



## **Evaluation Effects of Deep Rooted Crops on Soil Compaction in a No-tillage System**

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Deep rooted crops with rigorous taproots can potentially alleviate soil compaction by breaking up the compacted layer. These roots can later decay and loosen the dense soil 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 rooting systems 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. Soil penetration resistance (PR) was measured with a digital penetrometer in 2.5-cm increments to a 30-cm depth within each plot. Soil water contents were also determined using a digital TDR sensor at the time of PR measurements. Soil PR measurements were monitored prior to planting and after harvest. Initial results from 2014 showed that all plots had a compacted layer ( $> 2$  MPa) between the 8-20 cm depth presumably due to a past history of tillage that likely caused a plow pan layer, continuous durum, and wheel traffic caused by various management practices. After one cycle of the 2-yr rotation, the 2016 compaction measurements indicated that the compacted layer existed at the same initial depths. Preliminary results confirmed that crop roots were ineffective in reducing soil compaction after the first cycle of rotations. Additionally, visual observations also revealed that most of the crop root systems developed above the compacted layer within the 0 - 8 cm layer, thus potentially affecting crop yield.