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“Bridging the gap between increasing knowledge and decreasing resources”

Post-Grazing Secondary Succession Dynamics of a Tamaulipan Thornscrub

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Abstract

Successional trajectory after an abandon under semi arid conditions is still not well understood. In arid and semi arid zones, rain and water available in the soil for plants has been described as one of the most decisive factors in the productivity and heterogeneity in the distribution and living forms of the plants. On a regional scale, Tamaulipas shrubland used in livestock production affects natural regeneration in some of the species, as a result there is a secondary succession in the ecosystem. The results of this research manifests that the areas with passive regeneration after livestock use in Linares municipality are conformed predominantly by the Fabaceae family and the *Prosopis* sp. genera. In total, 16 families, 23 genera and 27 species were registered in the successional estate, where the most abundant species were *Vachellia farnesiana*, *Diospyros texana* and *Prosopis laevigata*, being *V. farnesiana* the only one present in the three states and in the reference area. A direct relationship between the species richness and abandon time was observed in the study areas. In any case, a major number of timber species was found in the reference area compared with the other three studied áreas ($F=28.1$, $p < 0.001$). The same effect was found for the two biodiversity indexes, with higher values of the Shannon ($F=21.9$, $p < 0.001$) and Margalef ($F=46.3$, $p < 0.001$ variances not homogeneous) indexes in the ever grazed than in any of the grazed sites. Density values showed a not significant decreasing trend over time since grazing stopped with a 45 % reduction in the number of woody individuals in the 30-yr site in relation to the 10-yr site. However, the highest values in density were found in the reference site. Both basal area and projected cover were significantly lower in the youngest ecosystem. The greatest differences were found between 10-yr and 30-yr for basal area (more than 5 times higher; $F=7.99$, $p = 0.003$) and 10-yr and the reference for canopy cover (2.5 times higher; $F=4.48$, $p = 0.025$). Passive restoration through grazing exclusion triggers the recovery of biodiversity and structure of the woody component of Mexican Tamaulipan thornscrub, although these two ecosystem services change at different rates, the structure faster as the diversity. Active restoration by non-aggressive techniques may represent a suitable action for the establishment of late-successional species.

Keywords: Livestock, Fabaceae, Margalef, Shannon, Tamaulipas shrubland