# A Checklist of the Roadside Trees of Kolkata City

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## Introduction

From the time of human civilization there is intricate and close relationship between plants, specially trees, and human beings. The forests and trees of urban areas are essential elements both for the environment and the people of urban community. The beneficial roles of street trees are extended manifolds, like protection of local watershed, providing shade on asphalt etc and surrounding structures, thereby improving energy efficiency for local buildings, reduction of air pollution, absorption of greenhouse gases, improving the aesthetic beauty and reduction of ambient air temperature. Due to the pressure of urbanization, the green sources in urban city are limited only as the gardens or parks and as roadside trees.

Only few studies have been done on the roadside green sources in urban area or cities in India such as, Bangalore (Nagendra & Gopal, 2010); Chandigarh (Kohli et al., 1998); Kalyani (Roy & Mukherjee, 2011); Gwalior (Bhat & Sharma, 2016); Mandsaur (Mitra & Singh, 2012); Burdwan (Ganguly & Mukherjee, 2016) and Kadapa (Nagireddy et al., 2015).

The aim of the present study was to achieve preliminary information of the roadside tree diversity planted on footpaths of various roads of Kolkata, which are potential for carbon sequestration and conservation of urban animal diversity. Earlier Mukhopadhyay & Chakravarty (2008) have enumerated the plant wealth of a part of Kolkata, the Raj Bhawan.

## Materials and Methods

Data was collected by field surveys from various roads of Kolkata city stretching from north to south and east to west part of the city, particularly Prince Anwar Shah Road, under Kolkata Metropolitan Corporation Area (KMC). Survey was carried out from April, 2016 to April, 2017. With the help of collected samples (leaf, flowers, seeds etc) alongwith pictorial documentation, the avenue trees of the study area were identified to their taxonomic position, following Mukherjee (1983); Krishen (2006); Guha Bakshi (1984) etc. Based on the abundance pattern, the avenue trees were categorized into four phases as high, moderate, low and rare.

## Results and Discussion

After the study, 104 tree species belonging to 33 families were recorded as roadside trees in Kolkata city, among which *Ficus benghalensis, Ficus religiosa, Drypetes roxburghii, Neolamarckia cadamba, Peltophorum pterocarpum, Delonix regia, Pongamia pinnata* and *Mimusops elengi* were found to be most abundantly distributed (Table 1). It was also found that the avenue trees were dominated by native types which might be satisfactory for conservation of regional biodiversity. Three tree species namely, *Spathodea campanulata, Leucaena leucocephala* and *Pithecelobium dulce* were found to be invasive in nature. Not only that, maximum avenue trees were found to be evergreen which are preferable for shading perspectives in urban areas.

Most of the Indian cities are far behind in race of quality as well as quantity control of urban forests than the cities in Europe and America. High population density is one of the reasons for underdevelopment of urban greenery sector. Species selection demands maximum attention for urban plantation. Hedge type plants and decorative garden plants can beautify the city than to purify the environment. Recent development in industrialization and urbanization has resulted in a profound deterioration of urban environmental quality and also human health by producing large amount of pollutants (Wagh et al., 2006). There is requirement of large-scale aforestation and green belt development in and around urban areas. Additionally this perennial green envelope has the potentiality to abate the impacts of pollutants. Proper planning and planting scheme depending upon the magnitude and type of pollution, selection of pollution-tolerant and dust scavenging trees and shrubs should be done for bioremediation of urban environment. Resistant trees considering their agro-climatic suitability and canopy architecture, is to be planted in right manner for efficient reduction of pollution in urban areas (Roy & Singh, 2014). It was found that plant species of Indian origin with a good air pollution tolerance index (APTI) scoring show a good dust trapping and carbon sequestering (Sahu & Sahu, 2015; Mate & Deshmukh, 2015). Planting is to be done in such a way so that green belt is developed within a short period and remains effective over the years.

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**Table 1. Roadside tree diversity of Kolkata with their names and abundance.**

| | Family | Scientific name | Common name | Local name | Abundance |
|---|---|---|---|---|---|
| 1 | Moraceae | *Ficus religiosa* L. | Sacred Fig | Asawath | H |
| 2 | | *Ficus virens* Ait | White Fig | Pilkhan/Pakud | L |
| 3 | | *Ficus benghalensis* L. | Bengal Fig | Bat | H |
| 4 | | *Ficus rumphii* Bl. | Mock peepul | Pakur | L |
| 5 | | *Ficus hispida* L. | Fig tree | Dumur | L |
| 6 | | *Ficus arnotiana* Miq. | Indian Rock Fig | Paras peepul | L |
| 7 | | *Ficus elastica* Roxb. ex Horn | Indian rubber bush | Rubber bot | R |
| 8 | | *Artocarpus lacucha* Buch- Ham | Monkey jack | Daifal | R |
| 9 | | *Artocarpus hirsutus* Lam. | Wild Jack | - | R |
| 10 | | *Artocarpus heterophyllus* Lam. | Jackfruit | Kathal | L |
| 11 | Combretaceae | *Terminalia arjuna* (Roxb.) Wight & Arn | Arjun tree | Arjuna | L |
| 12 | | *Terminalia catappa* L. | Indian almond | Kath Badam | M |
| 13 | | *Terminalia chebula* Retz. | Chebulic myrobalan | Haritaki | L |
| 14 | | *Terminalia belerica* (Gaertn) Roxb. | Bastard myrobalan | Triphala | L |
| 15 | Fabaceae | *Albizia lebbeck* (L.) Willd. | Frywood/lebbek | Koroi | M |
| 16 | | *Delonix regia* (Boj. ex Hook.) | Fire tree | Krishnachura | H |
| 17 | | *Bauhinia variegate* L. | Mountain ebony | Kanchan | M |
| 18 | | *Bauhinia purpurea* L. | Purple orchid | Kanchan | M |
| 19 | | *Tamarindus indica* L. | Tamarind | Tentul | L |
| 20 | | *Cassia siamea* (Lam.) Irwin & Bameby | Kassod tree | Kasud | H |
| 21 | | *Edinanthera pavoniana* L. | Red Bead tree | Rakta Kamal | R |
| 22 | | *Gliricidia sepium* (Jacq.) Kunth ex Walp. | Quickstick | Biliti Sirish | L |
| 23 | | *Leucaena leucocephala* (Lam.) de Wit | Subabul | Subabul | M |
| 24 | | *Peltophorum pterocarpum* (DC.) K.Heyne | Yellow Flame | Radhachura | H |
| 25 | | *Saraca asoca* (Roxb.) Willd. | Ashoka tree | Ashoka | L |
| 26 | | *Samanea saman* (Jaeq.) Merr. | Rain tree | Sirish | M |
| 27 | | *Cassia roxbergii* DC | Red Cassia | - | L |
| 28 | | *Cassia fistula* L. | Indian Labrnum | Badarlathi | M |
| 29 | | *Acacia auriculiformis* Benth. | Earpod Wattle | Sonajhuri | L |
| 30 | | *Dalbergia sissoo* Roxb. | Indian Rosewood | Sishoo | L |
| 31 | | *Pongamia pinnata* (L.) Pierre | Indian Beech | Karanja | H |
| 32 | | *Erythina indica* L. | Indian coral tree | Mandar | L |
| 33 | | *Butea monosperma* (Lam.) Taub. | Flame of the forest | Palash | L |
| 34 | | *Acacia nilotica* (L.) Willd.ex. Delile | Egyptian acacia | Babul | R |
| 35 | | *Amherstia nobilis* Wall. | Orchid Tree | Urbasi | R |
| 36 | | *Dalbergia lanceolaria* L. f. | - | Takoli | R |
| 37 | Bignoniaceae | *Tecoma stans* (L.) H.B. & K. | Yellow bell | Tecoma | L |
| 38 | | *Spathodea campunalata* P. Beauv. | Scarlet Bell | Ghantakarna | M |
| 39 | | *Tabebiua pallida* (Lindl.) Miers | Cuban pink trumpet | - | R |
| 40 | | *Tabebuia aurea (Silva manso)* Benth. et Hook.f. ex S. Moore | Caribbean trumpet | - | L |
| 41 | | *Millingtonia hortensis* L. f. | Indian cork tree | Akashneem | R |
| 42 | Apocynaceae | *Thivetia peruviana* (pers). | Yellow oleander | Kalke | L |
| 43 | | *Nerium indicum* (L.) | Nerium Oleander | Rakta karabi | L |
| 44 | | *Plumeria alba* L. | White Frangipani | Dolon champa | L |
| 45 | | *Plumeria rubra* L. | Red Frangipani | Rakta karabi | R |
| 46 | | *Alstonia scholaris* (L.) R. Br. | Black board tree | Chhatim | R |

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|---|---|---|---|---|---|
| 47 | Annonaceae | *Polyalthia longifolia* (Sonn.) Thwaites | False Ashoka | Debdaru | L |
| 48 | | *Annona squamosa* L. | Custard apple | Aata | R |
| 49 | | *Annona reticulata* L. | Netted custard apple | Noa | R |
| 50 | Meliaceae | *Azadirachta indica* A. Juss. | Indian Lilac | Neem | L |
| 51 | | *Swietenia mahogoni* L. | West Indian Mahogany | Mahogony | L |
| 52 | | *Swietenia macrophylla* King. | Honduras Mahogany | Mahogony | M |
| 53 | | *Toona ciliata* M.Roem. | Red cedar | Mahogony | L |
| 54 | | *Eucalyptus* sp. Hook. | Eucalyptus | Eucalyptus | L |
| 55 | | *Melia azadirach* L. | Pertian lylac | Mahaneem | L |
| 56 | | *Aphanamixis polystachya* (Wall.) R. Parker | Rohituka tree | Pittaraj | R |
| 57 | Myrtaceae | *Callistemon viminalis* (Sol. ex Gaertn.) | Weeping Bottle brush | Botol brush | M |
| 58 | | *Psidium guajava* L. | Guava | Peara | L |
| 59 | | *Syzigium cumini* (L) Skeels | Java Plum | Jam | M |
| 60 | Arecaceae | *Borassus flabellifer* L. | Daab Palm tree | Tal | R |
| 61 | | *Cocos nucifera* L. (Palmae) | Coconut tree | Narkel | L |
| 62 | | *Phoenix sylvestris* (L.) Roxb. | Indian Date | Khejur | R |
| 63 | | *Areca catechu* L. | Areca nut | Supari | R |
| 64 | | *Corypha utan* Lam. | Cabbage Palm | Buri palm | R |
| 65 | Malvaceae | *Sterculia foetida* L | Wild almond | Baksho badam | M |
| 66 | | *Pterygota alata* (Roxb.) R.Br. | Heart shape | Budhha narkel | R |
| 67 | | *Bombax ceiba* L. | Silk Cotton | Desi Shimul | M |
| 68 | | *Ceiba pentandra* (L.) Gaertn. | White Silk-Cotton | Swet shimul | L |
| 69 | | *Thespesia populnea* L. Soland. ex Corr. | Portia tree | Pasur | M |
| 70 | | *Berrya cordifolia* (Wild.) | Trincomalee wood | Saral | R |
| 71 | Anacardiaceae | *Mangifera indica* L. | Mango | Aam | M |
| 72 | | *Sponius dulcius* Parkinson | Jew plum | Amra | L |
| 73 | Rutaceae | *Murraya paniculata* (L.) Jack. | Orange jessamine | Kamini | M |
| 74 | | *Aegle marmelos* (L.) Corrêa | Bengal quince | Bael | R |
| 75 | | *Murraya koenigii* L. Sprengal | Curry leaves | Sweet neem | R |
| 76 | | *Citrus maxima* (Burm.) Merr. | Pomelo | Batabi lebu | R |
| 77 | | *Limonia acidissima* L. | Wood apple | Kadbel | R |
| 78 | Sapotaceae | *Mimusops elengi* L. | Spanish cherry | Bakul | M |
| 79 | | *Madhuca latifolia* Roxb. | Honey tree | Mohua | L |
| 80 | Rhamnaceae | *Zyziphus jujuba* Mill. | Chinese date | Kul | R |
| 81 | | *Zyziphus mauritiana* Lam. | Indian Plum | Topa kul | R |
| 82 | Callophyllaceae | *Calophyllum inophyllum* L. | Alexandrian laurel | Sultan champa | L |
| 83 | | *Messua ferrea* L. | Indian rose chestnut | Nageshwar | L |
| 84 | Euphorbiaceae | *Trewia nudiflora* L. | False white teak | Pithali | L |
| 85 | | *Drypetes roxburghii* (Wall.) Hurus. | Lucky Bean tree | Putranjib | H |
| 86 | Sterculinaceae | *Pterospermum acerifolium* L. | Karnikra | Kanakchampa | M |
| 87 | | *Kleinhobia hospita* L. | Heart shape | Bola | R |
| 88 | Lecythidaceae | *Couroupita guianensis* Aubl. | Cannonball tree | Nagkeshar | L |
| 89 | | *Barringtonia acutangula* (L.) Gaertn. | Indian Oak | Hujal | R |
| 90 | Oleaceae | *Nyctanthes arbor-tristis* L. | Night Jasmine | Sheoli | L |
| 91 | Rubiaceae | *Neolamarckia cadamba* (Roxb.) Bosser. | Burflower tree | Kadam | H |
| 92 | Lythraceae | *Lagerstromia speciosa* (L.) Pers. | Common Crape myrtle | Jarul | M |
| 93 | Ehertiaceae | *Cordia dichotoma* Frost F | Indian Chery | Bohnari | R |
| 94 | Ulmaceae | *Trema orientalis* (L.) Blume. | Indian Charcoal | Chikun | L |
| 95 | Dileniaceae | *Dillenia indica* L. | Elephant Apple | Chalta | L |

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|---|---|---|---|---|
| 96 | Magnoliaceae | *Michelia champaka* L. | Champok | Champa | M |
| 97 | Moringaceae | *Moringa oleifora* Lam. | Drumstick tree | Sajne | L |
| 98 | Tiliaceae | *Grewia asiatica* L. | Falsa | Falsa | L |
| 99 | Ebenaceae | *Diospyros malabarica* (Desr.) Kostel. | River ebony | Gaab | R |
| 100 | Capparaceae | *Crataeva roxburghii* R.Br. | Caper tree | Barun | R |
| 101 | Lamiaceae | *Gmelina arborea* Roxb. | White teak | Goomar tree | R |
| 102 | Verbenaceae | *Tectona grandis* L. f. | Ship tree | Segun | R |
| 103 | Simaroubaceae | *Ailanthus excelsa* Roxb. | Tree of heaven | Swarnabrikhha | R |
| 104 | Mimosaceae | *Pithecellobium dulce* (Roxb.) Benth. | Monkey pod | Gilapi | M |

H= High, M= Moderate, L= Low, R= Rare.

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*(b. f. from p. 124)*

water and food systems free of potentially harmful residues and bacteria.

Though each of these interventions will have substantial impact, they must be supported by surveillance systems that can monitor the problem effectively and allow policymakers in all sectors to respond as and where needed. There is much that we still do not know about the quantity of antibiotics and resistant bacteria in the environment, and the various ways it got there, meaning gathering actionable information is crucial.

Reversing AMR and safeguarding the efficacy of our most precious drugs—antibiotics—is a complex undertaking. It requires addressing how antibiotics are produced and regulated; how they are prescribed and consumed; and how different sectors can work together to counter a range of AMR-related threats. It is an understanding for which WASH principles are well-suited, and for which WASH resources should be marshalled. In home and hospital, town and city, high quality water, sanitation and hygiene is a vital and cost-effective means to beat back AMR's rapid emergence.