

Assessing plant utilisation by communities bordering a protected area in Zimbabwe using utilitarian diversity metrics

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Abstract

Protected areas and their peripheries harbour biodiverse ecosystems which underpin ecosystem service provision to local communities. Understanding the relationship between the species contained within these ecosystems and the utilitarian services they provide is important. However, there is a shortage of quantitative methods for assessing species' utilitarian roles. We used a dendrogram-based method to quantify utilitarian diversity and an ordination method to determine co-occurrences in three sites at the periphery of Gonarezhou National Park, in Zimbabwe. The use categories for the plants were determined using household questionnaire surveys, and vegetation data was collected via standard plotless sampling techniques. There was higher plant diversity in the sites adjacent to the protected area, i.e. Malipati communal area ($S = 45$; Simpson's index = 0.7271) and Gonakudzingwa farms ($S = 50$; Simpson's index = 0.9351), with the lowest diversity recorded at the site far from the park, i.e. Chomupani communal area ($S = 25$; Simpson's index = 0.6305). Utilitarian diversity was also highest in the areas adjacent to the protected area, with Malipati and Gonakudzingwa having values of 22.2 and 21.4, respectively, while Chomupani attained 20.6. A principal component analysis ordination indicated which utilitarian species occurred in the same areas. Our results contribute to plant conservation by highlighting the utilitarian relationships of species at protected area peripheries. This allows planners and conservationists to set conservation priorities to avoid losing species that contribute the most to ecosystem service provision.

Keywords: Gonarezhou, alpha diversity, utilitarian diversity, protected areas, ecosystem services