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Field survey on distribution and diversity of flora in and around Sadakathullah appa college campus in Tirunelveli district, Tamilnadu, India

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Abstract
A Green Campus is a place where environmental friendly practices and education combine to promote sustainable and eco-friendly practices in the campus. The present study of focused area is Sadakathullah Appa college campus, Tirunelveli district. Tamilnadu, India. The College is located on a 40 acre sprawling campus and is run by Sadakathullah Appa Educational Society. To assess the nature and distribution of plant diversity in and around the college campus monitored. Field observations were made and plants were photographed. The survey was conducted to collect information about the plant species like their identification and documentation in the form of Botanical name and family. The number of *Azadirachata indica* was found to be the highest planted trees. *Leucaena leucocephala* was the second top most plant followed by *Millettia pinnata, Terminalia catappa and Albizia lebbeck* commonly found plants. The important and prominent shrub species are *Ricinus communis, Abutilon indicum, Cascabela thevetia, and Calotropis gigantean.* In terms of preserving the floral biodiversity, it is very important to set up a botanical garden in the confines of the campus and cultivate these plants, and protect the ones that grow naturally on the grounds. The study found that the plants recorded from the campus area are economically very important.

Keywords: biodiversity, trees, shrubs, herbs and ornamental plants, Sadakathullah Appa College Campus

Introduction

Biodiversity is the variability among living organisms from all sources including *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. In a broad sense it is to mean the abundance and distributions of and interactions between genotypes, species, communities, ecosystems and biomes. (Leadley *et al*., 2010) [6]. India is one of the 12 "mega-diversity" countries in the world and this country has a forest area of 23.81% of the country's geographical area. Mankind has been utilizing plants for food and medicinal purpose since the time immemorial. Therefore various aspects of plants towards health, economic value, sustainable utility, their conservation, floral assessment and documentation are necessary. India is a rich centre of plants diversity. Plant diversity is the most important feature, which plays a vital role in complexity of natural ecosystems (Surender Kumar *et al*., 2016) [12]. The plant diversity at any site is infuenced by species distribution and abundance patterns (Reddy *et al.,* 2014) [10]. The richness of fowering plants makes India is one of the mega diversity countries in the world with four biodiversity hotspots and three mega centers of endemism. India ranked seventh among 17 mega diversity countries of the world and more than 17,000 species of higher plants are reported to India. Conservation of biodiversity is essential for the proper functioning of ecosystems and for the maintenance of the environmental services they provide. India blessed with high biological diversity, is one of the 12 mega diverse countries and lodges two of the eight hottest hotspots of global biodiversity. Major wilderness areas include the Western Ghats, Eastern Ghats, tropical dry evergreen forests of peninsular India and Eastern Himalayas (Parthasarathy *et al*., 2010) [7]. Biodiversity keeps the ecological processes in a balanced state, which is necessary for human survival (Kaur and Sharma 2014) [13].

The green campus concept offers an institution the opportunity to take the lead in reducing its environmental culture and developing new paradigms by creating sustainable solutions to environmental, social and economic needs of the mankind (Sen and Keshari, 2019) [11]. The study was conducted to document the diversity of flora in and around Sadakathullah Appa College campus in Tirunelveli district of Tamilnadu, India. Number of field trip was undertaken to enumerate the biodiversity for identification and documentation of floral diversity of Sadakathullah Appa College campus.

Materials and Methods

Description of the study area

The present study of focused area is Sadakathullah Appa college campus, Tirunelveli district. Tamilnadu, India and the college is run by Sadakathullah Appa Educational Society. The college campus sprawling over 40 acres area and consists of some old trees along with shrubs, herbs, palms, insects, birds, reptiles and mammals of fauna species. In addition to administration buildings, the remaining area of this college is occupied by natural vegetation, play ground, Mosque and Vehicle parking etc. Our study area is presented in Figure 1.

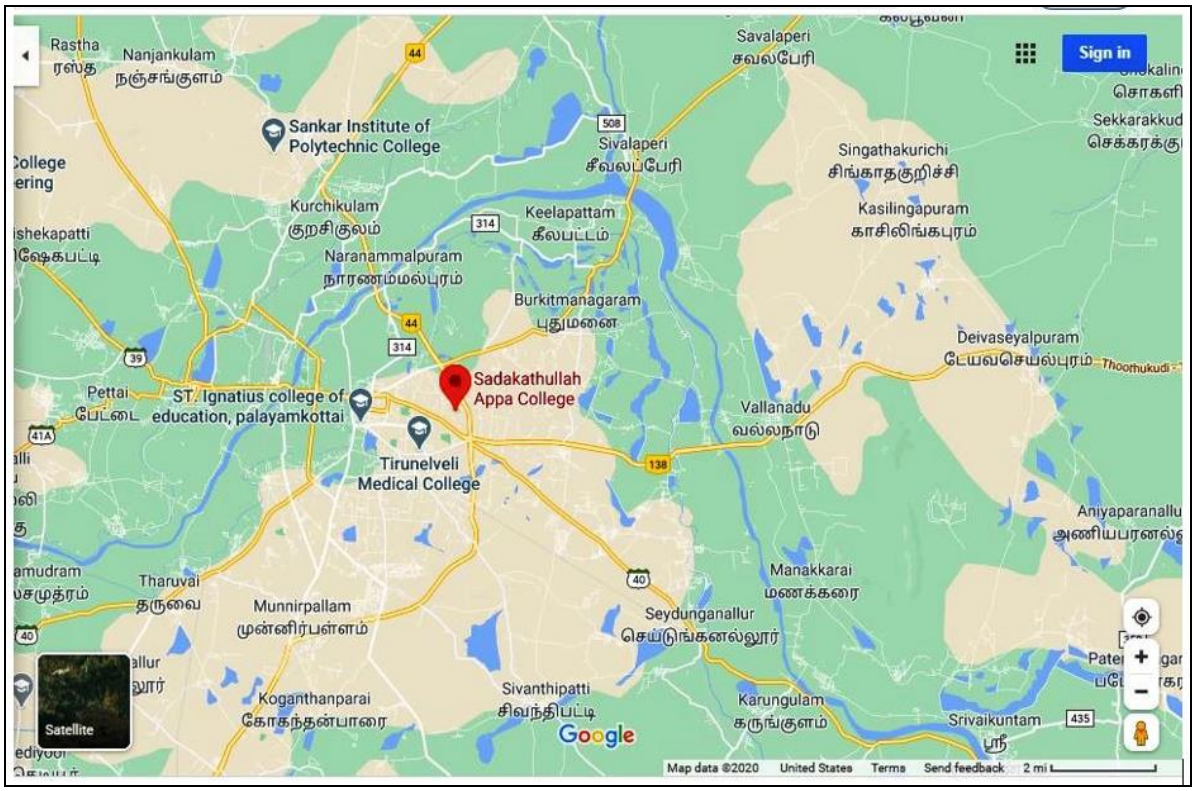

Fig 1: Map of study area

Field visit and documentation of floral species of Sadakathullah Appa college campus

The task of inventorying the plant diversity of Sadakathullah Appa college campus was undertaken systematically and intensively to cover most species in flowering and fruiting stages. Field observations were made and plants were photographed. The survey was conducted to collect information about the plant species like their identification and documentation in the form of Botanical name and family. The whole campus was visited daily during the study period for identification of plants.Regular field visits were made during the year December 2019 to December 2020 during all seasons to explore the various plant species. All the plant specimens available in the study areas were collected for authenticity by following the method of Rao R.R and Razi B.A, 1981 [8]. All the studied plant species have been arranged alphabetically, along with their family, binomial and vernacular names. The families are arranged according to Bentham and Hooker's system of classification (Bentham G., Hooker J.D, 1876) [1]. Plant diversity study was undertaken to check and document the floral diversity in the campus. Six localtions were chosen based on the abundance of trees, herbs and shrubs. The selected locations in Sadakathullah Appa college campus in and around are Administrative buildings, Mosque area, Sports ground, Boys hostel, Girls hostel and college entrance area etc. Plants were identified using the method by Gamble, J.S, 1994 [3].

Results and Discussion

The present research has been carried out to explore the diversity of plants species and for sustainable utilization of available biodiversity resources.

Identification and documentation of floral species in Sadakathullah Appa College campus

The Plant diversity is the functional and structural unit of the biotic components of ecosystem and is subjected to change due to the interaction of biotic and abiotic factors of the environment. The visual observations of plants were recorded with a view to obtaining some idea about the relative density of certain species and their predominance. Campus flora consists of trees, shrubs, herbs and ornamental plants belongs to various families. The highest diversity of plant was observed in the college campus with 54 plant species. A total of 54 species were recorded in whole campus are belonging to *Meliaceae, Fabaceae, Combretaceae, Annonaceae*, *Rutaceae, Euphorbiaceae, Malvaceae* and *Moraceae* families. Out of 54 species identifeied in the study area, 29 trees, 16

species of shrub and herbs, 9 species of ornamental plant species. The whole campus area have several floral species and reported with some prominent tree species are *Leucaena leucocephala, Millettia pinnata, Terminalia catappa, Albizia lebbeck, Polyalthia longifolia and Murraya koenigii.* The most dominant tree is *found in campus Azadirachita indica.* The detailed dominant tree species documentation is represented in Table 1. From 28 families recorded in study area, the *Fabaceae* was represented by the largest number of species of 300. *Fabaceae* was found in rich family in college campus followed by Meliaceae species of 241, *Euphorbiaceae* species of 100, *Combretaceae* species of 69, *Annonoceaae* species of 62 and Rutacea (56).Family wise habit is represented in Figure 2. The important and prominent shrub species are *Ricinus communis*, *Abutilon indicum*, *Cascabela thevetia, and Calotropis gigantea*. The dominant Shrub diversity is presented in Table 2. The most important ornamental plant species are Dransfieldia *micrantha, Philodendron erubescens and Duranta erecta* observed. On the basis of field survey of campus plants, important species showed their presence in the campus which were collected, identified and photographed in Plate 1 and Plate 2. Figure 3 shows that the different shrubs and herb species found in different study sites and their relative abundance. The family with highest number of individual was *Euphorbiaceae* (93) was followed by *Apocynaceae* (35), *Fabaceae* (34), *Malvaceae* (32) and *Moraceae* (25). The identified shrub and ornamental plant diversity was photographed in plate 3 and plate 4.

Table 1: Identification of dominant floral species with tree habit in Sadakathullah Appa College campus area

S. No.	Common Name/ Vernacular name	Botanical name of the plant	Family	Abundance of plants(%)
1	Neem Tree	*Azadirachita indica*	*Meliaceae*	33.94 %
2	River tamarind	*Leucaena leucocephala*	*Fabaceae*	14.36%
3	Pongam Tree or Indian beach tree	*Millettia pinnata*	*Fabaceae*	14.22%
4	Indian almond or Country almond	*Terminalia catappa*	*Combretaceae*	9.71%
5	Lebbek tree	*Albizia lebbeck*	*Fabaceae*	8.73%
6	Monoon longifolium or False ashoka tree	*Polyalthia longifolia*	*Annonaceae*	8.16%
7	Bitter albizia	*Albizia amara*	*Fabaceae*	2.53%
8	West Indian pea	*Sesbania grandiflora*	*Fabaceae*	2.25 %
9	Teak Tree	*Tectona grandis*	*Lamiaceae*	1.97 %
10	Banyan Tree	*Ficus benghalensis*	*Moraceae*	1.12 %
11	Yellow flamboyant or copper pod	*Peltophorum pterocaspum*	*Fabaceae*	0.84 %
12	Indian Cork/Tree Jasmine	*Millingtonia hortensis*	*Bignoniaceae*	0.70 %
13	Portia *tree or Indian tulip tree*	*Thespesia populnea*	*Malvaceae*	0.56 %
14	Indian sandalwood	*Santalum album*	*Santalaceae*	0.42 %
15	Peepal tree or sacred fig	*Ficus religiosa*	*Moraceae*	0.42 %
16	Curry leaf	*Murraya koenigii*	*Rutaceae*	43.90 **%**
17	Black plum tree	*Syzygium cumini*	*Myrtaceae*	11.38 **%**
18	Tamarind Tree	*Tamarindus indica*	*Fabaceae*	8.94**%**
19	Papaya	*Carica papaya*	*Caricaceae*	6.50 **%**
20	Indian gooseberry	*Phyllanthus emblica*	*Phyllanthaceae*	6.50 **%**
21	Common Guava	*Psidium guajava*	*Myrtaceae*	5.69 **%**
22	Mango	*Mangifera indica*	*Anacardiaceae*	4.06 **%**
23	Drumstick Tree	*Moringa oleifera*	*Moringaceae*	4.06 **%**
24	Custard apple	*Annona reticulata*	*Annonaceae*	4.06 **%**
25	Coconut Tree	*Cocos nucifera*	*Arecaceae*	2.43 **%**

Table 2: Identification of floral species with shrub and herb habit in Sadakathullah Appa College campus area

S No	Common Name/vernacular name	Botanical name of the plant	Family	Abundance of plants (%)
1	Castor bean or Castor oil plant	*Ricinus communis*	*Euphorbiaceae*	35.49
2	Indian mallow /gaint milkweed	*Abutilon indicum*	*Malvaceae*	10.68
3	Yellow oeleander	*Cascabela thevetia*	*Fabaceae*	10.30
4	Mulberry V1	*Morus indica*	*Moraceae*	9.54
5	Crown flower /swallow -woot	*Calotropis gigantea*	*Apocynaceae*	8.01
6	Indian Mulberry	*Morinda tinctoria*	*Rubiaceae*	4.58%
7	Red nerium	*Nerium oleander*	*Apocynaceae*	3.43 %
8	Paper flower	*Bougainvillea glabra*	*Nyctaginaceae*	3.43 %
9	Jungle geranium or Jungle flame	*Ixora coccinea*	*Rubiaceae*	2.67 %
10	Madras thorn or Manilatamarind	*Pithecellobium dulce*	*Fabaceae*	2.67 %
11	Indian jujube	*Ziziphus mauritiana*	*Rhamnaceae*	2.29 %
12	White Nerium	*Nerium oleander*	*Apocynaceae*	1.90 %

13	Henna plant	*Lawsonia inermis*	*Lythraceae*	1.90 %
14	Hibiscus or Rose mallow	*Hibiscus rosasinensis*	*Malvaceae*	1.52 %
15	Pomegranate	*Punica granatum*	*Lythraceae*	1.14 %
16	Arabian jasmine	*Jasminum sambac*	*Oleaceae*	0.38 %

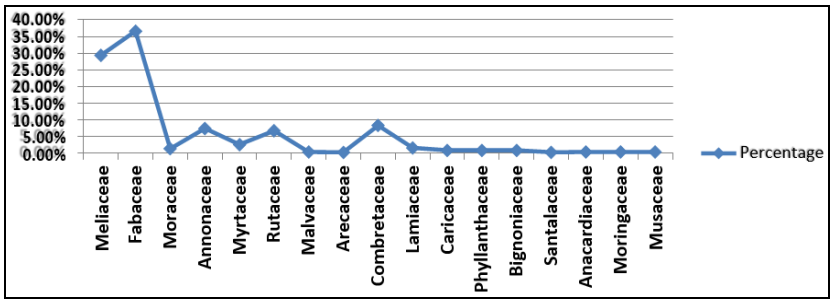

Fig 2: family wise distribution of tress recorded in sadakathullah appa college campus area

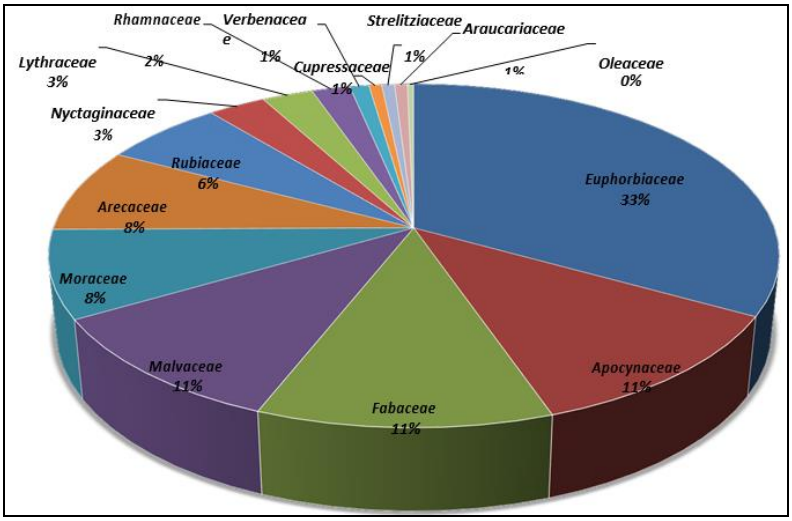

Fig 3: habitat distribution of shrub and ornamental plants recorded in sadakathulla appa college campus area

Plate 1: Photograph showing dominant trees found in Sadakathullah Appa College Campus

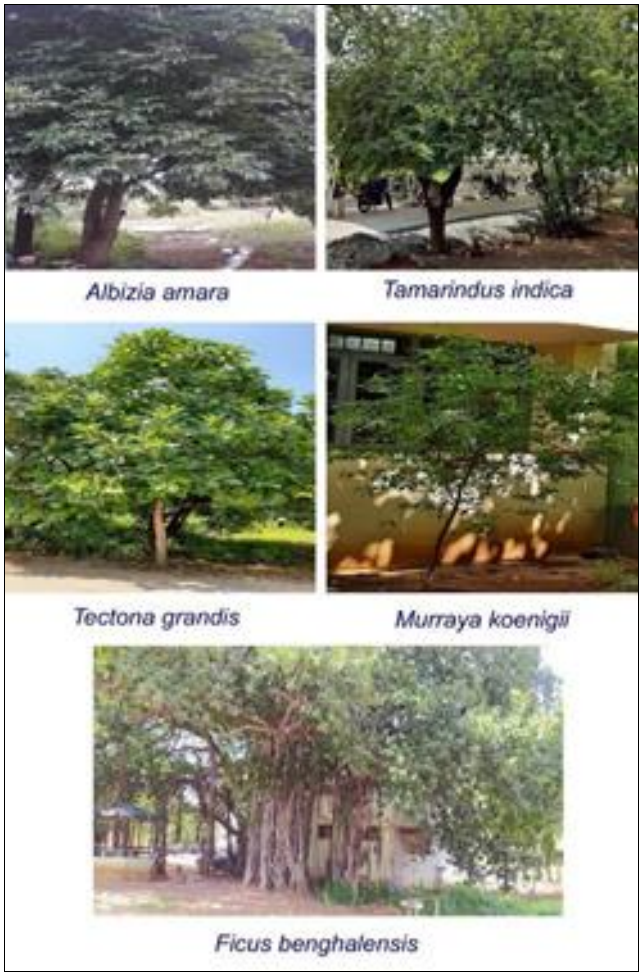

Plate 2: Important tree species identified in Sadakathullah Appa College Campus

Plate 3: Identified shrub species in college campus

Plate 4: Important ornamental plants in college campus

From the 39 families recorded in the study sites, the Rubiaceae had the highest number of genera (12) and species (17) followed by the Sterculiaceae with 6 species and 3 genera. A total of 82 genera were recorded in the study sites. *Cola* (Rubiaceae) were the most abundant genera with the highest number of species (4). This was followed by the genera *Strombosia* (Olacaceae) and *Vernonia* (Asteraceae) having 3 species each (B.A. Fonge *et al*. 2013) [2].

Top ten species rich families were *Asteraceae* (50, 64.10%), *Fabaceae* (27, 34.62%), *Lamiaceae* (25, 32.05%), *Poaceae* (18, 23.08%), *Solanaceae* (15, 19.23%), *Acanthaceae* (9, 11.34%), *Amaranthaceae* (8, 10.26%), *Cucurbitaceae* and *Rubiaceae* (7, 8.97%) each and *Brassicaceae* (6, 7.69%). The remaining families; *Apiaceae, Euphorbiaceae*, *Myrsinaceae*, *Polygonaceae*, *Ranunculaceae and Rosaceae* were (5, 6.41%) each; *Boraginaceae*, *Flacourtiaceae; Myrsinaceae* and *Oleaceae* (4, 5.13%) each; *Anacardiaceae, Asparagaceae, Buddlejaceae*, *Celastraceae, Cucurbitaceae, Malvaceae, Moraceae, Sapindaceae* and *Urticaceae* (3, 3.85%) each; *Asclepiadaceae*, *Balsaminaceae*, *Cactaceae*, *Cupressaceae*, *Rhmnaceae*, *Rutaceae*, *Tiliaceae* and *Verbenaceae* (2, 2.56%) (Zewdie Kassa *et al*. 2016) [14].

A total of 304 plant species belonging to 216 genera and 78 families were identified. About four major life forms were identified of which 165 (54.28%) of the species were herbs, 80 (26.32%) were shrubs, 43 (14.14%) were trees and the remaining 16 (5.26%) were climbers. Top five plant families with the highest percentages of the total recorded were Asteraceae 50 (64.10%), Fabaceae 27(34.62%), Lamiaceae 25(32.05%), Poaceae 18(23.04%) and Solanaceae 15 (19.23%). About 47.44% of the families were represented by more than one species and 52.56% of the families were represented by single species each accounting 1.28% of the total. Of the 55 families, the most dominant family is Euphorbiaceae with 13 species, followed by Asteraceae (12 species), Poaceae (9 species), Araceae (8 species), Arecaceae (7 species), Apocyanaceae (6 species), Acanthaceae, Amaranthaceae, Liliaceae with 5 species and remaining families with 1-4 species (C.K. Renukarya *et al*. 2015) [9].

Poaceae was reported as the dominant family, other main contributing families were Fabaceae, Solanaceae, Apocynaceae Euphorbiaceae and Asteraceae. The dominance of plants from Poaceae family in the study area indicates the harsh environmental conditions especially the water stress, because the species of Poaceae have made morphological, anatomical and physiological adaptations to overcome the drought conditions (Vasistha *et al*. 2010) [5, 13].

Poaceae was the most dominant family with 23 genera and 28 species, followed by Papilionaceae (13 genera and 20 species) and Asteraceae (12 genera and 12 species). The dominance of Poaceae in Kandi area may be due to the climatic and physiognomic conditions such as presence of low soil moisture and nutrient status (Manhas, R.K *et al*.2010) [13, 5].

Conclusion

The campus flora of an institution is a unique opportunity as an outdoor botanical and ecological learning for the campus community. The study found that the plants recorded from the campus area are economically very important. Some of them are medicinal value; some are ornamental value and few are edible. The documentation of plant is the only way to preserve the fundamental knowledge of the plant resources and it will be useful to the campus students for further research.

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References

1. Bentham G, Hooker JD. Genera Plantarum Reeve & Co., London, 1876, 1-3.
2. Fonge BA, Tchetcha DJ, Nkembi L. Diverity and distribution of plants in Lewoh-Lebang in the Lebialem highlands of southwestern Cameroon. International journal of biodiversity,2013:642579:1-13.
3. Gamble JS. Flora of the presidency of Madras, 1994, 1-10.
4. Bishen Singh Mahendra, Pal Singh, Dehradun, Kaur, Sharma. Diversity and Phytosociological Analysis of Tree Species in Sacred Groves of Vijaypur Block, Samba (J&K) Int. J.Sc and Res,2014:6:3:859-862.
5. Manhas RK, Singh L, Vasistha HB, Mridula Negi M. Diversity of protected ecosystems of Kandi region of Punjab, India New york Sci. J,2010:3(4):96-103.
6. Leadley P, Pereira HM, Alkemade R, Fernandez-Manjares JF, Proenca V, Scharlemann JPW *et al*. Biodiversity scenarios: Projections of 21st century change in biodiversity and associated ecosystem services. A Technical Report for the Global Biodiversity Outlook 3 CBD Technical Series No. 50, 2010.
7. Parthasarathy N, Ragasan AL, Muthumperumal C, Anbarashan M. Flora of Pondicherry University Campus. Puducherry, Pondicherry University Publication, 2010, 398.
8. Rao RR and Razi BA. A synoptic flora of Mysore district Today & Tomorrow's printers and publishers, New Delhi, 1981, 20- 22
9. Renukarya CK, Krishna Kumar HN, Jyoti Bala Chauhan. Studies on the flora of Mahajana PG campus. Journal of Scientific and Innovative Research,2015:4(5):207-212.
10. Reddyn B, RaonVH, RedynVB, RaonVV. Diversity and richness of herb species in Peddagattu, the proposed site for uranium mining, Nalgonda district, Telangana state, India. Global Journal of Multidisciplinary Studies,2014:11(3):197-204.
11. Sen M, Keshari KK. Green campus report. Directorate of Technical Education, 4th Floor, Satpura Bhawan Bhopal,2019:462004:1-4.
12. Kumar S, Sunita JS, Laura D, Singh N, Kudesia R. Phytodiversity on Campus of K.M. Government College Narwana, India. Int. J. Curr. Microbiol. App. Sci,2016:5(7):565-570.
13. Vasistha HB, Manhas RK, Singh L, Negi M, Sharma J. Impact of Disturbances on Biodiversity Status, Resource Availability and their Management for Sustainable Development in Kandi Area of Punjab. Punja Forest Department, Chandigarh, 2010.
14. Kassa Z, Asfaw Z, Demissew S. Plant diversity and community analysis of the vegetation around Tulu Korma project centre, Ethiopia. Tropical plant research international journal,2016:3(2):292-319.