



## **Grazing exclusion, substrate type, and drought frequency affect plant community structure in rangelands of the arid unpredictable Arabian Deserts**

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Grazing and drought can adversely affect the ecology and management of rangeland ecosystems. Several management actions have been applied to restore species diversity and community structure in degraded rangelands of the unpredictable arid environment. Protection from grazing is considered as a proper approach for restoration of degraded rangelands, but this depends on substrate type and sometime is hindered with water deficiency (drought). In this study, the effect of protection from grazing animals on species diversity and plant community structure was assessed after a dry and wet periods in both sandy and gravelly substrates in the Dubai Desert Conservation reserve (DDCR), United Arab Emirates. Two sites were selected during November 2012 on the two substrate types (fixed sandy flat and gravel plain) in the arid DDCR. An enclosure was established in each site. Plant community attributes (plant cover, density, frequency, species composition, and diversity indices) were assessed in a number of permanent plots laid inside and outside each enclosure during November 2012, April 2014 and April 2016. The results showed that protection improved clay content, but decreased the organic matters. Interestingly, the protection reduced the concentrations of most estimated nutrients, which could be attributed to the high turnover rate of nutrients associated grazing and low decomposition of accumulated dry plants of non-protected sites. Protection significantly increased all plant community attributes, but the only significant effect was for plant density. Plant density was almost twice greater inside than outside the enclosures. During the dry period, protection resulted in significantly greater deterioration in cover, density and all diversity indices in gravel, compared to sandy sites. Most of the grasses and shrubby plants had died in the gravel plains. However, plant community of the gravel plains was significantly restored after receiving considerable rainfalls. The overall results indicate that rangelands of the gravel plains are more fragile and should receive proper management through conservation and restoration.