



Effect of previous crop roots on soil compaction in a no-tillage system

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Crop roots can potentially reduce soil compaction. These roots can later decay and loosen the compacted layer to allow water and nutrients to move freely through the soil profile. A field study was initiated in 2014 to evaluate the effect of various crops on soil compaction in 2-yr rotations of camelina, carinata and a cover crop mix planted in place of fallow with durum. The study was designed as a randomized complete block with three replications in a no-tillage system. Three soil penetration resistance (PR) measurements were taken with a digital penetrometer in 2.5-cm increments to a 30-cm depth within each plot. Soil moisture contents were also determined using a digital TDR sensor at the time of PR measurements. Soil PR measurements were monitored prior to planting in spring and after harvest. Initial soil PR results from spring 2014 showed that all plots had an average of 2.244 MPa between the 8-20 cm depth, presumably due to a past history of tillage, continuous durum, and wheel traffic caused by various management practices. Using covariance analysis indicated that soil PR was not significantly affected by crop type and soil moisture content. After one cycle of the 2-yr rotation, the 2016 measurements indicated that the compacted layer existed at the same initial depths. However, after two cycles (2015-18), soil PR values in spring of 2018 were significantly reduced to 1.484, 1.854, 1.763, 1.654, and 1.384 MPa under camelina, carinata, cover crop mix, durum, and fallow treatments, respectively. These preliminary favorable results confirmed that previous cover crops roots were effective in reducing soil compaction below the threshold of 2 MPa after two cycles of the 2-yr rotation. Further research is still needed to validate these results on different soils and under various cover crops prior to making any recommendation.