

Effects of Agro-climatic variation on floristic composition, structure and regeneration status in the Bale mountains national park, South-eastern Ethiopia

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Abstract

The Bale Mountains National Park (BMNP) is an internationally significant biodiversity hot-spot area located in the Bale eco-region, south-eastern highlands of Ethiopia. In spite of its huge ecological importance, however, habitat degradation takes place at an alarming rate at different agro-climatic zones and poses a severe threat to the survival of most species. The aim of this study was to assess the effects of agro-climatic variation on floristic composition and structure and exploring the human-induced factors responsible for the change in the ecosystems of the park. Sampling sites were selected by means of purposive sampling to represent a wide range of agro-climatic zones. A total of 144 sampling plots covering an area of 5.76 ha were established on twelve parallel transect lines that were laid along the three altitudinal gradient with four replications to draw representative vegetation data. Mean species comparison across agro-climatic zones was determined using one-way ANOVA and significant differences were reported at 5% level of significance ($p < 0.05$). Result show that oth species richness (76) and mean DBH of woody species (49.63 ± 1.34 cm) were significantly ($p < 0.05$) higher in the sub-moist mid highland than cold humid afro-alpine zone (29), and in the cool moist mid highlands (31 and 44.50 ± 1.42 cm, respectively). Similarly, the density of seedling, sapling, and mature trees were significantly ($p < 0.05$) higher in the sub-moist mid highland compared to the density in the cool moist mid highlands (3000–3400 m a.s.l). The study concludes that the sub-moist mid-highland harbors most species and has trees with higher DBH which requires protection against ecological degradation due to human activities. The higher altitude such as the cold humid afro-alpine zone is ecologically fragile and needs a comprehensive natural resource management strategy that combines the restoration and protection of natural ecosystem.

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