Woody species composition, structure and regeneration status of Alka forest Beyeda District, North Gondar Zone, Amhara Region, Northern Ethiopia

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Abstract

Background Ethiopia's varied geography, from the Simien Mountains to the Great Rift Valley, creates unique microclimates that support an incredible range of plant species. However, forests are declining due to the expansion of farmlands, settlement and overgrazing factors. Therefore, there is a need of extensive assessments to inventory plant species diversity and understand their structural dynamics in Alka forest.

Methods A reconnaissance survey was carried out in February 2021, in order to obtain a general understanding of the research area and the vegetation. The vegetation sampling was carried out using a systematic sampling technique. A total of 40 main plots, each measuring 20 m × 20 m and spaced 100 m apart, were placed along the marked transects at 50 m intervals to gather vegetation data. A 2 m x 2 m subplots (one ateach corner and one at its center) were laid to collect vegetation data on seedlings and saplings. Trees and shrubs with a diameter at Breast height ≥ 2.5 cm were measured in each plot, and their heights were recorded. Hierarchical cluster analysis was performed by using R statistical software version 3.4.0 to sort vegetation into vegetation community types.

Results A total of 48 woody species within 37 families were identified. Of the total number of species, four were found to be endemic to Ethiopia. Fabaceae was the dominant family, followed by Asteraceae . The species richness, eveness and diversity of Alka forest were 48, 0.65 and 3.54 repectively. Moreover, the density of woody plant species for matured individuals, saplings and seedlings were 2556.875, 1633.125 and 1641.25 stems ha^{-1} respectively

Conclusion The density of tree species in the forest decreased with increasing height class and DBH, which implied that small individuals were more predominant in the lower classes than in the higher classes, indicating that these individuals have fair reproductive potential. A higher species count (32.7%) was found in the abundance class (5), indicates that the vegetation is more or less diverse, which requires the promote communication and cooperation amongst the many forest owners and fortify the network of parties engaged in forest conservation.

Keywords: Plant diversity, Regeneration status, Structure, Woody plant