RESEARCH ARTICLE

Diversity and Status of Plants on Some Major Avenues of West Nagpur

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Manuscript details:

Available online on
http://www.ijlsci.in

ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)

Editor: Dr. Chavhan Arvind

Cite this article as:
Madavi SV and Dongarwar NM (2016) Diversity and Status of Plants on Some Major Avenues of West Nagpur, *Int. J. of Life Sciences*, A6: 121-124.

Acknowledgement
Authors are thankful to the Head, Department of Botany, RTM Nagpur University for providing necessary facility.

ABSTRACT

Trees and shrubs play a vital role in maintaining an ecological balance and improving livelihood of peoples. Trees not only provide shade and shelter for road users but also act as a soil stabilizer and prevent water and soil erosion. Trees are also a source of wood products, including fuel wood, poles, and lumber. Human beings are dependent upon trees for these by products, so it is necessary to do plantation along with sustainable development. With the road network continuously increasing at fast rate, roadsides occupy a very broad area in most of the countries. So that, people started plantation on either side of roads. Nagpur is the second greenest city in our country is also called the 'Garden City of Maharashtra'. No work on avenue plantation has been conducted in the city. Therefore the present investigation reveals the diversity and status of avenue plants of West Nagpur.

Keywords- Avenue plantation, pollution control, shade value, *Cassia siamea.*

INTRODUCTION

In earlier time, trees were planted on either side of the road to provide shade and shelter for road users, which were primarily pedestrians or slow moving vehicles. Avenue plantation of trees continues even now on all types of roads as there also improve the appearance of highway by adding variety and enhance the aesthetic appeal of surrounding because of their foliage, flowers and shape. Roadside planting are often the responsibility of local municipalities and are made to beautify the cities, provide shade and control outdoor noise and traffic pollution. In recent years many of the cities and towns in the world have learned through experience that paving roadways, streets and sidewalks does not complete the job.

Avenue plantations have several objectives:

- Trees increase the comfort of travellers by providing shade and attractive surroundings;
- Trees may protect the road itself against the moving dunes or acts as a windbreak for adjacent fields.
- Roadside trees are frequently considered a part of the national forest planting programme. Such trees may produce edible fruits, yields pods for feeding animals, furnish food and shelter for birds or when in bloom, be valuable in beekeeping.

Nagpur is the second capital of Maharashtra State, situated at latitude 21^0 9'N and 79^{0}6'E and it is practically located at the geographical centre of India and is therefore also called as 'Zero Mile' City. Climate of the city is characterized by minimum temperature in August (27°C) with gradual decrease up to December (11.4°C). Maximum temperature gradually increases from 29.5 to 33.2°C from August to September and then gradually declines to 25.4°C in December. In general the climate is semi-arid with unimodel monsoon (Nagpur District Gazetteer).

The Nagpur district is quite rich and varied in its plant composition. According to Flora of Nagpur District (Ugemuge, 1986) there are 1136 plant species which fall under 679 genera and 142 families. In addition to the natural flora of the district, there are large numbers of plants found either in cultivation or introduced for various purposes at one time or other which have now been naturalized in the area.
After floristic investigation by Ugemuge (1986), no revision was undertaken in Nagpur district and no work on avenue plantation has been conducted in the city. Mourya (2009) did preliminary study on Medicinal Trees of Nagpur City. Joshi (2000) studied Arboreal Flora of Thane Municipal Corporation but no such study was conducted in Nagpur. Therefore the present investigation has been undertaken with following objectives.

MATERIAL AND METHOD

In the present study, the aspect of number of plants, their condition and which types of plants are planted has been carried out. This was based on amount of standing woody trees on the road side of selected roads from Nagpur city. Observed plants were identified by using standard Floras like Lakshminar- simhan and Sharma (1991), Sharma et. al., (1996), Naik(1998); Singh et al., (2001), Yadav and Sardesai(2002), Swaminathan and Kochhar (2003). The data was compiled from extensive field visits during the project time.

Documentation of Plant Species

Planned field trips were conducted to selected roads of Nagpur city. More than fifty five species of trees are listed, collected and identified during the study period, by using standard floras like Flora. Coloured photographs of flowering and fruiting trees as well as vegetative trees along with road sites were taken in the field.

Documentation of Aesthetic, Shade and Pollution Control Values

The aesthetic values of plants were estimated on the basis of external appearance, flowering, etc. Duration, showiness, colour, size of flowers were also observed. As well as the shape of canopy or shape of tree was observed. On the basis of canopy cover the shade values were noted. The height of plant, area covered by canopy was observed, which are responsible for shade values. The pollution control values were estimated on the basis of types of trees, shape and size of leaves.

RESULT AND DISCUSSION

In the present investigation, four major avenues of West Nagpur were studied to record the diversity of avenue trees. The roads selected for the study are Amravati Road (NH-6), Wardha Road (NH-7), West High Court Road and North Ambazari Road.

The reported taxa are arranged alphabetically along with family and their presence or absence on respective avenues is denoted by +ve or –ve sign.

The outcome of present investigation shows more than 55 plants species belonging to 24 families (Table 1). Almost all plant species reported are dicot and very few are monocot. The most dominant families are Bignoniaceae, Caesalpiniaceae, Fabaceae, Mimosaceae and Myrtaceae. The dominant taxa found are *Albizia lebbeck*, *Alstonia scholaris*, *Ailanthus excelsa*, *Azadirachta indica*, *Delonix regia*, *Pongamia pinnata.* Most of the plant species are deciduous and very few are ever green.

The plants which are planted for shade values are *Ailanthus excelsa, Albizia lebbeck, Alstonia scholaris, Azadirachta indica, Bombax ceiba, Ceiba pentandra, Dalbergia sissoo, Delonix regia, Ficus benghalensis, Ficus racemosa, Ficus religiosa, Hardwickia binata, Kigelia pinnata, Mangifera indica, Malia azedarach, Millingtonia hortensis, Mitragyna parvifolia, Parkia biglandulosa, Peltophorum pterocarpum, Polyalthia longifolia* (with umbrella like canopy), *Pongamia pinnata, Pterocarpus marsupium, Putranjiva roxburghii, Sapindus emarginatus, Schleichera oleosa, Syzygium cumini, Tamarindus indica* and *Terminalia catappa.*

These are very rich in canopy. These plants also play an important role in pollution control.

Table 1: Taxa Reported During the Investigation

Sr. No.	Name of Plant	Family	Amravati Road	Ambazari Road	Wardha Road	West High Court Road
1.	*Acacia leucocephala*	Mimosaceae	+	+	-	+
2.	*Acacia nilotica*	Mimosaceae	+	-	+	+
3.	*Aegle marmelos*	Rutaceae	-	-	+	-
4.	*Ailanthus excelsa*	Simaroubiaceae	+	+	+	+
5.	*Albizia lebbeck*	Mimosaceae	+	+	+	+
6.	*Alstonia scholaris*	Apocynaceae	+	+	-	+
7.	*Annona squamosa*	Annonaceae	-	-	-	+
8.	*Azadirachta indica*	Meliaceae	+	+	+	+
9.	*Bauhinia racemosa*	Caesalpiniaceae	-	-	+	+
10.	*Bombax ceiba*	Bombacaceae	+	+	-	-
11.	*Callistemon citrinus*	Myrtaceae	+	-	-	-
12.	*Calotropis procera*	Asclepiadaceae	+	+	-	-
13.	*Cassia fistula*	Caesalpiniaceae	-	+	+	-
14.	*Cassia siamea*	Caesalpiniaceae	+	+	+	+
15.	*Casuarina equisetifolia*	Casuarinaceae	-	+	-	-
16.	*Ceiba pentandra*	Bombacaceae	-	+	+	+
17.	*Crateva religiosa*	Capparaceae	+	-	-	-
18.	*Dalbergia sissoo*	Fabaceae	-	+	-	+
19.	*Delonix regia*	Caesalpiniaceae	+	+	+	+
20.	*Eucalyptus* sp.	Myrtaceae	+	-	+	-
21.	*Ficus bengalensis*	Moraceae	+	+	+	-
22.	*Ficus racemosa*	Moraceae	+	+	+	+
23.	*Ficus religiosa*	Moraceae	+	+	+	+
24.	*Gliricidia sepium*	Fabaceae	+	-	-	+
25.	*Haedwickia binata*	Caesalpiniaceae	+	-	-	-
26.	*Kigelia pinnata*	Bignoniaceae	+	+	-	+
27.	*Lagerstoemia reginae*	Lythraceae	+	-	-	+
28.	*Leucaena leucocephala*	Mimosaceae	+	+	+	+
29.	*Mangifera indica*	Anacardiaceae	+	+	-	-
30.	*Melia azedarach*	Meliaceae	+	+	-	-
31.	*Millingtonia hortensis*	Bignoniaceae	+	+	-	-
32.	*Mimusops elengi*	Sapotaceae	-	+	-	-
33.	*Mitragyna parvifolia*	Rubiaceae	+	-	-	+
34.	*Moringa oleifera*	Moringaceae	+	-	-	-
35.	*Parkia biglandulosa*	Mimosaceae	+	-	-	-
36.	*Peltophorum pterocarpum*	Caesalpiniaceae	+	+	+	+
37.	*Phoenix sylvestris*	Arecaceae	+	-	-	-
38.	*Pithecellobium dulce*	Mimosaceae	+	-	+	-
39.	*Polyalthia longifolia*	Annonaceae	+	+	-	+
40.	*Pongamia pinnata*	Fabaceae	+	+	-	+
41.	*Prosopis juliflora*	Fabaceae	+	+	-	+
42.	*Psidium guajava*	Myrtaceae	+	-	-	-
43.	*Pterocarpus marsupium*	Fabaceae	+	+	-	-
44.	*Putranjiva roxburghii*	Euphorbiaceae	+	-	-	-
45.	*Roystonea regia*	Arecaceae	+	-	-	+
46.	*Sapindus emarginatus*	Sapindaceae	+	+	-	-
47.	*Schleichera oleosa*	Sapindaceae	-	-	-	+
48.	*Syzygium cumini*	Myrtaceae	+	+	-	-
49.	*Tabebuia argentea*	Bignoniaceae	+	-	-	-
50.	*Tamarindus indica*	Caesalpiniaceae	-	+	+	-
51.	*Tecoma stans*	Bignoniaceae	-	+	+	-
52.	*Tectona grandis*	Verbenaceae	-	+	+	-
53.	*Terminalia catappa*	Combrataceae	+	+	+	+
54.	*Thevetia neriifolia*	Apocynaceae	-	+	-	-
55.	*Ziziphus mauritiana*	Rhamnaceae	+	+	-	-

The plants having beautiful flowers and lovely canopy shape are planted for aesthetic values. The plants which are planted for this value are *Bauhinia purpurea, Bombax ceiba, Ceiba pentandra, Callistemon citrinus, Cassia fistula, Cassia siamea, Crateva religiosa* (rare in Nagpur), *Delonix regia, Lagerstoemia reginae, Peltophorum pterocarpum, Polyalthia longofolia, Roystonea regia, Spathodia companulata, Tabebuia argentea* and *Tecoma stans.* All the above plants have large, showy and bright coloured flowers.

Some plants have social or religious values. The plants which are planted for these social or religious values are *Ficus benghalensis, Ficus religiosa, Gliricidia sepium, Leucaena leucocephala, Mangifera indica, Moringa oleifera, Psidium guajava* and *Tectona grandis.* Among these, few are considered as sacred plants and some are useful for fruits.

Besides the above mentioned trees planted along the roadsides, some shrubs are planted on the dividers. These include dwarf varieties of *Agave, Bougainvillia, Lantana, Nerium* and some Arecaceae members.

CONCLUSIONS

Urban areas in Nagpur witness a high level of air pollution affecting ambient air quality, which has an adverse effect on health. The realization that the forest cover acts as green lungs of city besides acting as filter for suspended particulate matter (SPM), has resulted in shift towards urban greening in metro cities and towns along the road sides. Avenue plantations contribute significantly to the urban society's physical, social and economic wellbeing. Realizing these importance of avenue plantation, its study is most important for better management of plantation.

The present investigation reveals that, the plantations along some of the avenues of West Nagpur are true to the objectives of avenue plantation strategies. Most of the plants are planted for shade and pollution control values; some are planted considering their aesthetic values; and very few are planted for social or religious values. Beside this some plants are wrongly planted. The plants which are planted for aesthetic, pollution control and shade values are fulfilling these values in all sites. While some patches are found barren.

Beside above mentioned plants, some are planted wrongly during plantation; while some wrong plants are grown naturally. These are *Acacia leucophloea, Acacia nilotica, Calotropis procera, Casuarina equisetifolia, Phoenix sylvestris, Pithecellobium dulce* and *Prosopis juliflora.*

Some plants have died due to improper management. Most of the plants are planted at correct distance from one another. While some are planted far away from each other and some are too close. The distance between road and plants should be proper. But few plants are planted at wrong distance and due to widening of the road few plants are now growing on the roads.

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