

Comparison of Organic and Conventional Treatments Through Soil Water Retention Graphs

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INTRODUCTION

California is the country's leading crop producing state; field crop production value of \$2.78 B (California Agricultural Statistics Review, 2022)

Conventional farming (i.e., incorporating synthetic fertilizers and pesticides) poses a threat to the environment and human health when used incorrectly (Aktar, MW et al.)

Organic farming generally reduces crop yield but is less intensive; increases soil aggregate stability (Mondelaers et al., 2009)

Understanding the water retention capabilities of soils with different treatments can help to determine best practices for certain regions/locations

LITERATURE REVIEW

Soil compaction & water infiltration are closely correlated phenomena (Aktar et al., 2012)

Being able to measure water content reveals more about the compaction of a soil

Soils that are compacted reduce the chances of short-term water infiltration to be classified as lasting improvements (Bationo et al., 2012)

MATERIALS AND METHODS

- Soil from Century Experiment, UC Davis; corn tomato rotation, full subsurface drip irrigation
 - 9 organic – winter cover crop, compost source
 - 9 conventional - mineral fertilizer, pesticide incorporation
- Collected with 250mL sampling ring
- Saturated in 0.1 M CaCl₂ solution from bottom
- Dried on HYPROP – matric potential in wet range
- Measured with WP4C – matric potential in dry range

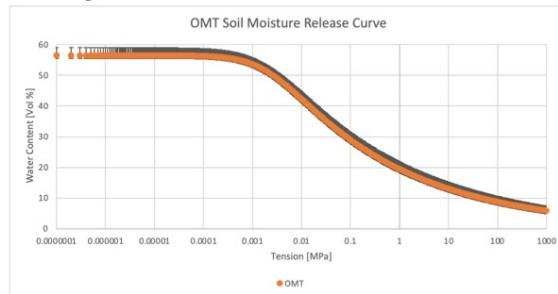


Fig 1. Datapoints for each average volumetric water content value at a specific tension for the organically treated soils

RESULTS

- Organic soils had higher average saturation point
 - Organic – 56.5%;
 - Conventional – 51.6%
- Organic had higher average water content at all tension points
- Average water content values for each treatment get closer as tension increases

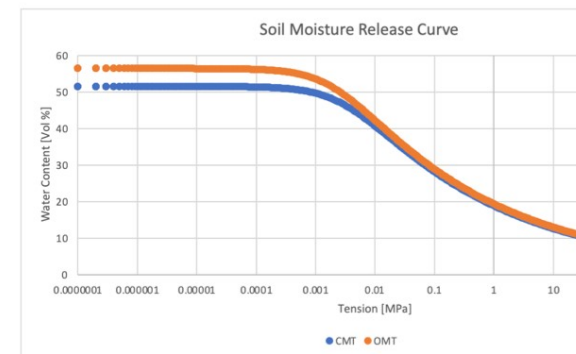


Fig 5. Datapoints for each average volumetric water content value at a specific tension for the all collected soils

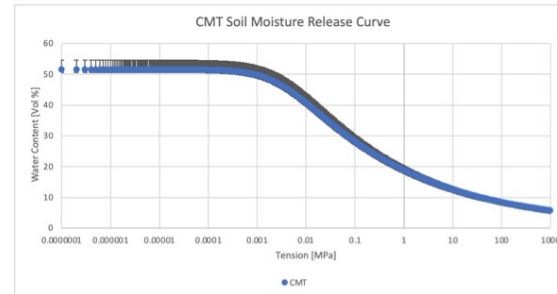


Fig 2. Datapoints for each average volumetric water content value at a specific tension for the conventionally treated soils



Fig 3. Three HYPROP weighing units in front of degassing unit



Fig 4. Two soil cores saturating in CaCl₂ solution

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