

Comparing soil aggregate stability at different grazing intensities (case study: Bardasiab rangeland, Fereidounshahr)

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Abstract

Soil quality, aggregate stability and erosion sensibility are affected by different range management practices. This research aimed to evaluate the relationships between soil organic carbon, mean weight diameter (MWD) and aggregate size distribution in the surface soil layer (0- 20 cm) of various range sites with different grazing intensities (non, slightly and heavily grazed) in Bardasiab rangeland, Feridounshahr, Isfahan province. Stratified random sampling method was used to collect soil samples along the established transects. Some physical and chemical properties of soil samples such as texture, electrical conductivity (EC), organic carbon (OC), MWD and sodium absorption ratio (SAR) were measured in the soil laboratory. Simple linear regression and One-way ANOVA followed by the Fisher's LSD test were used to analyze the data. Results of regression analysis showed that MWD and OC of the soil samples were significantly correlated ($\alpha=1\%$, $R^2= 61.3\%$). The soil MWD values of range sites with various grazing intensities were significantly different ($\alpha=5\%$). Organic carbon was increased and SAR was decreased in the sites located inside exclosures, which lead to higher soil MWD. Aggregate size distribution among various sites were significantly different ($\alpha=5\%$) only for the aggregate smaller than 0.25 mm. Soil aggregates sizes between non-grazed and heavily grazed sites were also significantly different only for the size ranges of 4- 8 mm ($\alpha=5\%$,) and less than 0.25 mm ($\alpha=1\%$.) In addition, macro aggregates increased and micro aggregates decreased in range sites with no or slight grazing intensity, respectively as these sites experienced low trampling and increased litter and organic carbons. Soil aggregate stability can therefore be used as an appropriate indicator for monitoring the impact of different management practices on rangeland soil quality and health.

Keywords: Aggregate stability, soil mean weight diameter (MWD), exclosure, grazing intensity