

7th International Conference on

BIODIVERSITY CONSERVATION AND ECOSYSTEM MANAGEMENT

July 26-27, 2018 Melbourne, Australia

Examining vegetation structure, species diversity, richness and vegetation-environmental relationships in the subtropical forests of Kotli District (AJK), Pakistan, using a multivariate approachMuhammad Shoaib Amjad¹, Arshad M², Page S³ and Berrio J C⁴¹Women University of Azad Jammu and Kashmir Bagh, Pakistan²Pir Mehr Ali Shah Arid Agriculture University, Pakistan³University of Leicester UK⁴University of Leicester, UK

A phyto-sociological survey was carried out during 2014-2016 using a stratified random sampling design at 15 different localities in Kotli District, AJK Pakistan. Quantitative data on species composition and environmental variables were collected from 450 quadrats. Based on cluster analysis, three different plant associations were recognized viz. subtropical scrub forest association, subtropical pine forest association and subtropical broad leaf humid association which are clearly separated on a two dimensional Detrended Correspondence Analysis (DCA) diagram. The number of plant species per site varied from 17 to 47; Shannon and Simpson diversity indices were 1.83-3.19 and 0.75-0.95, respectively; Menhinick and Margalef species richness values were between 0.68-1.35 and 2.48-5.95, respectively, Equitability values between 0.65-0.90 and Evenness values between 0.37-0.71. DCA and Canonical Correspondence Analysis (CCA) indicated altitude and aspect to be the main determinants of the plant species distribution patterns and classification and grouping of vegetation into different associations. CCA indicated that both species diversity and richness showed strong correlations with altitude as well as aspect and grazing intensity. All the forest stands were immature (33.8-54.7%) with average tree density varying between 280 to 2060 ha⁻¹, and basal area between 1.99-19.18 m²/ha⁻¹. The results clearly reflect the deteriorating forest structure in this region, demanding urgent conservation measures involving effective participation by local communities.

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