

Estimating saturated hydraulic conductivity using different well known pedotransfer functions

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ABSTRACT

Saturated hydraulic conductivity (K_s) is a key input factor in agricultural modeling tools. The direct methods of measuring this property, either in situ or in a laboratory, are time consuming, expensive and impractical in large scales. Pedotransfer functions (PTF), which relate easy collected data to hydraulic properties, can use to solve these problems. In this research, the performance of some already published well known pedotransfer functions including Jabro, Puckett et al., Rosseta and NeuroTheta were compared to identify the accuracy of them in the estimation of saturated hydraulic conductivity of Turkish soils. For this purpose, 346 undisturbed samples with 2 replications from the surface layer (0-30cm) were gathered from different parts of Turkey. The K_s of samples were measured in the laboratory using by laboratory permeameter instrument. The soil texture, dry bulk density and organic matter contents were measured with common methods and were used as input parameters. The performance of models showed that the PTFs can use with reasonable accuracy for predicting K_s . The result proved the supremacy of the PTFs which derived based on the neural network, Rosseta and NeuroTheta, over the PTFs which derived based on regression, Jabro and Puckett.

Keywords: Jabro, NeuroTheta, Rosseta, Puckett, Turkish soils.