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Variation in Some Soil Properties and Soil Organic Carbon and Total Nitrogen Stock Capacities of Anatolian Chestnut: In Relation to Soil Depths and Altitudes

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Aim of the study: From ancient times to present, chestnut tree is known as one of the most remarkable tree on earth due to its economical and anthropogenic importance. Turkey has 88.443 hectares of chestnut forests (*Castanea sativa* Mill.) and many studies have been carried out to investigate the natural distribution, development, productivity, ecology and diseases (chestnut ink and blight). However, the effects of chestnut tree on soil organic carbon and total nitrogen contents and stock capacities has received less attention. Aim of this study was to study the variation in soil organic carbon and total nitrogen contents and stock capacities of Anatolian Chestnut.

Material and Methods: This study was carried out in the Kastamonu province, Abana and Inebolu Districts, north-east of Kastamonu, Turkey, (41°59′ N, 34°01 E). Soil samples were collected from six soil depths (0-5 cm, 5-10 cm, 10-15 cm, 15-50 cm, 20-25 cm, 25-30 cm) at three altitudes of 41 m, 250 m and 305 m. The soil samples were air-dried, ground and pass through 2 mm mesh-sized sieve. They placed into marked plastic bags and kept in a fridge until chemical analysis. The soil samples were then analyzed for soil pH, soil texture, bulk density, soil organic carbon (SOC) and total nitrogen (TN) contents and stock capacities. Soil pH (H_2O) was measured in deionized H_2O using a glass calomel electrode, after equilibration for 1 h in a solution:soil paste ratio of 10:1. Soil texture (sand, silt and clay) was determined by Bouyoucos' Hydrometer method. Soil organic carbon and nitrogen contents were analyzed Kastamonu University Center Laboratory using Eurovector EA3000-Single CNH-S element analyzer. The total soil organic carbon and total nitrogen stock capacities were then calculated by multiplying soil volume, soil bulk density, and the total soil organic carbon or total nitrogen content.

Results: Among soil properties, soil bulk density and clay content increased with altitudes, while soil pH, silt and sand contents decreased. There were clear trends of decreasing soil pH and bulk density with the soil depths, but no clear trends with soil textures. Mean SOC and TN contents decreased with the altitudes and the soil depths. Mean SOC-stock capacity also decreased with the altitudes showing 87,4 t C ha at the altitude of 41 m, followed by 69,8 t C ha at the altitude of 305 m and 66,3 t C ha at the altitude of 250 m. Similarly, mean TN-stock capacity was highest with 6,61 t N ha at the altitude of 41 m, followed by 6,39 t N ha at the altitude of 305 m and 6,07 t N ha at the altitude of 250 m. Both mean SOC- and TN-stock capacities decreased with the soil depths.

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