

Hydraulic Conductivity in a Soil Cultivated with Wheat-Rapeseed Rotation Under Two Tillage Systems

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Abstract

To evaluate the effect of tractor transits and tillage system operations on soil pore functioning in a Haploxeroll, soil physical properties were measured on a field located in central Chile. The study site was divided into management under no tillage (NT) and conventional tillage (CT) and a wheat-rapeseed rotation was conducted within the last 7 years. During the last wheat season, soil properties (bulk density, water content, and saturated hydraulic conductivity, K_s) were evaluated at 0-5-cm depth at six timesteps (before tillage, after tillage, after sowing, first knot, anthesis, after harvest) and at two locations: in the wheel track (WT) and out of (OWT) the wheel track. The bulk density was stable in time, with values ranging between 1.18 and 1.33 Mg m⁻³, expected for soil texture. The water content was in agreement with water supply and rain, decreasing sharply at the end of the season. For the saturated hydraulic conductivity, average values ranged between 0.49 and 3.08 cm h⁻¹, representing moderately high values. In NT, a wheel track effect was observed after sowing due to the mass of the equipment, with the lowest K_s values in the NT-WT treatment (0.49 cm h⁻¹), followed by CT in both conditions (WT and OWT). The highest K_s values were observed in CT-WT at anthesis (3.08 cm h⁻¹) as an indicator of the recovery of the soil structure. Higher variations on K_s values were observed in CT than NT, with tillage x time interaction as the main factor for K_s variability; in this sense, soil functioning recovers during the season has not been affected by wheel track.

Palabras clave

Palabras clave de autor: [Triticum aestivum](#); [Saturated hydraulic conductivity](#); [Wheel track](#); [Soil physical properties](#); [Temporal variability](#)

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