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The effect of fuelwood harvesting on structure, floristic composition, and coppicing ability of Miombo woodlands in Ruzawi Estate, Zimbabwe

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ABSTRACT

This study was conducted in Miombowoodland in Ruzawi, Marondera, Zimbabwe. The objective was todetermine the effect of selective stem removal on structure, composition and coppicing ability of miombo woodlands. Stratified Random Sampling method was used to collect vegetation data. Accordingly, 60 plots of $20 \times 20m$ ($400m^2$) were laid at every 30m along 4 transect lines located from the gridlines on the study site map. Regeneration data was collected from $2 \times 2m$ ($4m^2$) subplots located in each main sample plot. Vegetation parameters such as height, diameter at breast height (DBH), density and number of regenerates were determined. All woody species with DBH > 5cm were identified in both the disturbed and undisturbed miombo woodland. Statistical Package for Social Sciences (SPSS) version 21 was used for data analysis in this study. A paired t test was used to compare the two woodland types (disturbed and undisturbed) in vegetation data variables. Analysis of variance (ANOVA) was used to test coppicing ability in the three coppicing treatments (thinned 1 year ago, thinned $2 - 3$ years ago, and thinned $3 - 4$ years ago). CANOCO version 5 was used to analyze the species distribution in the woodland. The Sorenson's and Jaccard coefficients were used to detect similarities between the disturbed and undisturbed miombo. Shannon-Weiner and the Simpson's diversity indices were used to detect evenness between the two woodland types. A total of 31 species belonging to 26 genera and 17 families were identified in Ruzawi miombo woodland. The most diverse family was *Fabaceae*, followed by *Combretum*, *Strychnos*, *Cussonia*, and *Protea* in their order of importance. A hierarchical cluster analysis using importance value index (IVI) showed the dominance of *Brachystegia spiciformis*, *Julbernardia globiflora*, *Uapaca kirkiana* and *Parinari curatellifolia* the key miombo species.There was a significant difference in mean diameter ($p = 0.02$) and mean height ($p = 0.009$) between the undisturbed and disturbed miombo. The undisturbed miombo also differed significantly with the undisturbed miombo in regenerates ($p = 0.037$). There was no significant difference in species richness, species diversity, and evenness between the disturbed and undisturbed miombo hence thinning does not alter species composition in Ruzawi forest. ANOVA results showed significant differences in coppicing ability of miombo woodland species. This shows that miombo woodlands have a great ability to recover after a disturbance Therefore, thinning if sustainably managed can be recommended for fuelwood production in Ruzawi miombo woodland.