

Consideration of various factors on the expression of Soil Water Repellency

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Soil water repellency (SWR) is a phenomenon that exhibits soil hydrophobicity mainly related to the presence of organic matter coating in soil grains. Agricultural farm manure, organic fertilizer, different vegetation type as well as microbial activity in the soil could be the reasons to develop hydrophobicity of soil. Importance of SWR studies is to understand the nonuniformed infiltration, surface run-off and soil erosion etc. The objectives of this study are (i) to investigate the difference of SWR measurement in the field and laboratory condition and (ii) to identify the relationship between the SWR and soil physical and chemical properties. Two sites were selected; greenhouse vegetable farm at Mizuho-farm, Miki city, Hyogo prefecture in Japan and pasture land at Tihoi farm, Waikato in New Zealand. Field measurement and soil sampling in Mizuho-farm were carried out on December 2013 and October 2014. Sampling in Tihoi farm was carried out on February 2014 and December 2014. At the Mizuho-farm, two greenhouses were selected (No. 7 and No. 21) and field water drop penetration time (WDPT) were carried out using transect walk, grid locations (10 m x 3.0 m area), auger samples for depth profile and random points measurements. In addition to correlate the biomass production to SWR, biomass percentage were estimated using quadrat (0.3 m x 0.3 m) method.

Similar to that, WDPT were measured at Tihoi-farm on selected transect lines along the sloping land (ridge and furrow) and most top of the pasture land. At the same time, surface soil samples and core samples were selected to measure laboratory WDPT and soil physio-chemical properties for Japan and New Zealand sites. Results were analyzed to compare field and laboratory WDPT measurements and effect of physio-chemical properties on degree of SWR.

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