

Effect of Infiltrax™ on soil structure aggregate, stability, pore number and connectivity

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Soil structural stability in agricultural soils is of a high importance for maximising crop productivity, minimising compaction and reducing nitrous oxide emissions. This study investigates the effect of a soil ameliorant (Infiltrax™) on soil structure, particularly on aggregate stability and porosity. Infiltrax™ is a combination of electrolytes, wetters, permeants and specific functional groups to aid in the aggregation and stabilisation of soil aggregates. Infiltrax™ is a non-toxic biodegradable liquid product and has been designed for application to soils in-furrow and via irrigation. Urrbrae soil (Red Chromosol) was packed in columns and treated with three wetting and drying cycles using Infiltrax™ as a treatment solution. Saturated hydraulic conductivity (HC_s) measurements were taken at the end of the experiment and compared with an untreated control column. Significant increase in HC_s was observed in the Infiltrax™ treated soil. Emerson dispersion test, performed on the air dried treated soil aggregates, showed the significant improvement in aggregate stability comparing with the control. X-ray computed tomography (CT) scanning of the replicate columns provided a means of measuring changes of soil structure in two (2D) and three (3D) dimensions. 2D and 3D images reconstructed from CT scans allowed visualisation of the structural effects of Infiltrax™ and quantification of increased porosity and connectivity due to Infiltrax™ treatment. CT scan results confirmed that the soils treated with the Infiltrax™ solution had much higher porosity than that of the soil leached with water only. Further studies are in progress to evaluate Infiltrax™ for the major farmed soil types of Australia.

