

SUMMARY OF MINOR RESEARCH PROJECT

Impact of Physico-chemical parameters on Diversity of Plant species in Tropical Forests of Jashpur district with special reference to their Ethnomedicinal uses

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by

**Dr. Prasant Kumar Singh,
Department of Botany,
Govt. VBSD Girls College,
Jashpur (C.G.) 49633**

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The proposed work was conducted in Jashpur, a tribe dominating district of Chhattisgarh (22°17' to 23°15'N and 83°30' to 84°24' E). The forest is tropical dry deciduous type and the climate is monsoon type with 3-4 months of critical dry periods. The aim of the present study was to quantify the diversity of plants along the gradients of anthropogenic disturbance and their ethnomedicinal uses. The sites were selected according to the impact of anthropogenic disturbance and were categorized into moderately disturbed and heavily disturbed sites. Three sites of each category i.e. both in moderately and heavily disturbed sites were selected for the collection of data for the calculation of diversity. Soil physicochemical analyses were also done to find out the relationship between diversity and soil chemistry. Documentation of ethnomedicinal wisdom of the tribal/local people was also done. The data was collected by random quadrat method with a quadrat size of 20mx5m.

The forest in Jashpur district is sal (*Shorea robusta*) dominated forest and a frequency of 100% was observed for *Shorea robusta* at all the sites. *Buchanania lanzan* which is also a common tree species of the study area showed 100% frequency at the sites with moderate disturbance and was absent from the two heavily disturbed sites. *Diospyros melanoxylon* which is also a very common plant of Jashpur forest, showed 100% frequency only at one site. Similarly *Adina cordifolia* (Haldu/Karam) was found only at BMD with a frequency of only 56% although it is an important plant for many tribal social customs and rituals. *Terminalia tomentosa* was also seen only at LMD and CMD sites. The frequency calculated for different plants at different sites clearly reflects that the important plants are gradually becoming lower in number and these plants are not continuous in their distribution. The density also reflects that there is domination of *Shorea robusta* in the forest and the heavily disturbed sites are low in density of this plant. *Diospyros melanoxylon* shows very low density but the density at LHD was found higher than LMD but the plants at the LHD were only saplings and mature plants were lacking at LHD. *Shorea robusta* showed contagious distribution at all the sites. *Diospyros melanoxylon* showed

regular distribution, whereas *Adina cordifolia* and *Schleichera oleosa* were found random in distribution. *Curculigo orchioides* (Kali Musli), a very important medicinal plant was found only at CMD and showed random distribution. From all the other sites, *C. orchioides* was not reported from the sample plots, this reflects that important medicinal plants are disappearing from the forest either due to overexploitation or forest degradation. Habitat destruction has posed many of the important plants which were once common to these areas. The relative density was maximum at all the sites for *Shorea robusta* except at LHD where R.D. was maximum for *Dicanthium annulatum* (a grass) i.e. grasses have started to dominate at this site. At BHD maximum R.D. was observed for *Shorea robusta* followed by *Lantana camara* which is an invasive alien plant (Batianoff & Butler 2003). Several invasive species possess allelopathic potential which provide them capacity to withstand under severe abiotic disturbances (Huang *et al.* 2009; Sharma *et al.* 2005). Forest degradation provides opportunity for *Lantana* to grow and dominate. The tree density (stems ha⁻¹) was calculated for 0.74 to 0.93. The evenness (Whittaker Index) for the moderately disturbed sites was in the range of 1.86 to 3.43 and for the disturbed sites in the range of 1.10 to 1.65. The Simpson's index for moderately disturbed sites was in the range of 0.43 to 0.69 and for the heavily disturbed sites in the range of 0.18 to 0.78. The higher value at LHD was possibly due to number of species almost equal to that of moderately disturbed sites. But at LHD adult trees were very few, and thus, average basal area (m² ha⁻¹) was very less 0.41. Very low values of Simpson's index as recorded in our study sites was possibly due to very high anthropogenic disturbance and common occurrence of forest fire. The value of β -diversity was maximum for the MHD and it varied from 1.32 to 1.43. The values of β -diversity are not a very good indicator for the determination of disturbance as almost similar values were observed both for the moderately and heavily disturbed sites. The disturbance index was calculated for all the six sites selected for the study. Among the heavily disturbed sites, maximum disturbance was at LHD followed by BHD and MHD. For moderately disturbed sites, disturbance index was found minimum for CMD followed by BMD and LMD. Over felling of trees might be the major reason for the disturbance on these sites. Regarding the ethnomedicinal practices, it is clear from the present study that tribal culture the adults and saplings. At MHD, there was a high tree density, but this value might be due to large number of saplings while the adults were very few in number. The disturbance to the site provides better opportunity for the seeds to germinate for the restoration and reestablishment of the forest to the degraded sites. The IVI was maximum for S.

robusta at all the sites showing its dominance at all study sites followed by *B. lanzan*. The values of IVI on the study sites reflect that *S. robusta* is dominant tree species followed by *B. lanzan*, *S. cumini* and *D. melanoxylon*. *Terminalia tomentosa* was reported only at CMD with IVI value 6.4. In the present study the average basal area in m² ha⁻¹ for the tree species having DBH \geq 10 cm, was recorded for the moderately disturbed sites in the range of 11.25 m² ha⁻¹ to 56.47 m² ha⁻¹ and on the disturbed sites 0.41 m² ha⁻¹ to 19.89 m² ha⁻¹. The species richness (SR) values at the moderately disturbed sites were found greater than at the disturbed sites. The Margalef Index at the moderately disturbed sites was in the range of 1.23 to 2.03 while for the disturbed sites it was 0.74 to 0.93. The evenness (Whittaker Index) for the moderately disturbed sites was in the range of 1.86 to 3.43 and for the disturbed sites in the range of 1.10 to 1.65. The Simpson's index for moderately disturbed sites was in the range of 0.43 to 0.69 and for the heavily disturbed sites in the range of 0.18 to 0.78. The higher value at LHD was possibly due to number of species almost equal to that of moderately disturbed sites. But at LHD adult trees were very few, and thus, average basal area (m² ha⁻¹) was very less 0.41. Very low values of Simpson's index as recorded in our study sites was possibly due to very high anthropogenic disturbance and common occurrence of forest fire. The value of β -diversity was maximum for the MHD and it varied from 1.32 to 1.43. The values of β -diversity are not a very good indicator for the determination of disturbance as almost similar values were observed both for the moderately and heavily disturbed sites. The disturbance index was calculated for all the six sites selected for the study. Among the heavily disturbed sites, maximum disturbance was at LHD followed by BHD and MHD. For moderately disturbed sites, disturbance index was found minimum for CMD followed by BMD and LMD. Over felling of trees might be the major reason for the disturbance on these sites. Regarding the ethnomedicinal practices, it is clear from the present study that tribal culture and knowledge is alive and people still depend on forest resources for their livelihood as well as therapeutic purposes. 78 plant based formulations were documented based on the information provided by the local/tribal herbalist of the study area. There is a need to provide scientific backup to such traditional practices which has a base of thousands of years of experience. People in the tribal areas are still relying on the traditional medical practices which they have acquired from their ancestors from one generation to the next. Fidelity level was higher for herbaceous species as compared to tree species because most of these are widely used as traditional medicines for treatments of various body ailments.

Therefore, there is an urgent need for the provisioning of traditional knowledge digital library (TKDL) of Jashpur district so that it can be preserved and real benefits of this precious resource goes to original inhabitants and habitat where these resources are present. Also, preparation of TKDL will prevent misuse of ethnomedicinal knowledge and the same can be submitted to Government of India.

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1. Prajapati SK, Sharma K & **Singh PK** (2018). Plant diversity in tropical dry deciduous forests of Jashpur, Chhattisgarh with special reference to their ethnomedicinal uses, *Tropical Ecology* 59(3): 505-514.