

Abstract

Pedo-transfer functions are mathematical equations that use basic features describing the soil (e.g. particle size distribution, bulk density, organic matter content) in order to predict other properties the values of which are not otherwise available. To predict the physical quality of agricultural soils a pedo-transfer function that uses basic soil properties (e.g. particle size distribution, dry bulk density, organic matter content) was produced. Evaluation of the soil physical quality was done by using the S index values. S is a measure of soil structure which controls many of the physical properties of soils. S index was calculated after using the Arya-Paris model in order to obtain the parameters from van Genuchten equation that describe the water retention properties of soils. Data analysis from 1923 soil horizons showed that the S index can be predicted by a single equation from basic soil features, such as clay contents and dry bulk density values that were taken as independent data variables. A statistically significant multiple linear regression equation was found and proposed as pedo-transfer function for prediction of the soil physical quality index, S ($r^2 = 0.41$; $p < 0.0001$). Pedo-transfer functions are useful solutions for investigation of different aspects of the physical quality of agricultural soils that do not have readily-available measured data.

Key words: (pedo-transfer function, S index, soil water retention curve)