

On campus Phyto-Diversity at Guru Kashi University, Talwandi Sabo, Punjab

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ABSTRACT

Intensive field survey on phyto-diversity was conducted at Guru Kashi University, Talwandi Sabo, Punjab, from June 15 to 31st October, 2017. Thorough surveillance was carried out in all areas at the university campus. The plant samples were collected for the purpose of setting up herbarium in the department of Botany. For identification, whole plants of various herbs were taken, where as in the case of plants and trees, only the branches and floral parts were picked up for identification purposes. After completely drying all plant samples, the specimens were pasted on white herbarium sheets. The collection was protected from unwanted infestation of pests and fungal pathogens by using 1% mercuric chloride and naphthalene bolls in the sheets. All plants were identified by using on line resources and by obtaining expert advice from plant taxonomists of PAU, Ludhiana and HPAU, Palampur (HP). The specimens were labeled using common name, botanical name and family. Growth habits and other pertinent characteristics of plants and trees were documented as per information available in literature. All trees and majority of shrubs on campus were labelled with permanent name tags. The total number of plant species were recorded and the data revealed a homogenous and heterogeneous floristic composition at the university campus. A number of species of angiosperms were recorded and some of them were gymnosperms. More herbaceous genera comprising several shrubs and trees, were also documented. The information reported here in this article is of paramount significance for researchers, involved in studying and planning of sustainable utilization of phyto diversity resources.

Key Words: Phytodiversity, Surveillance ,Herbarium, Sustainable Utilization

I INTRODUCTION

The diversity of plant species in a particular area develops an interest to know more about it. India is one amongst the several countries having mega diversity of plants, where 23.8% of its geographical area is covered with forests. Plants are well known for fulfilling basic needs of humans like food, clothes and shelter. Various types of plants and shrubs had been in use for cattle feed and medicinal purposes from ancient times of civilization. Because of the

health and economic benefits of plants to human life, their sustainability and conservation have become necessary through long term planning, documentation and identification of plants. Large geographical area and climatic variations of India are the other contributing factors to plants diversity and their habitats.

The distribution of plants in different parts of India, depends on their genetic makeup and environmental factors such as temperature, water and other edaphic factors of soil (Curtis et. al., 1956; Phillips,1959; Misra, 1968). Phyto-diversity is the most important feature, playing vital role in complexity of natural ecosystems. The present study is an effort of intensive surveillance to know the extent and distribution of plants and trees in Guru Kashi University, covering more than 50 acres of land. Main objective of the study was, of course, to exploring diversity of plants and their sustainability in utilization. The findings are expected to prove useful to explore the possibility of producing bio-petrol, Ethnobotanicals and medico-tech information.

II MATERIALS AND METHODS

The field survey on phyto-diversity was conducted at Guru Kashi University, Talwandi Sabo, Punjab, from June 15 to 31st October, 2017. The work was done in all colleges of university in their respective zones. Plant samples were collected and were got dried by keeping between paper folding. The dried specimens of plants were pasted on the herbarium sheets (Jain and Rao, 1977). The collection was protected from unwanted infestation of pests and fungal infection by using 1% mercuric chloride and naphthalene bolls in the sheets. All plants were identified by using on line resources and by obtaining expert advice from plant taxonomists of PAU, Ludhiana and HPAU, Palampur. The specimens were labeled using common name, botanical name and family. All plants specimens of the project are available in the department of botany, university college of agriculture ,GKU.

The work was accomplished in two phases-

- a) Visiting fields several times in and around the university campus with to obtaining information regarding identification and classification of plants, trees and shrubs. Plants were identified using taxonomical, morphological and anatomical techniques. The plants were described on the basis of growth habits and other characters. The extent and variation of plant diversity was studies *in situ*.
- b) Pyto-taxonomy and classification: The plant samples were identified in the laboratory and library, using on line resources and books on plant taxonomy (Hooker, 1875; Jain, 1977; Bhandari, 1978; Meenakshi, 1985; Manhas, 2010).

Table.1. List of plants species at GKU

S.No	Botanical name	Common name	Family	Habit(s)
1.	Ficus benjamina Linn	Weeping fig	Moraceae	Tree
2.	Ficus religiosa Linn	Peepal	Moraceae	Dry season-deciduous or semi-evergreen tree
3.	Ficus benghalensis	Banyan	Moraceae	Tree
4.	Polyalthia longifolia	Ashoka	Annonaceae	Evergreen tree
5.	Alstonia scholaris	Blackboard tree,	Apocynaceae	Evergreen tropical Tree
6.	Cassia fistula Linn.	Golden rain tree	Fabaceae	deciduous, landscape, ornamental Tree
7.	Mangifera indica L.	Mango	Anacardiaceae	Deciduous, Fruit tree
8.	Phyllanthus emblica L.	Amla	Phyllanthaceae	Deciduous tree
9.	Terminalia arjuna (Roxb.) Wight & Arn	Arjuna	Combretaceae	Landscaping Tree, medicinal use
10.	Eucalyptus citriodora Hook.	Eucalyptus	Myrtaceae	Tree, industrial use, paper industry, flowers rich nector source for bees
11.	Azadirachta indica A.Juss.	Neem	Meliaceae	Evergreen Tree
12.	Melia azedarach Linn.	Indian lilac	Meliaceae	Deciduous Tree
13.	Dalbergia sissoo(Roxb.)DC	Shisham	Fabaceae	Deciduous Tree
14.	Oreodoxa regia Kunth Syn.	Bottle plant	Arecaceae	Tree

	Roystonea regia (Kunth) O.F. Cook			
15.	Syzygium cumini (L.)skeels.	Black plum	Myrtaceae	Tree
16.	Acacia nilotica (Linn.) Willd.	Babool	Fabaceae	Tree
17.	Prosopis juliflora(Sw.) DC.	Kikkar	Fabaceae	Deciduous Tree
18.	Prosopis cineraria (Linn.) Druce	Shami,	Fabaceae	Shrubs
19.	Zizyphu zujuba Mill.	Ber	Rhamnaceae	Shrubs
20.	Albizzia lebbeck	Sirin	Fabaceae	Tree
21.	Nyctanthes arbortristis (Linn.) Willd	Parijat	Oleaceae	Shrub
22.	Ailanthus excels Roxb.	Indian Tree of Heaven,	Simaroubaceae	Tree
23.	Morus alba Linn.	mulberry	Moraceae	Deciduous in temperate, evergreen in tropical region Tree
24.	Adhatoda vasica Linn.	Malabar nut	Acanthaceae	Shrub
25.	Ageratum conyzoides Linn.	Chick weed,	Asteraceae	Herb
26.	Aloe barbadensis Linn.	Aloevera	Liliaceae	Herb

27.	<i>Asparagus racemosus</i> Willd	Shatavari	Liliaceae	Herb
28.	<i>Calotropis procera</i> (Ait.) R.Br.	Apple of Sodom	Asclepiadaceae	Shrub
29.	<i>Catharanthus roseus</i> (L.) G. Don..	Periwinkle	Apocynaceae	Herb
30.	<i>Coleus forskohlii</i> Auct.	Indian coleus,	Lamiaceae	Herb
31.	<i>Cynodon dactylon</i> (Linn.) Pers	Indian doob	Poaceae	Herb
32.	<i>Cyperus rotundus</i> Linn.	Java grass,	Cyperaceae	Herb
33.	<i>Datura innoxia</i> Linn.	Downy thorn-apple	Solanaceae	Herb
34.	<i>Eclipta alba</i> (Linn.)Hassk	Bhringraj,	Asteraceae	Herb
35.	<i>Cassia tora</i> Linn.	Sickle Senna.	Fabaceae	Herb
36.	<i>Euphorbia hirta</i> . Linn.	Asthma Weed	Euphorbiaceae	Weed
37.	<i>Tagetes erecta</i> Linn.	Marigold,	Asteraceae	Herb
38.	<i>Hibiscus rosa - sinensis</i> Linn.	China rose,	Malvaceae	Evergreen Shrub
39.	<i>Phyllanthus niruri</i> (Sensu) Hook. f.	Gale of wind	Euphorbiaceae	Herb
40.	<i>Nerium indicum</i> Mill.	Oleander	Apocynaceae	Shrub
41.	<i>Rosa indica</i> Linn.	Rose	Rosaceae	Shrub
42.	<i>Sida acuta</i> Linn	Wireweed	Malvaceae	Herb
43.	<i>Achyranths aspera</i>	Devil's horsewhip	Amaranthaceae	Herb

	Linn.			
44.	Argemone mexicana Linn.	Mexican prickly poppy,	Papaveraceae	Herb
45.	Solanum nigrum Linn.	Black nightshade	Solanaceae	Herb
46.	Parthenium hysterophorus Linn.	Carrot grass	Asteraceae	Herb
47.	Chenopodium album Linn.	Lamb's quarters	Chenopodiaceae	Herb
48.	Oxalis corniculata Linn.	Creeping wood sorrel	Oxalidaceae	Herb
49.	Vicia sativa Linn.	Garden vetch,	Fabaceae	Herb
50.	Cannabis sativa Linn.	Hemp,	Cannabinaceae	Herb
51.	Boerhaavia diffusa (Linn.) Nom. Cons	Punarnava	Nyctaginaceae	Herb
52.	Tridax procumbens Linn	Tridax daisy	Asteraceae	Herb
53.	Croton bonplandianum Baill	Ban Tulsi,	Euphorbiaceae	Herb
54.	Amaranthus caudatus Linn.	Tassel Flower.	Amaranthaceae	Herb
55.	Launaea asplesifolia(Willd.) Hook. F.	Tikchana	Asteraceae	Herb
56.	Fumaria indica(Haussk.) Pugsley	Indian Fumitory	Fumariaceae	Herb

57	Ranunculus sceletarius Linn.	Celery-leaved butter cup	Ranunculaceae	Herb
58	Aristida setacea Retz .	Broom Grass	Poaceae	Herb
59	Cymbopogon citratus (DC. ex Nees) Stapf	Lemon grass	Poaceae	Herb
60	Dicanthium annulatum (Forsk.) Stapf	Marvel grass,	Poaceae	Herb
61	Punica granatum L.	Pomegranate	Lythraceae	Deciduous shurb
62	Malus pumila Mill.	Apple	Roseceae	Deciduous shrub
63	Acacia auriculiformis Benth.	Australian wattle	Fabaceae	Evergreen Tree
64	Musa acuminata colla	Banana	Musaceae	Evergreen, perennial Tree
65	Callistemon citrinus(Curtis) Skeels	Bottle Brush	Myrtaceae	Shrub
66	Hyophorbe lagenicaulis(L.H.Ba iley) H.E.Moore	Bottle palm	Arecaceae	Tree
67	Bougainvillea glabra Comm. ex Juss.	bougainvilla	Nyctaginaceae	Evergreen and deciduous Shrub
68	Jasminum sambac(L.) Aiton	Arabian jasmine	Oleaceae	Shrub
69	Tabernaemontana	Pin wheel flower	Apocynaceae	Shrub

	sp. R.Br. ex Roem. &Schult.			
70	Tabernaemontana divaricata 'Variegata'	Crepe Jasmine	Apocynaceae	Shrub
71	Livistona chinensis (Jacq.)R.Br.ex Mart.	China fan palm	Arecaceae	Tree
72	Chukrassia tabularis A. Juss.	Chittagong wood	Meliaceae	Tree
73	Cycus revoluta Thunb.	Sago Palm	Cycadaceae	Tree
74	Caryota aurens L.	Fish tail palm	Arecaceae	Tree
75	Citrus paradise Macfad.	Grape fruit	Rutaceae	Evergreen perennial shrub
76	Vitis vinifera L.	Grape vine	Vitaceae	Climber
77	Psidium guajava L.	Guava	Myrtaceae	Evergreen shrub
78	Delonix regia(Boj.ex Hook.)Raf.	Gulmohar	Fabaceae	Tree
79	Jatropha sp. Linn.	Nettle spurge	Euphorbiaceae	Shurb
80	Justicia spicigera Schltdl.	Mexican honeysuckle	Acanthaceae	Evergreen shurb
81	Senna siamea (Lam.) H.S.Irwin&Barneby	Kassod tree	Fabaceae	Evergreen Tree
82	Cordia myxa Linn.	Lasura	Boraginaceae	Deciduous Tree
83	Citrus limon(L.) Osbeck	Lemon	Rutaceae	Small evergreen tree
84	Adonidia merrilii Becc.	Manila palm	Arecaceae	Tree

85	Mimusop selengi Linn.	Maulsari	Sapotaceae	Evergreen tree
86	Lawsonia inermis Linn.	Henna	Lythraceae	Shrub
87	Plumaria obtusa Linn.	White Frangipani	Apocynaceae	Shrub
89	Carica papaya Linn.	Papaya	Caricaceae	Tree
90	Prunus persica Linn.	Peach	Rosaceae	Deciduous Tree
91	Pyrus comminus Linn.	Pear	Rosaceae	Tree
92	Prunus domestica Linn.	Plum	Rosaceae	Deciduous Tree
93	Populus deltoids	Necklace poplar	Salicaceae	Tree
94	Phoenix roebelenii O'Brien	Pygmy date palm	Arecaceae	Small tree
95	Citrus nobilis Lour.	Orange	Rutaceae	Small tree
96	Manilkara zapota(L.)P.Royen	chickoo	Sapotaceae	Evergreen tree
97	Grevillea robusta A.Cunn ex R.Br.	Silver oak	<u>Proteaceae</u>	Evergreen tree
98	Tectona grandisL.f.	Teak/Sagwan	Lamiaceae	Deciduous tree
99	Tecoma stans(L.)Juss ex Kunth	Yellow bells	Bignoniaceae	Perennial shrub
100	Toona sinensis(L.)Juss M. Roem.	Red Toon	Meliaceae	Deciduous tree
101	Pongamia pinnata(L.) Pierre	Sukhchain	Papilionaceae	Deciduous tree

102	Araucaria heterophylla(Salisb.) Franco	Living Christmas tree	<u>Araucariaceae</u>	Tree
103	Cascabela thevetia (L.) Lippold	Yellow oleander	<u>Apocynaceae</u>	Evergreen tropical shrub
104	<u>Holoptelea integrifolia</u> Planch	Indian Elm	<u>Ulmaceae</u>	Deciduous trees
105	Chrysanthemum morifolium Ramat	Florist's daisy	<u>Asteraceae</u>	Perennial plant
106	Artemisia scoparia Waldst& Kit.	Variegated worm wood, ¹	Asteraceae	Herb
107	Bidens bipinnata Linn.	Spanish needles	Asteraceae	Annual herb
108	Terminalia bellirica (Gaertn.)Roxb.	Bahera	<u>Combretaceae</u>	Deciduous tree
109	Cassia javanica Linn.	Java cassia	<u>Fabaceae</u>	Deciduous / Semi-deciduous tree
110	Celosia cristata Linn.	Cockscomb	<u>Amaranthaceae</u>	annual herb
111	Thuja occidentalis Linn.	Northern white-cedar	<u>Cupressaceae</u>	Evergreen coniferous tree,
112	Combretum indicum(L.) DeFilipps	Rangoon creeper	<u>Combretaceae</u>	Creeper
113	Laurus nobilis(L.)	Bay laurel	<u>Lauraceae</u>	Evergreen or large shrub
114	Ocimum tenuiflorum(L.)	Holy basil	<u>Lamiaceae</u>	Perennial herbs
115	Lagerstroemia indica(L.)Pers.	Crepe myrtle	<u>Lythraceae</u>	Deciduous shrub

III RESULTS AND DISCUSSION

The Phyto diversity is a major biotic component of ecosystem. It is evident that interaction of biotic and abiotic factors of the environment, invariably result in disturbing fauna and flora of that area. On the basis of field survey at the university campus, 115 species of plants were, collected, identified and recorded (Tables 1 and 2). The studies revealed a classified listing of 45 species of trees and 70 of herbs and shrubs. Most of the species planted in university campus were trees of different types with regard to their growth habits and canopy shapes. On the other side, the herbs and shrubs were characterized by natural vegetation. For instance, *Jatropha* spp. have traditionally been used in basket making, tanning and dye production. It is also used as oil crop for biodiesel production. *Ocimum tenuiflorum* is cultivated for religious and medicinal purposes. *Lagerstromia indica* is use in cuts and wounds. *Datura stramonium* for Asthma, cough & wounds. *Dalbergia sissoo* is used in dental hygiene problems, skin problems, ear-ache, leucorrhoea & swelling, gonorrhoea. *Azadirachta indica*, and *Melia azadiracta* used in Stomach disorders, diabetes, eye problems, birth control, as antiseptic leucorrhoea, piles, skin infections, bleeding gums, intermittent fever.

Fabaceae was reported as the dominant plant family. Other main contributing families are Apocynaceae and Asteraceae, Arecaceae, Moraceae, Meliaceae, Solanaceae, Euphorbiaceae and Poaceae. The dominance of plants from Fabaceae family indicated the tough environmental conditions and the ability of these plants to develop nitrogen fixation capacity to make legumes in their roots (Manhas *et al.*, 2010). Technical information of similar botanical nature is available literature and books (Hooker, 1875; Benthom and Hooker, 1876; Chopra *et al.*, 1956; Maheshwari, 1963; Bhandari, 1978; Meenakshi and Sharma, 1985; Jain, 1979. Kumar (2001) has given description of various plant species.

REFERENCES

1. Hooker, J.D. 1875. Flora of British India, Reeve & Co Ltd., England
2. Sabnis TS. A contribution to the Flora of Punjab plains and the associated Hill Regions. J.Bombay Nat. Hist. Soc., 1940:42.
3. Benthom, G., Hooker, J.D. 1876. Genera Plantarum in 3 Volumes, L. Reeve and Co. London, United Kingdom.
4. Chopra, R.N., Nayer, S.L., Chopra, I.C. 1956. Glossary of Indian Medicinal Plants, CSIR, New Delhi, India
5. Curtis, J.T., Cottom, G. 1956. Plant Ecology Workbook- Laboratory Field Reference Manuals, Burgess Publication Co. Minnesota U.S.A.
6. Jain, S.K. 1968. Medicinal Plants, National Book Trust, India. pp.1-126.

7. Misra, R. 1968. Ecology Workbook. Oxford and IBH Publishing Co., New Delhi, India. Phillips, E.A. 1959. Methods of vegetation study, Henry Holt, Rinehart and Winston New York,U.S.A.
8. Misra, R. 1968. Ecology Workbook. Oxford and IBH Publishing Co., New Delhi, India.
9. Phillips, E.A. 1959. Methods of vegetation study, Henry Holt, Rinehart and Winston New York, U.S.A.
10. Jain, S.K., Rao, R.R. 1977. Handbook of Field and Herbarium Methods. Today and Tomorrow Printer and Publications, New Delhi, India
11. Bhandari, M.M. 1978. Flora of Indian Desert, Scientific Publisher Jodhpur, India. 12)Nair NC. Flora of the Punjab Plains. Records of the Botanical Survey of India. Indian Botanic Garden, Howrah. 1978
12. Jain, S.P. 1979. Flora of Haryana, Ph.D. Thesis, Department of Botany, Kurukshetra University, Kurukshetra, India
13. Sharma M, Rajpal K. Flora of Punjab State- A Phytogeographic Assessment. J. Bombay Nat. Hist.Soc., 1995:92:160-165.
14. Jain, S.P., Singh, S.C., Verma, D.M., Singh, J.S., Kumar, S. 2000. Flora of Haryana, CIMAP, Lucknow, India.pp.1-266.
15. Kumar, S. 2001. Flora of Haryana, Bishan Pal and Mahender Co. Dehradon, India.
16. Maheshwari, J.K. 1963. Flora of Delhi, CSIR, New Delhi, India.
17. Sharma M, Jerath N, Chadha J. Angiosperms in Punjab Shivaliks. In: Jerath N, Puja, Chadha J, eds. Study of Biodiversity in Shivalik Ecosystem of Punjab. Punjab StateCouncil for Science and Technology, 2003:228-369
18. Tiwana NS, Jerath N, Saxena SK, Nangia P, Parwana HK. State of Environment: Punjab 2005. Punjab StateCouncil for Science and Technology, 2005:315.
19. Manhas, R.K., Singh, L., Vasistha, H.B., Negi, M. 2010. Diversity of Protected Ecosystems of Kandi Region of Punjab, India. New York Sci. J., 3(4): 96-103.
20. Meenakshi, Sharma M.1985. Flora of Ropar District, Dev Publishers, Patiala, Punjab, India
21. Misra, R. 1968. Ecology Workbook. Oxford and IBH Publishing Co., New Delhi, India. Phillips, E.A. 1959. Methods of vegetation study, Henry Holt, Rinehart and Winston New York,U.S.A.
22. Methods of vegetation study, Henry Holt, Rinehart and Winston New York,U.S.A.
23. Vasistha, H.B., Manhas, R.K., Singh, L., Negi, M., Sharma, J. 2010. Impact of Disturbances on Biodiversity Status, Resource Availability and their Management for Sustainable Development in Kandi Area of Punjab. Punjab Forest Department, Chandigarh

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