



Ecotaxonomical Studies of Unexplored Vegetation of Barkatullah University Campus Area, Bhopal (M.P.)

Reena Upadhyay, Dr. Zia-ul-Hasan, Anjali Bhargava, Saba Naaz,
Reeta Tripathi

Department of Bioscience, Barkatullah University, Bhopal
Department of Botany Saifia Science College, Bhopal

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ABSTRACT

Since ancient time the awareness and practices of traditional knowledge in Indian medicine system is acceptable all over world, according to Biodiversity Board report concluded that India ranks top ten species rich Nations and show high endemism. (25 Feb. 2020). According to the Botanical survey of India. India is Home to more than 8000 species of Medicinal plants. The country has rich history of traditional healing system, many of which are used of these plants (25 Feb. 2020). Because Traditional medicine has been proven to be used in treating of various Harmful diseases. In 2006, researcher concluded that more than 70,000 number of plant species were being used in medicine system all over the world. The medicinal plants are useful for curing of Human diseases and play important role in healing process due to presence of various important phytochemicals Antioxidant, Flavanoids, Terpenoids etc. The present study was carried out in different location of Barkatullah University Campus area of Bhopal. Total 90 plant species identified, and collected during rainy season in 2011. All the plant species were collected from field area in flowering, fruiting and seed development stages.

Keywords: Biodiversity, endemism, medicinal plants, traditional phytochemicals, Seed development.

I. INTRODUCTION:

Biodiversity provides the basis for livelihood culture and enemies of several hundred millions of people conservation of biological diversity leads to conservation of essential diversity to preserve the continuity of food chain (Ranjan Kumar 2000). All around the globe different culture made use of plant that grow them for medicinal uses. Today number of plants that grow them today and number of plants that once were abundant are now sadly endangered because of human activities

deforestation, industrialization and urbanization and due to climate (Jain, 1981).

Dr. V. Divyakranti concluded in 2020, the world lost 258,000 Sqkm of forest an area layer than the United Kingdom according WRI's Global forest watch. Divyakranti (2020) "Drishti current affairs today" magazines Divyakranti Publication.

Mishra (2011) concluded in the paper that Safed musli (*Chlorophyllum borivillanum*) plant is Haebaceous medicinal plants largely collects for Musli tubers for commercial as well as medicinal properties. This plants scoring less marks under various ecological parameters indicate the condition of plant very poor in Bhopal forest division as per norms it fall under critically endangered category. According to WHO about 80% of populations of world depends on Traditional medicine using for primary healthcare (Dar, 2019). Herbal medicine are very effective and have no side effects on our body (Thokar et al., (2017).

Vegetation is complex in nature and its structure and composition differ from place to place because of varying climatic conditions and Topography (Singh 2006, Rasturi, 2012). Vegetation of large area of world remains poorly understood.

According to Eckholm (1978) more than 50% of Tropical rainforest have not been documented. A stress has been laid on preparation of flora of M.P. by Heweston (1951). Similar Research Work has been done by Nasir et al., (1999) preliminary survey of flora of Bhopal has been documented. Dr. Jain, S.K. (.....) worked on Taxonomy flora and threatened plants. His research work mainly on Grasses, Orchid plants, floristic studies of vegetation, endangered species, Medicinal plants, Ethanobotany, and Economic Botany. He also published New flora of India.

Ecological survey of Barkatullah University campus survey never been systematically investigated. Therefore aim of the paper prepare to



make a detailed Ecotaxonomical survey was carried out to analyze the structure, composition and diversity of Herbs, Shrubs, trees, climber plant species present in Barkatullah University Campus area.

Location of Study area :-

Bhopal district is situated in the central part of India M.P. and located on 23°16' North Latitude and 77°25' East longitude.

Barkatullah University campus covered 360 acres (1.5 m²) of land located only Jabalpur-Jaipur National Highway (NH-12) at a distance about 3 km.

University campus area rich of forest vegetation including herbs, shrubs, trees & climbers and home of vast collection of medicinal plants.

Climate:-

The climate of Bhopal is warm and temperate with cool dry winters and hot summer and Humid season. Total Annual Rainfall in Bhopal – 1146 mm (46 inches). Monsoon starts in late June and ends in Late September in this period about 12.3 inches of precipitation fall annually. May is warmest month of the year. The temperature in May averages – 33.8 °C. January is coolest month temperature averaging 17.8°C.

The proposed study was in Barkatullah University Campus area Bhopal with following objectives:-

- i) To identify and collect different plant vegetation including Herbs, shrubs, trees, climbers making permanent record for preservation of plant specimen in the field area.
- ii) All the plant collected species has been identified and categorized by Taxonomist or Expert person in the field.

- iii) To evaluate the various plants species distribution in field area.
- iv) To capture the photograph of each plant species and attach it with specimen.
- v) To evaluate vegetational analysis of different location of Barkatullah University Campus area.

II. MATERIALS & METHOD:-

According to forest survey of India. The total forest cover 12.01% including scrub vegetation. Total forest cover in Bhopal city 43719.31 Hectare. Total 10 sample points has been selected in campus area for studying the vegetational analysis of university campus area.

According to Mishra (2011) concluded through various field survey during the year and secondary data were collected various sources including forest development records, Flora of Bhopal, research papers, published and unpublished literature.

All the sample area of university campus were representative of most common forest type mixed deciduous forest.

For collecting of plants & species from field area quadrat method followed –

The Quadrat is square sample plot or unit for detailed analysis of vegetation. It is actually the sample plots of element (1898). The quadrat method is used for study forest community in different life forms Herbs, shrubs, trees. For vegetational analysis, quadrat of any size, number and arrangement has been used. For study of different type of plant species present in campus area.

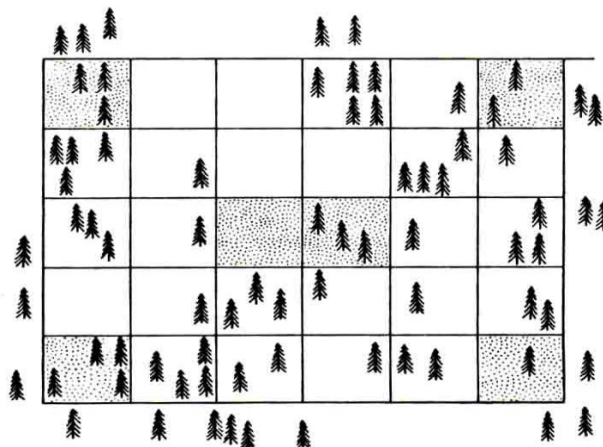


Fig. No.1 Quadrat sampling method for population estimation.



The plant species were collected in polythene bags, giving sample site, No. name of collected, plant species and these plant species has been identified with the help of flora, Research

papers, Flora of Bhopal, flora of Bentham and Hookers and others unpublished literature.

Similar research work has been done by Chauhan's (2018). Phytosociological Analysis of flora of Madhav National Park, Shivpuri (M.P.).

Table No.1

Tree Species

S.No.	Local Name	Species Name	Family
1.	Bottle brushes	<i>Callistemon species</i>	Myrtaaceae
2.	Jamun	<i>Syzygium cumini</i>	Myrtaaceae
3.	Guava	<i>Psidium guava</i>	Myrtaaceae
4.	Eucalptus	<i>Eucalptus denglupta</i>	Myrtaaceae
5.	Custard apple	<i>Annona squamosa</i>	Annonaceae
6.	Custard apple	<i>Annona reticulata</i>	Annonaceae
7.	Babool	<i>Acacia Arabica</i>	Fabaceae
8.	Shisham	<i>Dalbergia sisso</i>	Fabaceae
9.	Amaltash	<i>Cassia fistula</i>	Fabaceae
10.	Palash	<i>Butea monosperma</i>	Fabaceae
11.	Bael	<i>Agele marmelos</i>	Fabaceae
12.	Ashok tree	<i>Sarca asoca</i>	Fabaceae
13.	Panwar	<i>Cassia tora</i>	Fabaceae
14.	Kachnar	<i>Bahunia varigeta</i>	Fabaceae
15.	Imli	<i>Emerendus indica</i>	Fabaceae
16.	Australian babool	<i>Vachellia nilotica</i>	Fabaceae
17.	Gulmohar	<i>Delonix regia</i>	Fabaceae
18.	Lemon	<i>Citrus lemon</i>	Rutaceae
19.	Curry patta	<i>Murraya kenigii</i>	Rutaceae
20.	Orange	<i>Citrus sinensis</i>	Rutaceae
21.	Mahua	<i>Maduca longifolia</i>	Sapotaceae
22.	Mango	<i>Magnifera indica</i>	Anacardiaceae
23.	Kumbhi	<i>Careya arborea</i>	Combretaceae
24.	Arjuna	<i>Terminalia arjuna</i>	Combretaceae
25.	Mango	<i>Magnifera indica</i>	Anacardiaceae
26.	Karanj	<i>Pongomia pinnata</i>	Leguminaceae
27.	Ber	<i>Ziziphus jujube</i>	Rhamnaceae
28.	Shehtoot	<i>Morus nigra</i>	Moraceae
29.	Gular	<i>Ficus racemosa</i>	Moraceae
30.	Bargad or Banyan tree	<i>Ficus banghalensis</i>	Moraceae
31.	Peepal	<i>Ficus religiosa</i>	Moraceae
32.	Surjana	<i>Moringa oleifera</i>	Moringaceae
33.	Tendu plant	<i>Diospyros melanxylon</i>	Ebenaceae
34.	Papita	<i>Carica papaya</i>	Cariaceae
35.	Harsingar	<i>Nyctanthes arbortristis</i>	Oleaceae
36.	Sandal	<i>Santalum album</i>	Santalaceae
37.	Aamla	<i>Emblica officinalis</i>	Phyllanthaceae



38.	Champa	<i>Michelia champa</i>	Mangloiaceae
39.	Neeli gulmohar	<i>Jacaranda puberula</i>	Bignoniaceae
40.	Khajur	<i>Phoenix dactylifera</i>	Arecaceae

Table No.2

Shrubs

S.No.	Local Name	Species Name	Family
1.	Carondas	<i>Carissa carnadas</i>	Apocynaceae
2.	Jason or Gadhal	<i>Hibiscus rosa sinensis</i>	Apocynaceae
3.	Sadabahar	<i>Catharanthus roseus</i>	Apocynaceae
4.	Thorn apple	<i>Datura stramonium</i>	Solanaceae
5.	Madar	<i>Calotropis gigantea</i>	Asclepinaceae
6.	Paper flower	<i>Bougainvillea glabra</i>	Nyctaginaceae
7.	Wild sage	<i>Lantana camara</i>	Verbanaceae
8.	Cedar	<i>Thuja accidentalis</i>	Thujaceae
9.	Ixora species	<i>Ixora coccinea</i>	Rubiaceae
10.		<i>Bateria pritoris</i>	Ehretiaceae
11.	Henna	<i>Lawsonia intermeris</i>	Lyranthaceae
12.	Nirgundi	<i>Vitex negundo</i>	Vitaceae
13.	Marigold	<i>Tarqetes erecta</i>	Asteraceae
14.	Sarso	<i>Brassica compestris</i>	Brassicaceae
15.	Gokhru	<i>Pedaliium murex</i>	Acanthaceae
16.	Ratanjot	<i>Jatropha curcas</i>	Euphorbiaceae
17.	Gajar Ghas	<i>Parthenium hysterophorus</i>	Asteraceae
18.	Sarpgandha	<i>Rauwolfia serpentine</i>	Apocynaceae
19.	Tulsi	<i>Ocimum sanctum</i>	Laminaceae
20.	Pomegranate	<i>Punica granatum</i>	Lyranthaceae

Table – 3

S.No.	Taxa	No	Diacot plant	Monocot of plant
1.	Family	57	38 plant species	6 plant species
	Genus	-	-	-
2.	Species	-	71 plant species	7 plant species



Photograph of plant species shows Maximum frequency 80% shown by Five plant species in Barkatullah Campus area during Rainy Season.



Fig. (A)
Alternanthera Sessilis



Fig. (B)
Cynadon dactylon



Fig.(C)
Euphorbia hirta



Fig. (D)
Sida cordifolia



Fig. (E)
Tridax procumbens

Photograph of Plant species shows maximum density in Barkatullah University Campus area during Rainy Season



Bahunia variegata



Butea monosperma

Glorisa superb is species of flowering plant occurred in the family – Colchicaceae. Common name – family plant is a perennial tuberous climbing plant species flowering during month of November to March. This plant species observed in Barkatullah University campus area Bhopal. During the research work year 2011 to 13.

Plant is perennial herb growing as climbing species having modified leaf tip as a tendrils. The plant species mainly pollinated by butterflies and sunbirds. Plant mainly grown in area of Tropical jungles grows various types of climate.

Medicinal Value:

Flame lily has many type of phytochemical contents – colchicine, anthelmintic, gloriosine,

pungent bitter laxative etc. The plants is in great demand because used in various medicinal uses.

Colchicine is mostly used as one of best experimental tool in study of cell division, as it can reside Mitosis and induce polyploidy and has been used in the treatment of cancer.

Flamellity used in treatment of cholera, ulcers, arthritis, Snakebite, open wounds, kidney problem, itching, leprosy, hemorrhoids, small pox, cancer. This plants is great demand because used in cure of various diseases. Plant contain alkaloid rich sources long has been used as traditional Ayurvedic Medicine. This is the main reason for its decline in various parts of its native changes .





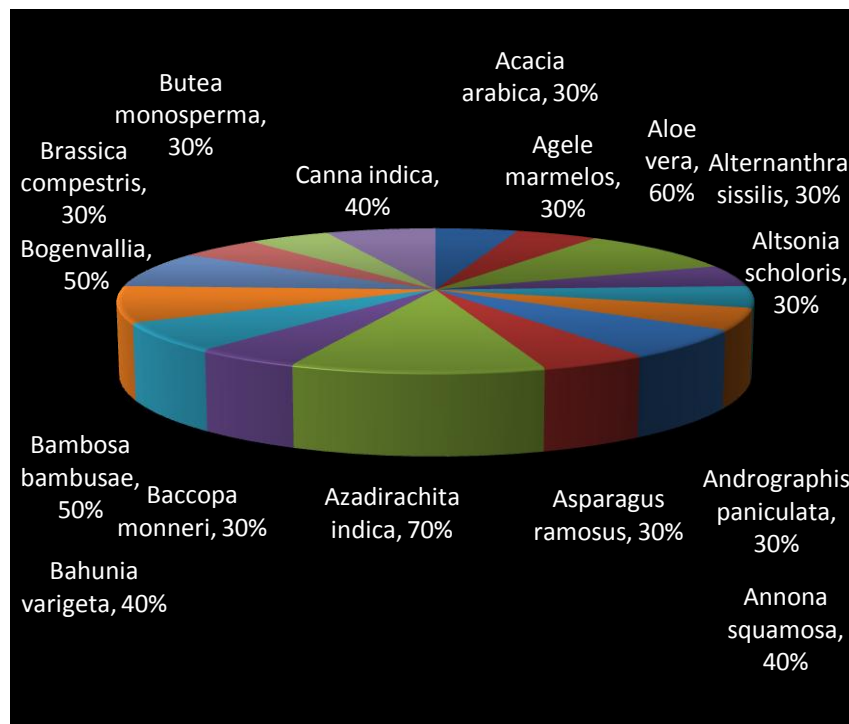
This research study shows total 94 plant species and 57 families were reported for survey of university campus area.

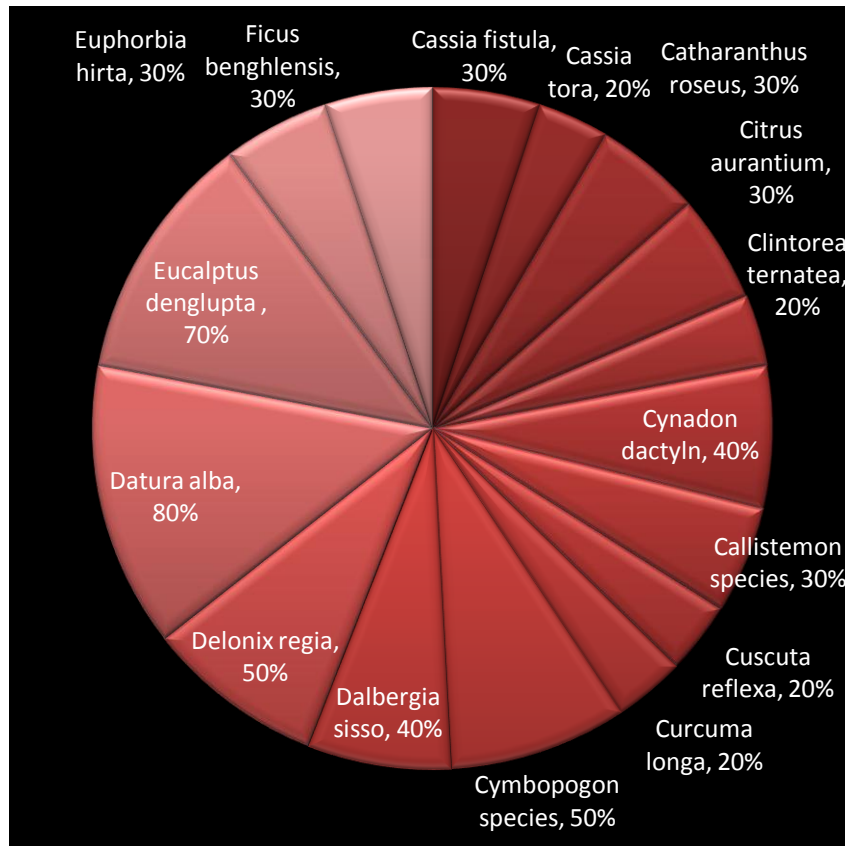
Fabaceae was dominant family recorded under present investigation. Author observed 11 genera of family fabaceae from field area survey.

Present research work has been done ecotaxonomic studies including quantitatively analyzed the diversity

of flora of Barkatullah University campus area and their relative density, relative frequency and relative dominance.

Plant species collected in the field of Barkatullah University campus area for calculating Frequency, Density, Abundance during Summer season (March - April 2012 – 2013)





III. RESULT AND DISCUSSION:

Ecotaxonomy means linking taxa with trails and integrating taxonomical and ecological research. Because there is Ecological factor play important role in distribution of various Taxa in environment. In ecotaxonomy we study various ecological parameters which effect on distribution of plant species in environment. These parameter will be helpful in Ecological and conservational studies based on distribution of various taxa.

In Ecotaxonomic studies of an area includes studied various ecological traits – Density, Frequency and abundance of various plants species observed in campus area of Bhopal city. On the basis of field survey has been conducted during

2011 to 2013 in different study sites of Barkatullah University campus area. The total 257 plant species has been reported in campus area – In rainy season 92 plant species in winter season – 85, In summer season – 80 plant species including herbs, shrubs trees species.

Vegetation of campus area observed total 47 trees, 20 herbs, 20 shrubs, 2 climbers, 3 grass species observed from field area. Total families – 57 families has been reported from campus area. Diacot plant species – 38 families and 71 plant species and Monocot plant species – 6 families 7 plant species. The ecotaxonomic studies of university campus area included quantitative analysis of field area.

$$IVI = \text{Relative Density} + \text{Relative frequency} + \text{Relative Dominance}$$

$$\left(\text{Relative Density} = \frac{\text{Density value of species}}{\text{Value of species}} \times 100 \right)$$

$$\text{Relative frequency} = \frac{\text{Frequency value of species}}{\text{Sum of frequency value of all species}} \times 100$$

$$\text{Relative dominance} = \frac{\text{Total basal area of species}}{\text{Total basal area of all species Biodiversity}} \times 100$$

On the basis of present investigation concluded that during the field survey fabaceae

family – Top list of families including 10 plants while Apocynaceae – 5 plants, Myrataceae 3 plant



species observed in Barkatullah University campus area.

In Rainy season maximum frequency shows 80% sows by five plant species *Altenhtra sessilis*, *Cynodon dactyln*, *Euphorbia hirta*, *Sida cordifolia*, *Tridax procombens*, *Butea monosperma*.

Minimum frequency 20% by 10 plant species documented from different sites of Barkatullah University campus area in Rainy season.

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