

Preliminary Studies on Geographical Distribution of Flora in Saraswati Plantation Wildlife Sanctuary in district Kurukshetra, Haryana (India)

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Abstract: During the present studies 22 species of trees, namely, *Acacia nilotica*, *A. Leucopholia*, *Albizia lebbek*, *Azadirachata indica*, *Bauhinia variegata*, *Butea monosperma*, *Cordea dichtoma*, *Crataeva nurvala*, *Dalbergia sissoo*, *Eukalyptus hybrid*, *Ficus bengalensis*, *Ficus glomerata*, *Ficus religiosa*, *Ficus rumphi*, *Morus alba*, *Parkinsonia aculeata*, *Prosopis cineraria*, *Prosopis juliflora*, *Salvadora oleoides*, *Tamarise aphylla*, *Syzygium cumera* and *Zizyphus mauritiana*; 14 species of herbs and shrubs, namely, *Adhatoda vasica*, *Argemone maxicana*, *Brassica campestris*, *Capparis sepilaria*, *Capparis desidua*, *Carissa opaca*, *Calotropis procera*, *Chenopodium album*, *Kochia indica*, *Solanum nigrum*, *Trifolium alexandarium*, *Triticum aestivum*, *Oryza sativa* and *Zizyphus mauritiana* and 9 species of grasses, climber and sedges namely, *Cuscuta reflexa*, *Desmostachya bipinnata*, *Cyprus rotundus*, *Cenchrus ciliaris*, *Dichanthium annuatum*, *Sporobolus marginatus*, *Saccharum spontaneum*, *Typha elephantia* and *Vetiveria zizanoides* were identified in the Saraswati forest were observed.

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Introduction:

Global change, including the changes in atmospheric composition, climate and land use, has modified and affected the climate system as well natural and anthropogenic-influenced ecosystems. Anthropogenic climate change is a major component of global change, which includes various issues such as the intensity and frequency of extreme events, the magnitude and rate of change, the change of mean climate state and climate variability, long-term and short-term changes, and rapid or abrupt changes. These changes will ultimately affect the ecosystems of the world, primarily influencing the distribution and growth of plants. Elevated CO₂ and NO₂ have been reported to affect the distribution of plants by controlling the plant growth. Global temperatures are expected to rise by up to 4°C by 2100. However the increase is neither temporally nor spatially uniform, where areas with above average warming co-occur with areas with minor warming or even slight cooling. Globally, climate change over last few decades has caused numerous shifts in the distribution of plant species. Tropical ecosystems are already experiencing higher degree of species extinction as well as alterations in species distribution due to rising temperatures, erratic rainfall, altered climatic extremes, where plants have been observed to be more sensitive to the variations in the seasonal extremes; other factors also involve anthropogenic disturbances such as conversion of land cover and forest fragmentation. Projecting future changes in the distribution of endemic flora is a crucial step towards

planning and mitigating the impacts of climate change on biodiversity. In Haryana, Thorny, dry, deciduous forest and thorny shrubs can be found all over the state and during the monsoon season; a carpet of grass covers the hilly areas; Mulberry, Eucalyptus, Pine, Kikar, Shisham and Babul are dominant trees found in the state. However, scanty information is available on various aspects of flora in Haryana. Therefore, present study was planned to assess flora species in Saraswati Plantation Wildlife Sanctuary (SPWS) in district Kurukshetra, Haryana.

Materials and Methods:

Study areas:

Saraswati Plantation Wildlife Sanctuary (SPWS):

Saraswati Plantation Wildlife Sanctuary (29°58' N latitude and 76° 32' N longitude) is located on Kurukshetra–Pehowa– Cheeka road around 35 Km toward West side of Kurukshetra University, Kurukshetra (Figs. 1). It is also called as Seonsar forest, is the third biggest forest in the state of Haryana covering 11231 acres of area. Saraswati Plantation Wildlife Sanctuary came under the jurisdiction of forest department, Government of Haryana in the year 1966. It was declared as reserve forest on dated 27 April, 1973 and later declared as wild life sanctuary on dated 29 July, 1988 (Montserrat, 1989).

It is an artificial forest and contains majority of the cultivated plants includes *Eucalyptus sp.*, *Dalbergia sissoo*, *Acacia nilotica*, *Prosopis juliflora*, *Morus alba*, *Ficus bengalensis*, *Ficus glomerata*, *Syzygium cumini* and many species of herbs and

shrubs. The area has dark coloured, alluvial soil rich in organic matter and having high water retention capacity. The sanctuary also maintains a two room set rest house managed by forest department. The main source of water in this sanctuary is Ban Ganga, a rivulet that passes through the sanctuary. Besides, there exists a small man made lake and two tube wells which supply water to sanctuary areas.

Scan sampling method (Altman, 1974; Kumar, 2017) was followed to record the floral and macro fauna (avian and mammalian) diversity in Saraswati Plantation Wildlife Sanctuary (SPWS). The study sites were thoroughly surveyed to analyze different species of flora prevalent there. The sighted flora were photographed by Sony cybershot camera DCR-H-9 and Sony handy cam model DCR-HC-42E. The samples of leaves, flowers, inflorescence etc. of flora were visually scanned and these plants materials were collected or photographed and brought in the laboratory for identification of different species of herbs, shrubs and trees.



Fig. 1. Saraswati Plantation Wildlife Sanctuary in district Kurukshetra, Haryana (India).

Table 1 Prevalent plant species in Saraswati Plantation Wildlife Sanctuary (SPWS) district Kurukshetra, Haryana (India).

S.N.	Local name	Scientific name	Order	SPWS
1	Kikar	<i>Acacia nilotica</i>	Fabales	+
2	Nimber	<i>A. Leucopholia</i>	Fabales	+
3	Siris	<i>Albizza lebbek</i>	Fabales	+
4	Neem	<i>Azadirachata indica</i>	Spindales	+
5	Kachnar	<i>Bauhinia variegata</i>	Fabales	+
6	Dhak	<i>Butea monosperma</i>	Fabales	+
7	Lasura	<i>Cordea dichtoma</i>	Unplaced	+
8	Barna	<i>Crataeva nurvala</i>	Brassicales	+
9	Shisham	<i>Dalbergia sissoo</i>	Fabales	+
10	Safeda	<i>Bukalyptus hybrid</i>	Fabales	+
11	Barh	<i>Ficus bengalensis</i>	Rosales	+
12	Gular	<i>Ficus glomerata</i>	Rosales	+
13	Peepal	<i>Ficus religiosa</i>	Rosales	+
14	Pilkhan	<i>Ficus rumphi</i>	Urticales	+
15	Tut	<i>Morus alba</i>	Rosales	+
16	Parkinsonia	<i>Parkinsonia aculeata</i>	Fabales	+
17	Jand	<i>Prosopis cineraria</i>	Fabales	+
18	Walayti jand	<i>Prosopis juliflora</i>	Fabales	+
19	Jaal	<i>Salvadora oleoides</i>	Brassicales	+
20	Jamun	<i>Syzygium cumini</i>	Myrtales	+
21	Frash	<i>Tamarise cumini</i>	Myrtales	+
22	Beri	<i>Ziziphus mauritina</i>	Rosales	+

+ Present; - Absent; SPWS- Saraswati Plantation Wildlife Sanctuary

Results and Discussion:

During the present studies 22 species of trees, namely, *Acacia nilotica*, *A. Leucopholia*, *Albizza lebbek*, *Azadirachata indica*, *Bauhinia variegata*,

Butea monosperma, *Cordea dichtoma*, *Crataeva nurvala*, *Dalbergia sissoo*, *Eukalyptus hybrid*, *Ficus bengalensis*, *Ficus glomerata*, *Ficus religiosa*, *Ficus rumphi*, *Morus alba*, *Parkinsonia aculeate*, *Prosopis*

cineraria, *Prosopis juliflora*, *Salvadora oleoides*, *Tamarise aphylla*, *Syzygium cumera* and *Zizyphus mauritiana* (Table 1); 14 species of herbs and shrubs, namely, *Adhatoda vasica*, *Argemone maxicana*, *Brassica campestris*, *Capparis sepiaria*, *Capparis desidua*, *Carissa opaca*, *Calotropis procera*, *Chenopodium album*, *Kochia indica*, *Solanum nigrum*, *Trifolium alexandarium*, *Triticum aestivum*, *Oryza*

sativa and *Zizyphus mauritiana* (Table 2) and 9 species of grasses, climber and sedges namely, *Cuscuta reflexa*, *Desmostachya bipinnata*, *Cyprus rotundus*, *Cenchrus ciliaris*, *Dichanthium annuatum*, *Sporobolus marginatus*, *Saccharum spontaneum*, *Typha elephantia* and *Vetiveria zizanoides* were identified in the Saraswati forest (Table 3) were observed.

Table 2 Prevalent herbs and shrubs species in Saraswati Plantation Wildlife Sanctuary (SPWS) of district Kurukshetra, Haryana (India).

S.N.	Local name	Scientific name	Order	SPWS
1	Bansa	<i>Adhatoda vasica</i>	Lamiales	+
2	Kandai	<i>Aegemone maxicana</i>	Ranunculales	+
3	Sarso	<i>Brassica indica</i>	Brassicales	+
4	Hiins	<i>Capparis sepiaria</i>	Brassicales	+
5	Kair	<i>Capparis desidua</i>	Brassicales	+
6	Karaunda	<i>Carissa opaca</i>	Gentianales	+
7	Ak	<i>Calotropis procera</i>	Gentianales	+
8	Bathua	<i>Chenopodium album</i>	Caryophyllales	+
9	Bui	<i>Kochia indica</i>	Poales	+
10	Mahua	<i>Solanum nigrum</i>	Solanales	+
11	Bersin	<i>T. alexandarium</i>	Fabales	+
12	Wheat	<i>Triticum aestivum</i>	Poales	+
13	Paddy	<i>Oryza sativa</i>	Poales	+
14	Malha	<i>Zizyphus mauritiana</i>	Rosales	+

+ Present; - Absent; SPWS- Saraswati Plantation Wildlife Sanctuary

Table 3 Prevalent herbs and shrubs species in Saraswati Plantation Wildlife Sanctuary (SPWS) of district Kurukshetra, Haryana (India).

S.N.	Local name	Scientific name	Order	SPWS
1	Akash bel	<i>Cuscuta reflexa</i>	Sonales	+
2	Della	<i>Cyprus rotundus</i>	Poales	+
3	Anjan	<i>Cenchrus ciliaris</i>	Poales	+
4	Dab	<i>Desmostachya bipinnata</i>	Poales	+
5	Sarkanda	<i>Dichanthium annuatum</i>	Poales	+
6	Chirhia grass	<i>Sporobolus marginatus</i>	Poales	+
7	Kans	<i>Saccharum spontaneum</i>	Poales	+
8	Patera	<i>Typha elephantia</i>	Typhales	+
9	Panni/Kans	<i>Vetiveria zizanoides</i>	Cyperales	+

+ Present; - Absent; SPWS- Saraswati Plantation Wildlife Sanctuary; BSRF- Bir Sonty Reserve Forest

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References:

- Adomou, A., Agbani, O. & Sinsin, B. (2011) Plants. In: Neuenschwander, P., Sinsin, B. & Goergen, B. (Eds.) *Nature conservation in West Africa: Red List for Benin*. International Institute

of Tropical Agriculture (IITA), Ibadan, pp. 21–46.

- African Plants Database (version 3.4.0) (2016) *African Plants Database (version 3.4.0)*. Conservatoire et Jardin botaniques de la Ville de Genève & South African National Biodiversity Institute. Available from: <http://www.ville-ge.ch/musinfo/bd/cjb/africa/> (accessed 1 April 2017)
- Antonelli, A., Zizka, A., Silvestro, D., Scharn, R., Cascales-Miñana, B. & Bacon, C.D. (2015) An engine for global plant diversity: highest evolutionary turnover and emigration in the

- American tropics. *Frontiers in Genetics* 6: 1–14. <https://doi.org/10.3389/fgene.2015.00130>
4. Araújo, M.B. & Peterson, A.T. (2012) Uses and misuses of bioclimatic envelope modeling. *Ecology* 93: 1527–1539. <https://doi.org/10.1890/11-1930.1>
 5. Augusseau, X., Nikiéma, P. & Torquebiau, E. (2006) Tree biodiversity, land dynamics and farmers' strategies on the agricultural frontier of southwestern Burkina Faso. *Biodiversity and Conservation* 15: 613–630. <https://doi.org/10.1007/s10531-005-2090-8>
 6. Baudron, F., Corbeels, M., Monicat, F. & Giller, K.E. (2009) Cotton expansion and biodiversity loss in African savannahs, opportunities and challenges for conservation agriculture: A review paper based on two case studies. *Biodiversity and Conservation* 18: 2625–2644. <https://doi.org/10.1007/s10531-009-9663-x>
 7. Beentje, H.J. & Callmander, M.W. (2014) Pandanaceae. In: Lebrun, J.-P. & Storck, A.L. (Eds.) *Tropical African Flowering Plants—Ecology and Distribution*. vol. 8. Conservatoire et Jardin botaniques de la Ville de Genève, Genève, pp. 316–323.
 8. Belem, B., Nacoulma, B., Gbangou, R., Kambou, S., Hansen, H., Gausset, Q., Lund, S., Raebild, A., Lompo, D., Ouedraogo, M., Theilade, I. & Boussim, J.I. (2007) Use of non wood forest products by local people bordering the “Parc National Kaboré Tambi”, Burkina Faso. *Journal for Transdisciplinary Environmental Studies* 6: 1–18.
 9. Belemsobgo, U., Kafando, P., Adouabou, B. A., Nana, S., Coulibaly, S., Gnomou, A. & Konrad, T. (2010) Network of protected areas. In: Thiombiano, A. & Kampmann, D. (Eds.) *Biodiversity atlas of West Africa. Volume II: Burkina Faso*. BIOTA, Ouagadougou & Frankfurt am Main, pp. 354–363.
 10. Beygelzimer, A., Kakadet, S., Langford, J., Arya, S., Mount, D. & Li, S. (2013) *FNN: fast nearest neighbor search algorithms and applications. Manual*. Retrieved from: <https://cran.r-project.org/package=FNN> (accessed 1 April 2017)
 11. Bocksberger, G., Schnitzler, J., Chatelain, C., Daget, P., Janssen, T., Schmidt, M., Thiombiano, A. & Zizka, G. (2016) Climate and the distribution of grasses in West Africa. *Journal of Vegetation Science* 27: 306–317. <https://doi.org/10.1111/jvs.12360>
 12. CBD (2010) *Decisions adopted by the conference of the parties to the Convention on Biological Diversity at its tenth meeting. Report. UNEP/CBD/COP/DEC/X/17*. Available from: <https://www.cbd.int/doc/decisions/cop-10/cop-10-dec-17-en.pdf> (accessed 1 April 2017)
 13. César, J., Lebrun, J.-P. & Bouyer, J. (2009) *Supplément au catalogue des plantes vasculaires du Burkina Faso*. Internal report, CIRDES/CIRAD/PPZS, Bobo-Dioulasso.
 14. Chatelain, C., Aké Assi, L., Spichiger, R. & Gautier, L. (2015) Cartes de distribution des plantes de Côte d'Ivoire. *Boissiera* 64: 1–327.
 15. Daget, P. (2012) FLOTROP—a biogeographical database on rangeland vegetation for northern tropical Africa. *Biodiversity & Ecology* 4: 293–293. <https://doi.org/10.7809/b-e.00091>
 16. Dressler, S., Schmidt, M. & Zizka, G. (2014) Introducing African Plants—a photo guide—an interactive photo database and rapid identification tool for continental Africa. *Taxon* 63: 1159–1161. <https://doi.org/10.12705/635.26>
 17. Elith, J. & Leathwick, J.R. (2009) Species distribution models: Ecological explanation and prediction across space and time. *Annual Review of Ecology, Evolution, and Systematics* 40: 677–697. <https://doi.org/10.1146/annurev.ecolsys.110308.120159>
 18. FAO (2012) *Harmonized World Soil Database (version 1.2)*. FAO, Rome, Luxemburg. Available from: <http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/en/> (accessed 1 April 2017)
 19. GMTED (2010) Global multi-resolution terrain elevation data. Available from http://topotools.cr.usgs.gov/gmted_viewer/ (retrieved 3 February 2016).
 20. Gnomou, A., Ouédraogo, O., Schmidt, M. & Thiombiano, A. (2015) Floristic diversity of classified forest and partial faunal reserve of Comoé-Léraba, southwest Burkina Faso. *Check List* 11: 1–17. <http://doi.org/10.15560/11.1.1557>
 21. Guigma, Y., Zerbo, P. & Millogo-Rasolodimby, J. (2012) Utilisation des espèces spontanées dans trois villages contigus du Sud du Burkina Faso. *Tropicicultura* 30: 230–235.
 22. Guinko, S. (1984) *Végétation de la Haute-Volta*. Dissertation, University of Bordeaux III, 394 pp.
 23. Hengl, T., Mendes de Jesus, J., MacMillan, R.A., Batjes, N.H., Heuvelink, G.B.M., Ribeiro, E., Samuel-Rosa, A., Kempen, B., Leenaars, J.G.B., Walsh, M.G. & Gonzalez, M.R. (2014) SoilGrids1km—Global soil information based on automated mapping *PLoS One* 9 (8): e105992. <https://doi.org/10.1371/journal.pone.0105992>
 24. Heubach, K., Wittig, R., Nuppenau, E.-A. & Hahn, K. (2011) The economic importance of non-timber forest products (NTFPs) for

- livelihood maintenance of rural West African communities: A case study from northern Benin. *Ecological Economics* 70: 1991–2001. <https://doi.org/10.1016/j.ecolecon.2011.05.015>
25. Heubes, J., Kühn, I., König, K., Wittig, R., Zizka, G. & Hahn, K. (2011) Modelling biome shifts and tree cover change for 2050 in West Africa. *Journal of Biogeography* 38: 2248–2258. <https://doi.org/10.1111/j.1365-2699.2011.02560.x>
 26. Heubes, J., Schmidt, M., Stuch, B., García Márquez, J.R., Wittig, R., Zizka, G., Thiombiano, A., Sinsin, B., Schaldach, R. & Hahn, K. (2013) The projected impact of climate and land use change on plant diversity: An example from West Africa. *Journal of Arid Environments* 96: 48–54. <https://doi.org/10.1016/j.jaridenv.2013.04.008>
 27. Hijmans, R.J., Phillips, S., Leathwick, J. & Elith, J. (2014) *dismo: Species distribution modeling. Manual*. Retrieved from: <http://cran.r-project.org/package=dismo> (accessed 1 April 2017)
 28. IPCC (2007) *Climate change 2007: The physical science basis. Contribution of working group I to the fourth assessment report of the intergovernmental panel on climate change*. Cambridge University Press, Cambridge & New York, 996 pp.
 29. IUCN (2012) *IUCN Red List Categories and Criteria. Version 3.1* (Second edition). IUCN, Gland, Switzerland & Cambridge, UK, iv + 32 pp.
 30. IUCN (2015) *The IUCN Red List of threatened species. Version 2015-4*. Retrieved from: <http://www.iucnredlist.org> (accessed 1 April 2017)
 31. IUCN (2016) *Mapping standards for IUCN Red List Assessments*. Presentation at the IUCN Red List Assessor Training Workshop. Available from: <http://www.iucnredlist.org/technical-documents/red-list-training/red-list-assessor-training> (accessed 1 April 2017)
 32. IUCN and UNEP-WCMC (2016) *The World Database on Protected Areas (WDPA)*. Retrieved from: www.protectedplanet.net (accessed 4 June 2016)
 33. IUCN Species Survival Commission (2012) *Guidelines for application of IUCN Red List criteria at regional and national levels. Version 4*. Gland, Switzerland & Cambridge, UK, III + 41 pp.
 34. IUCN Standards and Petitions Subcommittee (2016) *Guidelines for using the IUCN Red List categories and criteria. Version 12*. Available from: <http://www.iucnredlist.org/documents/RedListGuidelines.pdf> (accessed 1 April 2017)
 35. Krohmer, J. (2004) *Umweltwahrnehmung und -klassifikation bei Fulbegruppen in verschiedenen Naturräumen Burkina Faso und Benins (Westafrika)*. PhD thesis, University of Frankfurt, 302 pp. + annex.

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