Abstract

Knowledge of the root response of rangeland plants to animal grazing or harvesting of aerial parts is essential in vegetation management. However, there is little information about this issue, one of the reasons might be difficulty of assessing the effect of changes in the aerial organs on the root characteristics in rangelands. In this study, different grazing intensities of livestock were studied by simulating the intensity and frequency of harvesting of aerial parts on morphological characteristics of the root of *Agropyron desertorum* and *Festuca ovina* in greenhouse conditions. Sampling in greenhouse was done randomly with 3 replications. Experimental treatments consisted of three levels of harvesting of aerial parts, namely zero (control), 50% (moderate grazing) and 75% (heavy grazing), with randomly harvesting of plants in the period of 1 to 7 days. Root scanner (Delta-Tscan) and Root edge software were used to measure and calculate morphological traits of root. Root length, root diameter, root volume, root surface area and root mass were measured as root morphological characteristics. One-way analysis of variance (ANOVA) was used to analyze the effect of aerial shoot harvest on morphological characteristics of root. The mean comparison was done with Duncan's test at 0.05 level. The defoliation intensity of aerial shoot affected root growth of two species ($P < 0.05$). Effect of Harvesting of aerial parts at different intensities, i.e., heavy, medium and control on root growth was different ($P < 0.05$). The highest reduction in root growth was observed in heavy harvesting of aerial parts and the lowest root growth occurred in zero harvest in both species. The intensity of harvesting of aerial parts was not significant on root mass, volume and root surface area in *Festuca ovina* ($P > 0.05$). Therefore, root growth of *Agropyron desertorum* and *Festuca ovina* had a drastic reduction trend from the control to heavy harvesting.

Keywords: grass root, grazing simulation, root morphology, *Agropyron desertorum*, *Festuca ovina*

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Effect of simulated grazing on root morphological characteristics of *Agropyron desertorum* and *Festuca ovina*

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