

Abstract

Point Measurements of Soil Moisture Using TDR Technique—Comparison of Probes [†]

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There are many methods and techniques for measuring soil moisture. These methods are divided into direct and indirect ones. Direct methods, although characterized by high accuracy, are usually time consuming. Nowadays, when precision farming is more and more common, indirect methods are used which determine soil moisture by measuring other soil parameters. The most commonly used methods are time domain and frequency domain reflectometry. In order to achieve satisfactory performance in a given application, choosing an appropriate measurement technique and a suitable probe is necessary. There are many types of probes available on the market. The most common are two-rod probes, although single-rod, antenna-type probes [1], as well as multiple-rod probes that are also known from the literature. Apart from the rod probes, there are also other constructions, such as dagger probes [2]. Each of the mentioned constructions have appropriate measuring or mechanical properties. Another issue to consider is the sensitivity zone of the probe. Although, in the case of measurements of homogeneous materials, it does not matter much, in the case of soil moisture measurement, especially in field conditions, it may be a critical parameter determining the usefulness of the probe. The paper compares three types of TDR soil moisture measuring probes: dagger, antenna, and a two-rod probe. Based on the results obtained, the applicability of the probes in the field conditions was evaluated.

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