STRUCTURE AND DIVERSITY OF TREE SPECIES IN NATURAL FORESTS OF KUMAUN HIMALAYA IN UTTARAKHAND

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Abstract: Present study deals with density, basal area, population structure, species diversity and concentration of dominance of natural forests in Lohaghat of Champawat district in Kumaun Himalaya, Uttarakhand. The data were collected from each forest for different six classes such as seedling, sapling, young tree, pole size tree, mature tree and old tree. Soil bulk density was 1.02-1.18gcm-3. Soil porosity, water holding capacity and soil moisture ranged from 41.8-48.5, 56.4-65.5 and 27.1-32.2 percent respectively. The soil texture was in order: sand (42.6-47.3%)>silt (31.6-34.3%)>clay (21.1-23.1%). Soil pH and soil carbon ranged from 6.2 to 6.8 and 6.2to 6.8 percent. Density of seedling sapling and tree ranged from 270 to 1790, 365 to 1040 and 920 to 1345, respectively. Species diversity in each category was 0.757-1.500 for tree, 0.950 to 2.050 for seedling and 1.000 to 1.810 for sapling. The good regeneration structure depicted by *Rhododendron arboreum* in site 1, *Myrica esculenta, Cedrus deodara* and *Pinus roxburghii* in site-2, *Myrica esculenta, Prunus cerasoides* and *Pinus roxburghii* by site-3, while poor regeneration was depicted by *Quercus leucotrichophora, Myrica esculenta* and *Pinus roxburghii* in site-1, Quercus *leucotrichophora* in site-2 and *Cedrus deodara and Pinus roxburghii* in site-4. However, fair regeneration was shown by *Cedrus deodara* in site-1 and *Quercus leucotrichophora* in site-3. The *Quercus leucotrichophora* seedlings were less in number than other tree species. Decreasing regeneration pattern of *Quercus leucotrichophora* in each site indicated that increased anthropogenic pressure on oak tree species for fuel and fodder may be one of the reasons of poor regeneration in each studied forest.

Keywords: Species diversity, population structure, seedlings, saplings, tree size class, Kumaun Himalaya

REFERENCES

Barnes, B.V., Zak, D.R., Denton, S.R. and Spurr, S.H. (1998). Forest ecology (4ed), John Wiley and Sons Inc, New York.

Bisht, S. and Lodhiyal, L.S. (2005). Various aspects of soils and tree layer vegetation analysis in reserve forest of Kumaun in central Himalaya. *Indian Journal of Forestry* **28(1):** 37-50.

Borah, N. and Garkot, S.C. (2011). Tree species composition, diversity and regeneration patterns in undisturbed and disturbed forests of Barak valley, south Assam, India. *International Journal of ecology and Environmental Science*, **37(3):**131-141.

Busing, R.T. (1995). Disturbance and population dynamics of *Liriodendron nilifera:* simulations with a spatial model for forest succession. *Journal of Ecology* **83:**45-53.

Chaturvedi, O.P. and Singh, J.S. (1987). The structure and function of Pine forests in Central Himalaya, I. Dry matter dynamics. *Annals of Botany* **60:**237-252.

Haywood, V.H. and Watson, R.T. (1995). Global Biodiversity Assessment. Published for the United Nations Environment Programme. Cambridge University Press, Pages 1125.

Jackson, M.L.(1958) Soil chemical analysis . Prentice Hall Inc; USA, 498p.

Kumar, A. and Ram, J. (2005). Anthropogenic disturbances and plant biodiversity in forests of Uttarakhand, central Himalaya. *Biodiversity and Conservation* **14:** 300-331.

Lodhiyal, N. and Lodhiyal, L.S.(2012). Tree layer composition and carbon content of oak and Pine in Lohaghat forests of Kumaun Himalaya. *Journal of Plant Development Sciences* **4(1):** 55-62.

Misra , R. (1968). Ecology Work Book. *Oxford and IBH Publishing Co.,Calcutta.*

Raturi, G.P. (2012) Forest community structure along an altitudinal Gradient of District Rudraprayag of Garhwal Himalaya, India. *Ecologia* **2(3):**76-84.

Rawat, Y.S. and Singh, J.S. (1988) Structure and function of oak forests in Central Himalaya. I. Dry matter dynamics. *Annals of Botany* **62:**397-411.

Saxena, A.K. and Singh , J.S. (1984). Tree population structure of certain Himalayan forest associations and implications concerning their future composition. *Vegetatio,* **58:** 61-69.

Saxena, A.K. and Singh, J.S. (1982). Quantitative profile structure of certain forest in the Kumaun Himalayan: *Proceeding of the Indian Academy of Sciences*, **91:** 529-49.

Shankar, U. (2001). A case study of high tree diversity in a sal (*Shorea robusta*)-dominated lowland forest of Eastern Himalaya: Floristic composition, regeneration and conservation. *Current Science* **81:**776-786.

Shannon, C. and Wiener, W. (1963). *The mathematical Theory of communication* (Urban: University of Illinois Press).

Simpson, E.H. (1949). Measurement of diversity.*Nature.***163:**688-692.

Singh, J.S. and Singh, S.P.(1992). Forests of Himalaya: Structure, Functioning and Impact of man. *Gyanodaya Prakashan, Nainital, India.*

Swamy, S. L., Dutt, C.B.S., Murthy, M.S.R, Mishra, Alka and Bargali, S.S.(2010) Floristic and dry matter dynamics of tropical wet evergreen forests of Western Ghats, India. *Current Science* **99(3):** 353-364.

Uniyal, Pooja, Pokhariyal, P., Dasgupta, S., Bhatt, D. and Todaria, N.P. (2010). Plant diversity in two forest types along the disturbance gradient in Dewalgarh Watershed, Garhwal Himalaya. *Current Science* **98 (7):**938-943.