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Study of Floristic Diversity and Geotagging of Government Vidarbha Institute of Science and Humanities, Amravati (Maharashtra)

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ABSTRACT

An investigation for documentation of diversity of angiosperms in Government Vidarbha Institute of Science and Humanities, Amravati campus survey was carried out in rainy season in the month of June and July 2021. Annual and perennial wild and cultivated plants identified by using standard floras and documented GVISH campus region by using geotagging tool. In all 46 herbs, 24 shrubs, 20 climbers and 52 tree species identified. Among, total 142 plants, maximum plants (25) from the family fabaceae with highest frequency percent (17.61). After Fabaceae followed by families like apocynaceae (5.63%), euphorbiaceae (4.93%), malvaceae (4.23%), acanthaceae (4.23%), arecaceae (4.23%), myrtaceae (3.52%), lamiaceae (3.52%), moraceae (3.52%) and asteraceae (2.82); while all other families contribute only 1 or 2 percent in the regional diversity. Study is useful for recognition of plant species in the Institute campus and to retrieve details of their exact position.

Keywords: Diversity, Angiosperms, Documentation, Geotagging, Wild, Cultivated etc.

I. INTRODUCTION

From the very beginning of time, man has relied on plants to fulfil his needs. Besides the three basic needs i.e. shelter, food, clothing, plants have given much more to man through the ages and still providing. Soon after origin, man has realized that his mere existence is wholly depends on plants as only they can generate molecular oxygen for human breathing thereby responsible for human survival and development. Survival of three key living factors in environment (plants, animals and microorganisms) is utmost necessary for human survival as they recreate quality of air, water and even soil. These reasons add up to a long list for why we should concern about ongoing destruction of biodiversity. Since the UN Conference of Environment and Development (UNCED) held at Rio de Janiero (June 1992), global realization about importance of biodiversity for human survival and need for its conservation is increasing day-by-day (McCammon, 1992). Greatest range of altitude, rainfall, climate, temperature and topographic factors that we have in India, is responsible for having the diversity of living organisms like no other country in the world.

To conserve such a huge biological diversity of plants, it is necessary that everyone should join hands in order to locate, identify and conserve the plant species in its natural habitat. In recent years along with identification, location of plant habit also gained importance as it gives information about its original place (place of origin) which can help to retrieve

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migration information. A new tool of geotagging is found to be suitable for this purpose. Mapping the presence of particular species in an area usually helps to augment species distribution data. Nowadays with modernization of science and technology, taxonomist usually geotagged photos in order to share location; also to comment on environmental factors (soil, climate, animal interaction) in the area where plant resides. The present work attempts to highlight the diversity of vast plant resources of the college campus in a conservation perspective. Present attempt concerns with documenting floristic diversity of campus with respect to habit (herbs, shrubs and trees), location (in latitudes and longitudes by geotagging) and family.

II. MATERIALS AND METHODS

Present investigation carried out in Government Vidarbha Institute of Science and Humanities (former VMV College) which is located in the prime location of the Amravati city. It has a set of beautiful buildings along with a playground and Gardens situated over the 167 acres of a piece of a land. The study area has well demarcated four seasons as a hot summer, heavily raining monsoon, a brief autumn and a mild winter. The area has sub-tropical climatic conditions with ample rainfall in the monsoon resulting in a rich diversity of vascular plants. In present investigation, campus of Govt. Vidarbha Institute of Science and Humanities was survey conducted for plant diversity for two successive months – June and July. Plants identified based on their habits, vegetative characters and floral patterns by using standard floras like Cook (1908) and Naik (1998). Species were categorized as per their habits – herbs (or undershrub's), shrubs, trees and climbers. All the plants were geotagged by using GPS Map Camera app to locate them in the campus.

III. RESULTS AND DISCUSSIONS

During the study, it was observed that campus of Institute is literally flooding with diversity of plants during this season. Along with perennial species, many annual herbs, climbers and shrubs found to be growing vigorously. Their habit wise diversity tabulated in following tables (Table I, II, III and IV) –

Table I: Diversity of Herbs (or undershrubs)

Plant Name	Family	Geographical Location (Latitude, Longitude)	Plant Name	Family	Geographical Location (Latitude, Longitude)
Sida rhombifolia L.	Malvaceae	20.953833o, 77.754167o	Cyperus alternifolius L.	Cyperaceae	20.953963o, 77.753893o
Cymbopogon citratus Dc.	Poaceae	20.953832o, 77.754099o	Pistia stratiodes L.	Araceae	20.953963o, 77.753893o
Cassia obtusifolia L.	Fabaceae	20.953832o, 77.754099o	Cymbopogon sps. L.	Poaceae	20.953963o, 77.753893o
Indigofera cordifolia L.	Fabaceae	20.953998o, 77.753816o	Mimosa pudica L.	Fabaceae	20.953963o, 77.753893o
Tridax procumbens L.	Asteraceae	20.95358o, 77.755006o	Hydrilla sps. L.	Hydrocharitaceae	20.953963o, 77.753893o
Achyranthus aspera L.	Amaranthaceae	20.95358o, 77.755006o	Chlorophytum tuberosum	Asparagaceae	20.955495o, 77.755872o

			(Roxb.)		
Sida glutinosa Cav.	Malvaceae	20.954336o, 77.755466o	Scilla indica L.	Asparagaceae	20.955495o, 77.755874o
Polygala erioptera L.	Polygalaceae	20.953998o, 77.753816o	Ruellia tuberosa L.	Acanthaceae	20.955432o, 77.755862o
Salvia coccinea Caba.	Lamiaceae	20.953963o, 77.753893o	Sida acuta Burm. f.	Malvaceae	20.956663o, 77.7541o
Cyperus rotundus L.	Cyperaceae	20.953832o, 77.754099o	Acalypha sps. L.	Euphorbiaceae	20.955285o, 77.753239o
Tradescantia palliada L.	Commelinaceae	20.953832o, 77.754099o	Digera muricata (L.) Mart.	Amaranthaceae	20.954856o, 77.752917o
Acalypha indica L.	Euphorbiaceae	20.953013o, 77.758931o	Tradescantia spathacea Sw.	Commelinaceae	20.95445o, 77.752995o
Lagascea mollis Cav.	Asteraceae	20.954521o, 77.756557o	Indigofera linifolia L.	Fabaceae	20.955285o, 77.753239o
Euphorbia geniculata Ort.	Euphorbiaceae	20.953013o, 77.758931o	Euphorbia hirta L.	Euphorbiaceae	20.95445o, 77.752995o
Cassia uniflora L.	Fabaceae	20.954932o, 77.756051o	Commelina benghalensis L.	Commelinaceae	20.95445o, 77.752995o
Martynia annua L.	Martyniaceae	20.954521o, 77.756557o	Biophytum senstivum L.	Oxalidaceae	20.953559o, 77.753081o
Cleom sps. L.	Cleomaceae	20.954798o, 77.756161o	Turnera ulmifolia L.	Passifloraceae	20.955592o, 77.755043o
Tephrosia purpurea L.	Fabaceae	20.954556o, 77.756513o	Hymenocallis littoralis Herb.	Amaryllidaceae	20.955607o, 77.755028o
Hyptis suaveolens L.	Lamiaceae	20.955285o, 77.753239o	Parthenium hysterophorus L.	Asteraceae	20.954564o, 77.757715o
Nymphaea sps. L.	Nymphaeaceae	20.955592o, 77.755043o	Cassia tora L.	Fabaceae	20.953948o, 77.757684o
Kalanchoe sps. Adans.	Crassulaceae	20.955607o, 77.755028o	Impatiens balsamina L.	Balsaminaceae	20.954368o, 77.757615o
Cosmos sulphurius Cav.	Asteraceae	20.955592o, 77.755043o	Enicostema axillaris (Lam.)	Gentianaceae	20.95434o, 77.757598o
Zephyranthes citrina Herb.	Amaryllidaceae	20.955592o, 77.755043o	Boerhaavia diffusa L.	Nyctaginaceae	20.956107o, 77.755696o

Table II : Diversity of Shrubs

Plant Name	Family	Geographical Location (Latitude, Longitude)	Plant Name	Family	Geographical Location (Latitude, Longitude)
Caesalpinia pulcherima L.	Fabaceae	20.955985°, 77.755624°	*Lantana camara* L.	Verbenaceae	20.9543838°, 77.75319°
Thevetia peruviana (Pers.)k.	Apocynaceae	20.956107°, 77.755696°	*Hibiscus rosa-sinensis* L.	Malvaceae	20.953832°, 77.754099°
Galphimia gracilis hort.ex.	Euphorbiaceae	20.955592°, 77.755043°	*Vitex negundo* L.	Lamiaceae	20.953963°, 77.753893°
Ixora coccinea L.	Rubiaceae	20.955592°, 77.755043°	*Barleria prionitis* L.	Acanthaceae	20.953961°, 77.757672°
Pentas lanceolata Benth.	Rubiceae	20.955592°, 77.755043°	*Bougainvillea spectabilis* L.	Nyctaginaceae	20.956231°, 77.753791⁰
Euphorbia mili L.	Euphorbiaceae	20.955592°, 77.755043°	*Jasminum sambac* L.	Oleaceae	20.956284°, 77.75378°
Asystacia dalzelliana Santapau	Acanthaceae	20.955592°, 77.755043°	*Murraya paniculata* L.	Rutaceae	20.956231°, 77.753791⁰
Ziziphus sps. L.	Rhamnaceae	20.95358°, 77.755006°	*Duranta repens* L.	Verbenaceae	20.956284°, 77.75378°
Bauhinia sps. L.	Fabaceae	20.954325°, 77.755469°	*Hamelia patens* (Jacq) pers.	Rubiaceae	20.953963°, 77.753893°
Hiptage benghalensis (L.) Kurtz.	Malphighiaceae	20.953963°, 77.753893°	*Agave sps.* L.	Agavaceae	20.953832°, 77.754099°
Nerium oleander L.	Apocynaceae	20.953832°, 77.754099°	*Eranthemum nervosum* (Vahl) R.	Acanthaceae	20.953963°, 77.753893°
Jatropha panduraefolia L.	Euphorbiaceae	20.953963°, 77.753893°	*Justicia sps.* L.	Acanthaceae	20.953963°, 77.753893°

Table III: Diversity of Climbers

Plant Name	Family	Geographical Location (Latitude, Longitude)	Plant Name	Family	Geographical Location (Latitude, Longitude)
Trichosanthes cucumerina L.	Cucurbitaceae	20.953324°, 77.754757°	*Coccinea indica* L.	Cucurbitaceae	20.955289°, 77.755916°
Ipomoea dissecta (Jacq.)	Convolvulace	20.95401°,	*Rhynchosia*	Fabaceae	20.954564°

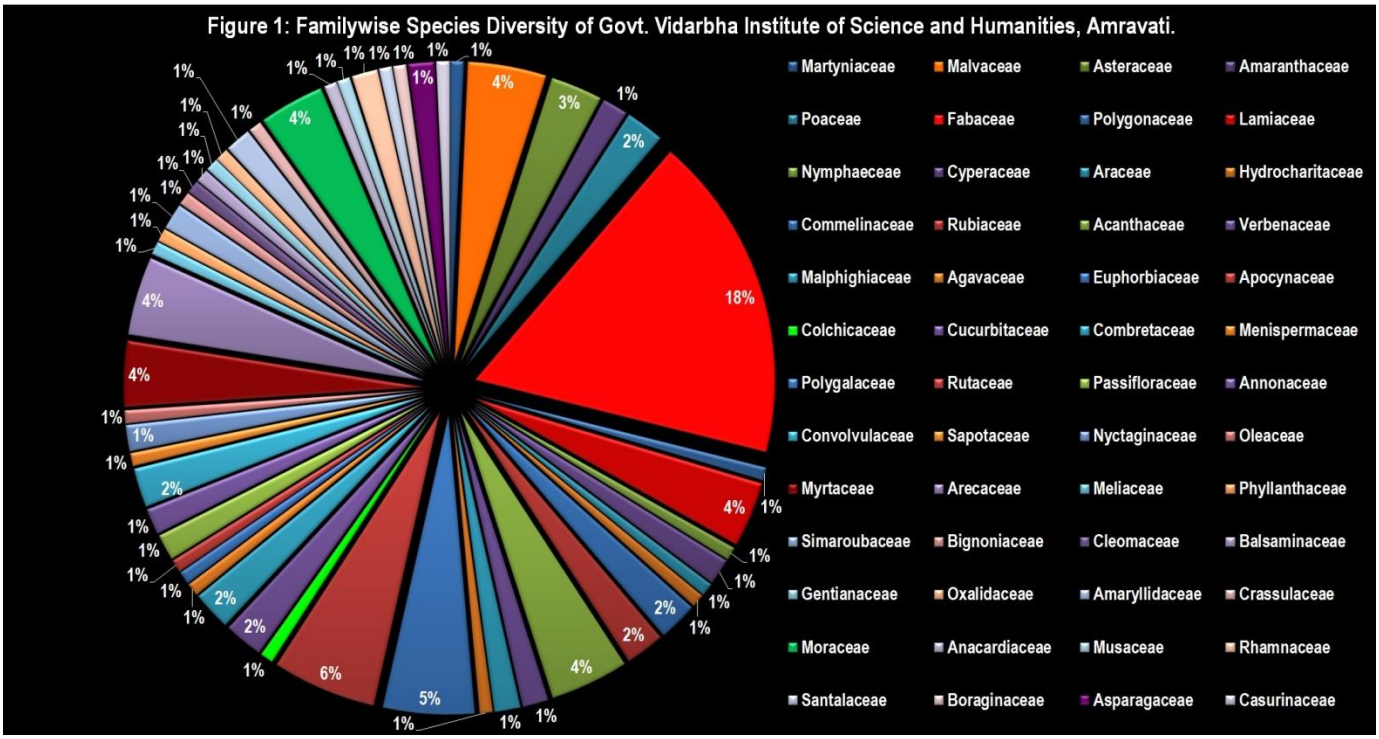
	ae	77.753828°	*minima* L.		, 77.757715°
Diplocyclos palmatus L.	Cucurbitaceae	20.95401°, 77.753828°	*Telosma palliada* L.	Apocynaceae	20.954525° , 77.755532°
Stigmaphyllon emarginatum (Cav.)	Malphighiaceae	20.95401°, 77.753828°	*Ipomoea quamoclit* L.	Convolvulaceae	20.955383° , 77.755838°
Quisqualis indica L.	Combretaceae	20.953963°, 77.753893°	*Eucalyptus sps.* L.	Myrtaceae	20.956284° , 77.75378°
Crotolaria sps. L.	Fabaceae	20.953963°, 77.753893°	*Argyreia nervosa* (Burm. f.)	Convolvulaceae	20.956159° , 77.755734°
Clitoria ternatea L.	Fabaceae	20.953832°, 77.754099°	*Mucuna pruriens* (L.) Dc.	Fabaceae	20.953832° , 77.754099°
Passiflora foetida L.	Passifloraceae	20.953873°, 77.754185°	*Tinospora cordifolia* L.	Menispermaceae	20.953832° , 77.754099°
Gloriosa superba L.	Colchicaceae	20.955592°, 77.755043°	*Vallaris solancea* Roth	Apocynaceae	20.953832° , 77.754099°
Antigonon leptopus Hook. and Arn.	Polygonaceae	20.955289°, 77.755916°	*Thunbergia laevis* Wall. Ex	Acanthaceae	20.953963° , 77.753893°

Table IV: Diversity of Trees

Plant Name	Family	Geographical Location (Latitude, Longitude)	Plant Name	Family	Geographical Location (Latitude, Longitude)
Carissa carandas Wt. Icon. t.	Apocynaceae	20.953963°, 77.753893°	*Delonix regia* (Hook.) Raf.	Fabaceae	20.954325° , 77.755469°
Peltophorum pterocarpum (Dc.)	Fabaceae	20.95398°, 77.753813°	*Plumeria alba* L.	Apocynaceae	20.954557° , 77.755696°
Pongamia pinnata L.	Fabaceae	20.953959°, 77.753885°	*Santalum album* L.	Santalaceae	20.954594° , 77.755706°

Azadirachta indica A. Juss.	Meliaceae	20.95401°, 77.753828°	*Cassia siamea* L.	Fabaceae	20.954525°, 77.755532°
Bauhinia purpurea L.	Fabaceae	20.953998°, 77.753816°	*Dendrocalamus strictus* Nees	Poaceae	20.955182°, 77.756043°
Ficus benghalensis L.	Moraceae	20.953271°, 77.754803°	*Tectona grandis* L. f.	Lamiaceae	20.95522°, 77.755987°
Mangifera indica L.	Anacardiaceae	20.953963°, 77.753893°	*Bombax ceiba* L.	Malvaceae	20.955571°, 77.755976°
Artocarpus heterophyllus Lam.	Moraceae	20.953963°, 77.753893°	*Madhuca indica* L.	Sapotaceae	20.955623°, 77.756001°
Coripha elata Roxb.	Arecaceae	20.956107°, 77.755696°	*Terminalia arjuna* (Roxb.)	Combretaceae	20.955623°, 77.756001°
Ficus carica L.	Moraceae	20.953963°, 77.753893°	*Hardwickia binata* Roxb.	Fabaceae	20.955623°, 77.756001°
Musa paradisiaca L.	Musaceae	20.953963°, 77.753893°	*Livistona australis* (R.Br.)	Arecaceae	20.956107°, 77.755696°
Zizyphus mauritiana Lamk.	Rhamnaceae	20.953832°, 77.754099°	*Roystonia regia* Kunth	Arecaceae	20.956284°, 77.75378°
Ficus elastica L.	Moraceae	20.953963°, 77.753893°	*Callistemon sps.* Curtis	Myrtaceae	20.956278°, 77.753765°
Caryota urens L.	Arecaceae	20.953832°, 77.754099°	*Polyalthia longifolia* (Sonn.)	Annonaceae	20.956663°, 77.7541°
Albizzia lebbeck L.	Fabaceae	20.953832°, 77.754099°	*Phoenix sylvestris* (L.) Roxb.	Arecaceae	20.956159°, 77.755734°
Ficus religiosa L.	Moraceae	20.954289°, 77.753229°	*Terminalia catappa* L.	Combretaceae	20.956663°, 77.7541°
Mascarena lagenicaulis L.H.Bailey	Arecaceae	20.956159°, 77.755734°	*Psidium guajava* L.	Myrtaceae	20.956663°, 77.7541°
Pithecellobium dulce (Roxb.) Benth.	Fabaceae	20.953359°, 77.754766°	*Phyllanthus emblica* L.	Phyllanthaceae	20.95445°, 77.752995°
Tectona gradis L. f.	Lamiaceae	20.956278°,	*Tamarindus*	Fabaceae	20.953584°

		77.753765°	*indica* L.		, 77.753077°
Gliricidia sepium (Jacq.)	Fabaceae	20.954131°, 77.757294°	*Annona squamosa* L.	Annonaceae	20.954383 8°, 77.75319°
Millingtonia hortensis L.	Bignoniaceae	20.953185°, 77.758673°	*Simarouba glauca* DC.	Simaroubace ae	20.956159° , 77.755734°
Cassia fistula L.	Fabaceae	20.954261°, 77.756865°	*Eucalyptus globulus* L.	Myrtaceae	20.956107° , 77.755696°
Ailanthus excelsa (Roxb.)	Simaroubacea e	20.95417°, 77.755366°	*Casurina eqisettifolia* L.	Casurinacea e	20.956159° , 77.755734°
Syzigium cumini L.	Myrtaceae	20.956107°, 77.755696°	*Butea monosperma* (Lam.)	Fabaceae	20.953559° , 77.753081°
Alstonia scholaris L.	Apocyanaceae	20.953013°, 77.758931°	*Morinda citrifolia* L.	Apocynacea e	20.956107° , 77.755696°
Cordia dichotoma G. Forst.	Boraginaceae	20.953584°, 77.753077°	*Ceiba petandra* L.	Malvaceae	20.956107° , 77.755696°



Data recorded for habit wise distribution of different species (Table I to Table IV) have analyzed further to calculate total number of species belongs to same family. Familywise distribution of different species in campus was studied and frequency of each family (ratio of number of observed species belongs to same family to total number of species reported in whole campus area) was calculated (Table V and Figure 1). As family Fabaceae has maximum species diversity (17.61), it is the most dominant family in the campus. After fabaceae, families like apocynaceae (5.63%), euphorbiaceae (4.93%), malvaceae (4.23%), acanthaceae (4.23%), arecaceae (4.23%), myrtaceae (3.52%), lamiaceae (3.52%), moraceae (3.52%) and asteraceae (2.82) shows species richness in decreasing order respectively. All other families comprise one, two or three members in the regional diversity.

Table V : Familywise Species Diversity of Govt. Vidarbha Institute of Science and Humanities, Amravati

Family	Sp.D.	F%	Family	Sp.D.	F%	Family	Sp.D.	F%
Martyniaceae	1	0.70	Euphorbiaceae	7	4.93	Phyllanthaceae	1	0.70
Malvaceae	6	4.23	Apocynaceae	8	5.63	Simaroubaceae	2	1.41
Asteraceae	4	2.82	Colchicaceae	1	0.70	Bignoniaceae	1	0.70
Amaranthaceae	2	1.41	Cucurbitaceae	3	2.11	Cleomaceae	1	0.70
Poaceae	3	2.11	Combretaceae	3	2.11	Balsaminaceae	1	0.70
Fabaceae	25	17.61	Menispermaceae	1	0.70	Gentianaceae	1	0.70
Polygonaceae	1	0.70	Polygalaceae	1	0.70	Oxalidaceae	1	0.70
Lamiaceae	5	3.52	Rutaceae	1	0.70	Amaryllidaceae	2	1.41
Nymphaeceae	1	0.70	Passifloraceae	2	1.41	Crassulaceae	1	0.70
Cyperaceae	2	1.41	Annonaceae	2	1.41	Moraceae	5	3.52
Araceae	1	0.70	Convolvulaceae	3	2.11	Anacardiaceae	1	0.70
Hydrocharitaceae	1	0.70	Sapotaceae	1	0.70	Musaceae	1	0.70
Commelinaceae	3	2.11	Nyctaginaceae	1	1.41	Rhamnaceae	2	1.41
Rubiaceae	3	2.11	Oleaceae	1	0.70	Santalaceae	1	0.70
Acanthaceae	6	4.23	Myrtaceae	5	3.52	Boraginaceae	1	0.70
Verbenaceae	2	1.41	Arecaceae	6	4.23	Asparagaceae	2	1.41
Malphighiaceae	2	1.41	Meliaceae	1	0.70	Casurinaceae	1	0.70
Agavaceae	1	0.70	**Sp.D. – Species Diversity, F% - Frequency percent**					

Many workers earlier documented species diversity of certain areas. Dhore (1986) documented flora of Amravati district (especially tree species) in his doctoral work. Hazarika et al. (2010) documented ecology and food plants of area Bos frontalis (Mithun) present in Arunachal Pradesh. Similarly Krishnamurthy et al. (2016) documented plant knowledge of ethnic Communities of Eastern Ghats and Adjacent Deccan Region in their book "Ethnobotany of India". Many workers including Tamang and Chapagain (2016), Aung et al. (2020), Huang (2011), Joshi and Joshi (2009) documented diversity of plants from several regions like botanical gardens of Makwanpur (Nepal), southeast Asia, China, wetlands of Kathmandu and Pokhara valleys etc. Several genetically similar species inhibits morphologically distinct traits due to climatic and topographic variations (ecads or ecophenes). These habitat wise variations may arise in species possessing

genetically similar stock and can be recognized by documenting them.

IV. CONCLUSIONS

Documentation of species resides in particular area helps to locate species and its geographical distribution. In present study, about 142 plants were documented belongs to 52 different families. Most of them are trees (52) and herbs (46); while shrubs (24) and climbers (20) also showed considerable diversity. Among these, fabaceae found to have maximum species richness followed by apocynaceae, euphorbiaceae, malvaceae, acanthaceae, arecaceae, myrtaceae, lamiaceae, moraceae and asteraceae family in Institute campus. Geotagging species in addition to their residence in particular area help to recognize morphological changes among genetically similar species and their reasoning by study of their specific habitat in that area. Present study is very helpful to recognize diversity of different species in the campus and to locate their exact position. Besides, these ever year there is need to survey for any addition of loss of plant species with respect to ecological condition to maintain floristic diversity of GVISH, campus.

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