trees were identified with the help of local flora and other relevant literature (Cooke, 1967; Bhat, 2003; Swaminathan & Kochhar, 2003,).

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3. RESULTS AND DISCUSSION

The preliminary data on the species diversity of urban trees of Shivamogga town comprises of 89 species. These species represent a total of 72 plant genera and 36 families. A list of all these trees with their family, and common name provided as table 1. A total of 1876 trees belonging to all the species were enumerated during the present study. The tree species diversity of Shivamogga town is high when compared to the smaller area of the town. A comprehensive study of urban forests of 360 km^2 area of Bangalore found 374 species in the different land-use categories (Sudha and Ravindranath, 2000). Urban forest in 43 ha of NEERI campusat Nagpur, Maharashtra has only46 tree species (Gupta et al., 2008).

The 114 km^2 area of Chandigarh which is considered to be the greenest city of India has about 200 species which includes about 66 multipurpose trees (Kohli et al., 1994).Majority of the recorded tree species of Shivamogga are indigenous while only few species are introduced or of exotic nature. Majority of the introduced tree species are observed in the roadside, parks and in front of government buildings as avenue and ornamentals whereas the trees grown and maintained within the compounds of residential buildings and private lands are predominantly the indigenous types with various beneficial properties. A few gigantic sized trees of Pongamia pinnata, Alstonia scholaris,

Thespesia populnea, Terminalia catappa, Spathodia campanulata ,Ficus religiosa and Bauhinia purpurea dominate the main roads of the town which represent the surviving older trees. Similarly, several large sized sacred and religious trees such as Ficus religiosa, F. benghalensis, F. racemosa, Aegle marmelos, Mimusops elengi, etc. are found at the vicinity of temples and other worship places. When population density was considered, the top ten most common tree species are Pongamia pinnata, Alstonia scholaris, Thespesia populnea, Terminalia catappa, Spathodia campanulata ,Ficus religiosa and Bauhinia purpurea.

These 07 species together account for about 65% of the total trees of Shivamogga in which the share of the first five species is almost 50%. The other 82 species together account for only 35% of trees. Among them, about few species are represented by only five or less number of trees each. Notable among such rare species with five or less number of trees are Artocarpus gomezianus, Adenanthera pavonia, Averrhoa bilimbi , Dalbergia latifolia , Kigellia pinnata, Mimusops elengi, Santalum album and Strychnos nux-vomica. In general, the tree diversity represents a good assemblage of different utility categories such as wild and cultivated fruit yielding trees, shade and ornamental trees, sacred and religious trees, medicinally useful trees etc. Besides the high proportion of older trees of wild mango and jackfruit, presence of other wild fruit yielding trees like Artocarpus incises and Spondias pinnata, large sized sacred trees such as Ficus religiosa and F. benghalensis, gigantic exotic avenue trees such as Samanea saman and Peltophorum pterocarpum, rare medicinal species such as Garcinia indica, Saraca asoca, Terminalia bellirica, etc., are some of the notable features of the urban tree flora of Shivamogga.

Table1. Tree species recorded from Shivamogga town.

Sl No	Name of the species	Family	Common name
1	Acacia auriculiformis	Fabaceae	Acacia
2	Acacia nilotica	Fabaceae	Acacia
3	Adenanthera pavonia	Fabaceae	Gulugunjimara
4	Adina cordifolia	Rubiaceae	Yethiga
5	Aegle marmelos	Rutaceae	Bilva
6	Ailanthus triphysa	Simoaroubaceae	Gugguladhoopa
7	Albizia lebbeck	Fabaceae	Bage
8	Alstonia scholaris	Apocynaceae	Halemara
9	Anacardium occidentale	Anacardiaceae	Geru,Godambi
10	Annona reticulata	Annonaceae	Rama phala
11	Annona squamosa	Annonaceae	Seethapala
12	Anthocephalus cadamba	Rubiacea	Kadamba
13	Artocarpus gomezianus	Moraceae	Vaatehuli
14	Artocarpus heterophyllus	Moraceae	Halasu

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15	Artocaprus incisus	Moraceae	Deevi/Neeru halasu
16	Averrhoa bilimbi	Oxalidaceae	Bimbuli
17	Averrhoa carambola	Oxalidaceae	Carabalu
18	Azadirachta indica	Meliaceae	Kahibevu
19	Bauhinia purpurea	Caesalpiniaceae	Mandara
20	Bauhinia tomemtosa	Fabaceae	Mani Mandara
21	Borassus flabellifer	Arecaeae	Talemara
22	Butea monosperma	Fabaceae	Muthaga
23	Caesalpenia pulcherrima	Fabaceae	Rathnagandhi
24	Callistemon citrinus	Myrtaceae	Bottlebrush
25	Calophyllum inophyllum	Clusiaceae	Sura Honnemara
26	Cassia siamea	Fabaceae	-
27	Cassia fistula	Fabaceae	Kakkemara
28	Casuarina equisetifolia	Casuarinaceae	Galimara
29	Ceiba pentandra	Bombacaceae	Biliburuga
30	Cordia myxa	Boraginaceae	Challehannu
31	Couroupita guianensis	Lecythidaceae	Nagalinga pushpa
32	Croton roxburghii	Euphorbiaceae	Somaru
33	Dalbergia latifolia	Fabaceae	Sissum
34	Delonix regia	Fabaceae	May flower/ Kempu torai
35	Dichrostachys cinerea	Fabaceae	Banni
36	Eucalyptus globulus	Myrtaceae	Neelagiri
37	Ficus benghalensis	Moraceae	Alada mara
38	Ficus elastica	Moraceae	Rubbermara
39	Ficus hispida	Moraceae	Geritalu
40	Ficus microcarpa	Moraceae	Kirugoli
41	Ficus racemosa	Moraceae	Atti mara
42	Ficus religiosa	Moraceae	Arali/Ashwatha
43	Garcinia indica	Clusiaceae	Murugalu
44	Gliricidia sepium	Fabaceae	Gobbaramara
45	Grevillea robusta	Proteaceae	Silveroak
46	Haldina cordifolia	Rubiaceae	Heddimara
47	Kigelia pinnata	Bignoniaceae	Cucumber Tree
48	Lagerstroemia speciosa	Lythraceae	Nandi,Hole
49	Leucaena leucocephala	Fabaceae	Wild Tamarind
50	Macaranga peltata	Anacardiaceae	---
51	Mangifera indica	Anacardiaceae	Mavu
52	Manihot esculenta	Euphorbiaceae	Maragenasu
53	Melia azedarach	Meliaceae	Hucchubevu
54	Michelia champaca	Magnoliaceae	Sampige

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55	Mimusops elegngi	Sapotaceae	Spanish cherry
56	Moringa oleifera	Moringaceae	Nuggemara
57	Muntingia calabura	Elaeocarpaceae	Singaporecherry
58	Myristica fragrans	Myristicaceae	Jayikayi
59	Nyctan thus arbor- tristis occidentale	Oleaceae	Parijata
60	Peltophorum pterocarpum	Fabaceae	Gulmohur
61	Phyllanthus cidus	Euphorbiaceae	Rajavale
62	Phyllanthus emblica	Euphorbiaceae	Nellikayi
63	Pithecellobium dulce	Fabaceae	Sihi hunese
64	Plumeria obtusa	Apocynaceae	Sampige
65	Plumeria rubra	Apocynaceae	Gosampige
66	Polyalthia longifolia	Annonaceae	Falls Ashoka
67	Pongamia pinnata	Fabaceae	Honge
68	Samanea saman	Fabaceae	Rain tree
69	Santalum album	Santalaceae	Gandha
70	Sapindus trifoliatus	Sapindaceae	Soapnut
71	Saraca indica	Fabaceae	Ashoka
72	Simarouba glauca	Simaroubaceae	Paradise tree
73	Spathodia campanulata	Bignoniaceae	Flametree
74	Spondias pinnata	Anacardiaceae	Amatekayi
75	Strychnosnux-vomica	Loganiaceae	Kasaraka
76	Syzygium cumini	Myrtaceae	Nerale
77	Syzygium malaccensis	Myrtaceae	Jambunerale
78	Syzygium aromaticum	Myrtaceae	Lavanga
79	Tabebuia rosea	Bignoniaceae	
80	Tamarindus indica	Caesalpiniaceae	Hunese
81	Tectona grandis	Verbenaceae	Saguvani
82	Terminalia catappa	Combretaceae	Indian almond
83	Terminalia paniculata	Combretaceae	Hunalu
84	Terminalia arjuna	Combretaceae	Arjuna
85	Terminalia bellirica	Combretaceae	Shantimara
86	Thespesia populnea	Malvaceae	Huvarasi
87	Alstonia scholaris	Apocynaceae	Karaveera
88	Trema orientalis	Ulmaceae	Kiruhale
89	Ziziphus mauritiana	Rhamnaceae	Borehannu

4. CONCLUSION

Urban trees serve many useful functions such as climate change mitigation by carbon sequestration, air quality improvement by air pollution abatement, biodiversity conservation and source of ecosystem goods to urban inhabitants.

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