



A Checklist of Trees & Shrubs in the campus of Gurudas College, Kolkata, West Bengal, India

Ripan Chandra Das^{1#}, Goutam Kumar Pahari^{1^} and Mitu De^{2*}

¹Assistant Professor, Department of Botany, Gurudas College, Kolkata-54, West Bengal, India.

²Associate Professor, Department of Botany, Gurudas College, Kolkata-54, West Bengal, India.

Correspondence E-mail: [#](mailto:rcdpdm@gmail.com), gpahari@gmail.com[^] and mitude@rediffmail.com*

Abstract

Green spaces within cities provide rich learning laboratories for students to learn about the composition of flora in their surroundings. Open green spaces within the campus of educational institutions provide an excellent opportunity to know more about the vegetation diversity. A student project was initiated by the Department of Botany, Gurudas College, Kolkata-54, India to quantify the woody trees and shrubs in the college campus. The objective of the student project was to quantify the woody trees and shrubs within the college campus by preparing a checklist. In this present investigation 63 trees and woody shrubs distributed over 30 families in the campus were found.

Keywords: Checklist, trees and shrubs, urban green space, student project

Introduction

Urban green spaces are an integral part of any cities, providing its residents with numerous benefits both tangible and in-tangible (Gaodi *et al.*, 2010). An urban forest is an important community resource, providing many social, economical, and environmental benefits. It can help mitigate the negative effects of urban development by improving water quality, reducing air pollution, decreasing soil erosion, buffering noise pollution apart from providing an aesthetic appeal. Cities are a key nexus of the relationship between people and nature and are huge centers of demand for ecosystem services and also generate extremely large environmental impacts (Elmqvist *et al.*, 2015).

Urban ecosystem services, directly or indirectly used/consumed by people, support the urban quality of life, including protection

from natural hazards. They provide benefits for humans, and thus they are in demand (Haase *et al.*, 2014). Cultural services of urban green spaces can be perceived and they are the main contributors to human well-being for urban inhabitants (Bolund & Hunhammar, 1999; Gilbert, 2016; Hartig & Kahn, 2016). The trees around our homes, schools, streets, and throughout our parks are part of an urban forest. The urban forest is made up of trees and other vegetation within the built environment where we live, work, and play. It is influenced by people, vehicles, pavement, utility lines, buildings, wildlife, underground pipes, other plants, and, of course, people. When the students are engaged in creating green spaces in their campus they get the opportunity to get acquainted with plants. They learn to identify medicinal plants and know about their common uses. Urban green

spaces are one of the most significant elements of any urban ecosystem, both due to its ecosystem dynamics and its essential contribution in well being of human race (Padigala, 2012). Green spaces within cities provide rich learning laboratories as sites that support opportunities for young people to explore, play and learn about nature within the city (Derr, 2018).

In Gurudas College as the students were actively involved in creating a green urban space in their campus through the NSS and Vasudha units (De et al, 2019b). These activities developed a sense of ownership. Pride of creating urban green space was instilled within these students. The college administration encouraged the participation of students in Vasudha projects by incorporating one class per class per week in the routine for Vasudha activity.

Some of the plants were collected by the faculty members of Vasudha from the Forest Department, Government of West Bengal over the years. They were collected especially during the 'Aranya Saptaha' in the month of July when free saplings are distributed by the Forest Department. Most of the fruit tree saplings and ornamental plants were purchased with the financial assistance of the college (De et al 2019c). Some of these trees are not just trees; they are gifts passed down from generations of educators, past and present, that have been part of this institution and continue to be so. On the Foundation Day of the College, on 14th August every year the senior teachers plant about 5-7 saplings of various tree species. So every year the number of tree species on campus increases.

Gurudas College

Gurudas College, established in 1956, is an undergraduate college in Kolkata, West Bengal, India. The Department of Botany of Gurudas College initiated a field study to prepare the Checklist of Trees & Shrub in the college campus 2019. The objectives of the project were to quantify the greenery found in the campus and to educate the students about the different tree species that they encounter in their daily lives.

Materials and Methods

Study design

Study site:

Gurudas College, Kolkata, West Bengal, India. It is located in an urban locality in the heart of the city. At present Gurudas College has a campus of total area of 2.33 acres (142 kathas). Gurudas College had three buildings constructed on three plots intersected by public roads. They are named as Main building, Commerce Building and the Library/Golden Jubilee Building. The coordinates of the college are 22.5712° N, 88.3905° E. The location map of the college using Google Earth image is presented as Fig.1.



Fig. 1. Google Earth image of Gurudas College, Kolkata- 700 054.

Objective

The purpose of this study was to prepare a checklist of the woody plants growing on the Gurudas College campus. The main goal of the project was to document the campus trees and shrubs to provide a baseline data set. An initiative was also taken by the Botany Department and NSS unit of the college to label each tree with its local and scientific names so that students are able to identify different tree species and therefore relate to them.

Methodology

Data collection of trees

The Gurudas College Trees & Shrubs Checklist Project was initiated by providing basic tree identification training to students of Third Semester who had Taxonomy of Angiosperms as a part of their curriculum. The students were then made to identify the trees

located in the college campus several times as part of their curriculum to observe different morphological forms and members of angiosperms. The Field study was carried on several occasions during the July, 2019 – Dec, 2019 academic session. They were guided by the faculty members of the Department of Botany.

The teachers also educated the students on the importance of each tree species found in the college campus. After the identification process, the Department along with volunteers of National Service Scheme (NSS) made name plates with thin metal sheets. These were durable and resistant to natural wear and tear. The scientific names of some of the plants were written on the metal plates with paint. The plates were tied to the trees using galvanized wire which could be recycled continuously to make new name plates.

Tree identification

Faculty members who were present with students helped in the tree and shrub identification. As Taxonomy and morphology of angiosperms was part of their Semester III syllabus they students participated wholeheartedly in the field study. Some trees and shrubs had been planted as avenue trees by the Kolkata Metropolitan Development Authority (KMDA) in the public roads intersecting the campus. These species have been included in the list as those trees provide an excellent tree cover in the college campus (Fig. 2a & 2b).



Fig2a. Google Earth image of trees present in front of the Main Building



Fig 2b. Google Earth image of trees present in between the Main Building and the Commerce Building.

Results

The result of this survey recorded a total of 63 woody tree & shrub species. The list of trees and shrubs present in Gurudas College campus is presented in Table 1 with their scientific names, angiosperm families to which they belong, common name in Bengali and frequency of occurrence. The plants are arranged in alphabetical order.

Table 1. Trees and Woody Shrubs present in Gurudas College, Kolkata 54 campus

Sl. No.	Scientific Name	Family	Common Name	Frequency
1	<i>Acacia auriculiformis</i> A. Cunn. ex Benth	Fabaceae (s.l.)	Akashmoni	2
2	<i>Adhatoda vasica</i> Nees	Acanthaceae	Vasak	1
3	<i>Albizia lebbbeck</i> (L.) Benth.	Fabaceae (s.l.)	Shirish	1
4	<i>Alstonia scholaris</i> (L.) R.Br.	Apocynaceae	Chatim	1
5	<i>Anthocephalus chinensis</i> Miq.	Rubiaceae	Kadam	1
6	<i>Araucaria araucana</i> (Molina) K. Koch	Araucariaceae	Monkey puzzle tree	1
7	<i>Areca catechu</i> L.	Arecaceae	Supari	1
8	<i>Averrhoa carambola</i> L.	Oxalidaceae	Kamranga	1
9	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neem	3
10	<i>Bauhinia tomentosa</i> L.	Fabaceae (s.l.)	Rakta Kanchan	1
11	<i>Bauhinia variegata</i> L.	Fabaceae (s.l.)	Kanchan	2
12	<i>Bombax ceiba</i> L.	Bombacaceae	Shimul	1
13	<i>Butea monosperma</i> (Lam.) Kuntze	Fabaceae (s.l.)	Palash	5
14	<i>Caesalpinia pulcherrima</i> (L.) Sw	Fabaceae (s.l.)	Krishnachura	2
15	<i>Carissa carandas</i> L.	Apocynaceae	Karamcha	1

16	<i>Cassia fistula</i> L.	Fabaceae (s.l.)	Amaltas	2
17	<i>Ceiba pentrandia</i>	Bombacaceae	Swet Shimul	3
18	<i>Cinnamomum tamala</i> Nees & Eberm.	Lauraceae	Tej pata	1
19	<i>Codiaeum variegatum</i> (L.) Blume.	Euphorbiaceae	Patabahar	4
20	<i>Dalbergia sisoo</i> Roxb. ex DC.	Fabaceae (s.l.)	Shishu	1
21	<i>Delonix regia</i> (Bojer ex Hook) Raffin	Fabaceae (s.l.)	Gulmohor	6
22	<i>Dillenia indica</i> L.	Dilleniaceae	Chalta	1
23	<i>Duranta repens</i> L.	Verbenaceae	Duronto	28
24	<i>Dyopsis lutescens</i> (H.Wendl.) Beentje & J.Dransf.	Arecaceae	Areca palm	3
25	<i>Embillica officinalis</i> Gaertn.	Euphorbiaceae	Amlaki	3
26	<i>Eucalyptus globosus</i> Labill.	Myrtaceae	Eucalyptus	1
27	<i>Ficus benjamina</i> L.	Moraceae	Both	2
28	<i>Gardenia jasmonoides</i> J. Ellis.	Rubiaceae	Gandharaj	1
29	<i>Grewia asiatica</i> L.	Tiliaceae	Phalsa	1
30	<i>Hibiscus rosa sinensis</i> L.	Malvaceae	Jaba	1
31	<i>Holarrhena pubescens</i> Wall. ex G.Don	Apocynaceae	Kurchi	1
32	<i>Ixora coccinea</i> L.	Rubiaceae	Rangan	30
33	<i>Lagerstroemia speciosa</i> (L.) Pers.	Lythraceae	Jarul	4
34	<i>Mangifera indica</i> L.	Anacardiaceae	Aam	32
35	<i>Manilkara zapota</i> (L.) P.Royen	Sapotaceae	Sabeda	1
36	<i>Michelia alba</i> DC.	Magnoliaceae	Swet Chapa	1
37	<i>Michelia champaca</i> L.	Magnoliaceae	Swarna Champa	2
38	<i>Mimusops elengi</i> L.	Sapotaceae	Bokul	12
39	<i>Murraya paniculata</i> (L.) Jacq.	Rutaceae	Kamini	6
40	<i>Nerium indicum</i> Mill.	Apocynaceae	Korabi	1
41	<i>Nyctanthes abor tristis</i> L.	Oleaceae	Shiuli	6
42	<i>Peltophorum pterocarpon</i> (DC.) Backer ex K.Heyne	Fabaceae (s.l.)	Radhachura	5
43	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Fabaceae (s.l.)	Jilipi phal	1
44	<i>Plumeria alba</i> L.	Apocynaceae	Kath Champa	2
45	<i>Polyalthia longifolia</i> (Sonn.) Thwaites	Annonaceae	Debdaru	32
46	<i>Psidium guajava</i> L.	Myrtaceae	Peyara	2
47	<i>Pterospermum acerifolium</i> (L.) Willd	Sterculiaceae	Mujkundchapa	1
48	<i>Putranjiva roxburghii</i> Wall.	Euphorbiaceae	Putranjiva	2
49	<i>Saraca asoca</i> (Roxb.) Willd.	Fabaceae (s.l.)	Ashok	1
50	<i>Senna siamea</i> (Lam.) H.S. Irwin & Barneby	Fabaceae (s.l.)	Minjiri Phool	2
51	<i>Spathodea campanulata</i> Beauv.	Bignoniaceae	Rudrapalash	2
52	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Kalo jaam	1
53	<i>Syzygium samarangense</i> (Blume) Merrill and Perry	Myrtaceae	Jamrool	1
54	<i>Swietenia mahagoni</i> (L.) Jacq.	Meliaceae	Mehogini	1
55	<i>Tabernaemontana divaricata</i> (L.) R. Br ex Roem. & Schult	Apocynaceae	Togor	35
56	<i>Tecoma stans</i> (L.) Juss. ex Kunth	Bignoniaceae	Tecoma	1
57	<i>Tectona grandis</i> L.f.	Verbenaceae	Segun	2
58	<i>Tecomaria capensis</i> (Thunb.) Spach	Bignoniaceae	Red Honey-suckle Cape	1
59	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun	2
60	<i>Termenalia bellirica</i> (Gaertn) Roxb.	Combretaceae	Bahera	1
61	<i>Thuja occidentalis</i> L.	Cupressaceae	Thuja	6
62	<i>Vitex negundo</i> L.	Verbenaceae	Nishinda	1
63	<i>Zamia furfuracea</i> L. f.	Cycadaceae	Zamia	1

Discussion

From Table 1 it is seen that there are 63 trees and woody shrubs distributed over 30 families in the campus of Gurudas College, Kolkata 700054. Based on the field study data it was observed those plants that were planted as hedge plants had a high frequency when compared to other species viz. *Duranta repens* L. with 28 individuals and *Ixora coccinea* L.

with 30 individuals. Likewise tree species that had been planted for aesthetic reasons had a higher frequency. Example is that of *Polyalthia longifolia* (Sonn.) Thwaites had 32 individual plants and *Tabernaemontana divaricata* (L.) R. Br ex Roem. & Schult had 35 individual plants. *Thuja occidentalis* L. was found near the canteen in the Commerce Building campus

with 6 individual plants. *Mimusops elengi* L. had a high frequency count of 12 as this species was planted as avenue tree by the Kolkata Metropolitan Development Authority (KMDA). Some avenue trees were planted along the boundary walls of the Golden Jubilee campus inside the campus too (Fig. 3).



Fig.3. Trees present along the boundary wall in the Golden Jubilee campus

Many medicinal trees and shrubs were found in the checklist as they had been planted when a medicinal garden had been set up in the college campus viz. *Adhatoda vasica* Nees, *Embilica officinalis* Gaertn., *Holarrhena pubescens* Wall. ex G. Don, *Saraca asoca* (Roxb.) Willd. and *Vitex negundo* L.



Fig.4. Mango field gene bank of Gurudas College

Mangifera indica L. had a high frequency viz. 32 plants. The field gene bank on campus (Fig. 4) with the indigenous mango varieties of Murshidabad district have contributed to the high frequency. Some economically important plants like *Albizia lebbbeck* (L.) Benth., *Cinnamomum tamala* Nees & Eberm. *Dalbergia sisoo* Roxb. ex DC, *Swietenia*

mahagoni (L.) Jacq. and *Tectona grandis* L.f. are also present in the campus (Fig. 5).



Fig 5. *Cinnamomum tamala* Nees & Eberm. commonly known as 'Tej pata' in the college campus

This mango field gene bank with 25 mango varieties had been established with the financial assistance of a Research Project of the West Bengal Biodiversity Board (WBBB) to the communicating author as principal investigator (De et. al., 2019a, c).

The students participated in the field study to prepare the checklist in addition to their morphological study. Most students gave a positive feedback and they enjoyed the field study.

Conclusion:

Investing in urban green infrastructure constitutes a tangible contribution that cities can make to the United Nations' agenda on a Green Economy for the 21st century (Hodson and Marvin 2010) and the Sustainable Development Goals (SDGs). It is hoped that this checklist would help in conducting green audit of the college.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this work.

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