

The effect of gap size on the physicochemical properties of soil in pure and mixed stands of *Fagetum hyrcanum* in the Tajan river watershed

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Abstract

Gaps affect the soil and other ecological features by affecting the amount of light inside the forest. In this study, the effect of natural and artificial gap of mixed and pure stands of *Fagus orientalis* on the physical and chemical properties of soil was investigated. For this purpose, 24 trees in the mixed type and 24 trees in the pure beech type were selected in the Hajikola-Tirankoli forestry project from the Tajan river watershed, in 2015. These gaps are classified into three classes: small (less than 150 square meters), medium (between 150 and 350 square meters) and large (350 to 500 square meters). In each gap, 5 plots were made on the diameters. Inside each plot, a soil sample was prepared from a depth of 0-30 cm and a composite sample was prepared. In addition, a control soil sample was also prepared outside each gap. The gap size had a significant effect on pH, EC, potassium, carbon, nitrogen while, the type of stands had significant effects on organic matter and nitrogen ($P < 0.05$). Also, the interaction effects of gap size and stand type had significant effects on nitrogen, organic matter ($P < 0.05$). The highest amount of potassium was observed in large gaps (with an area of 350-500) in pure beech stands and the lowest in mixed stands. The results of the present study showed that the amount of carbon, organic matter, nitrogen and potassium increases with the increase of the gap size. In the gaps resulting from cutting (artificial), the highest amount of nitrogen was observed in the large gaps of pure beech mass. There was more organic matter in the large gaps than the small ones. Also, the gap size and the stand type had no effect on the amount of phosphorus in the soil. Therefore, it can be said that in the mixed stands, especially in large gaps, soil fertility is higher than in small gap in pure stand.

Keywords: Harvesting, Mixed forest, pure stand, Organic matter, Hyrcanian forests.