Comparison of tree growth and soil properties in pure and mixed Eucalypt (*Eucalyptus camaldulensis*) plantation by Seymareh River

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Abstract

High demand to wood and its products followed by decrease in forests area leads to give special importance to forest plantation. This study aimed to consider the impact of 20-year pure and mixed plantation of Eucalypt and Arizona cypress on above-ground growth features and soil properties in Seymareh Park in Ilam province, Iran. A complete randomly design was conducted with two treatments of pure plantation of Eucalypt, and mixed plantation of Eucalypt and Arizona cypress with three repetitions in 2014. In total, 42 sample plots were determined. The quantity characteristics were as follow: diameter at breast height (DBH), diameter of collar (DC), tree height (H), crown coverage (CC), slender coefficient (SC), Form quotient, tree volume (V), leaf dry mass (LDM), leaf area index (LAI), total growth ring width (TWR), and wood density (WD). In order to determine the chemical and physical properties of soil, three soil samples from each plot at the depth of 0 to 30 cm were collected and a mixed sample was transformed to the laboratory for the further works. The results showed that DBH, DC, H, V, TWR of Eucalypt in pure plantation was significantly higher than those of mixed plantation ($P< 0.05$). According to the analysis of main components and growth features of Eucalyptus, two groups were separated across first and second axes as each of them indicated high adaptation with place of sampling (mixed or pure mass). The measuring soil properties between two plantations showed that potassium, nitrogen, phosphor, organic carbon and saturation moisture content were significantly more than that in pure plantation.

Keywords: Pure and mixed plantations, Growth features, Soil properties, Principle component analysis, Semi-arid zones.

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