COMPARISON OF TWO AGGREGATE STABILITY METHODS USING A RO-TAP® SIEVE SHAKER

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The Situation

- Erosion is a constant threat on the semi-arid Texas High Plains
- Different management practices can have different affects on soil health and erodibility
- Measurements of aggregate stability can help track the influence of management practices on potential soil erodibility
- Aggregate stability methods (dry vs. wet sieve) have not been thoroughly evaluated in semi-arid sandy soils of the Texas High Plains

Our Study

West TX

The Treatments

- Conventional tillage cotton (CT)
- No-tillage cotton, rye cover crop (RNT)
- No-tillage cotton, mixed species cover: rye (50%), hairy vetch (10%), winter pea (33%), and radish (7%) by weight (MNT)
- Native rangeland (NAT)

The Timeline

- 1998: conventional tillage vs. no-tillage, rye cover
- Native rangeland has been untilled for at least 80 years
- 2014: no-till, rye cover plots split and no-till, mixed species cover added

The Measurables

Aggregate stability (wet and dry)

Results & Discussion

Dry Aggregate Stability-

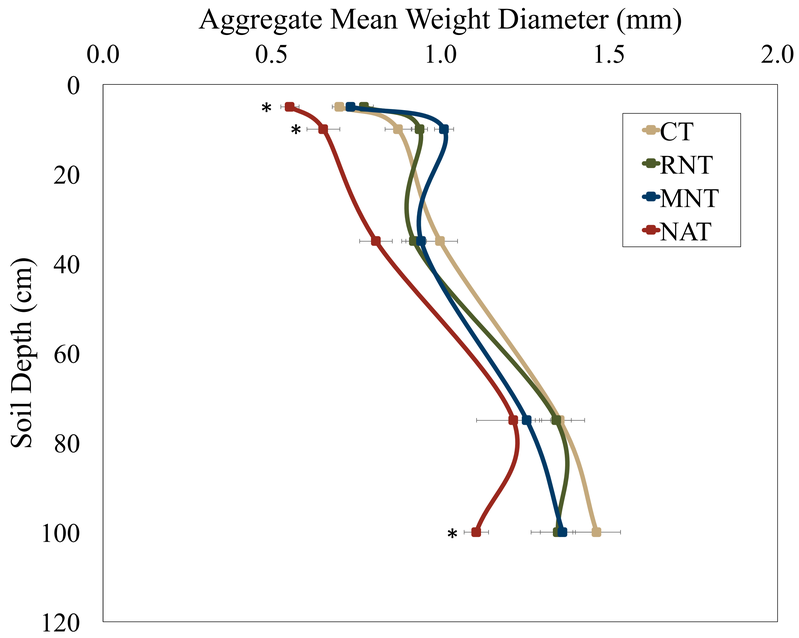

Figure 1. *Soil aggregate mean weight diameter using the dry sieve method from 0-100 cm depth below the soil surface for four management systems. Stars represent significant difference between treatments at a given sampling depth (α=0.05). Significant differences existed at the 0-5 cm (P=0.009), 5-10 cm (P=<0.0001), and 75-100 cm (P=0.07) depth, but did not exist at the 10-35 cm (P=0.388) and 35-75 cm (P=0.318) depth.*

Wet Aggregate Stability-

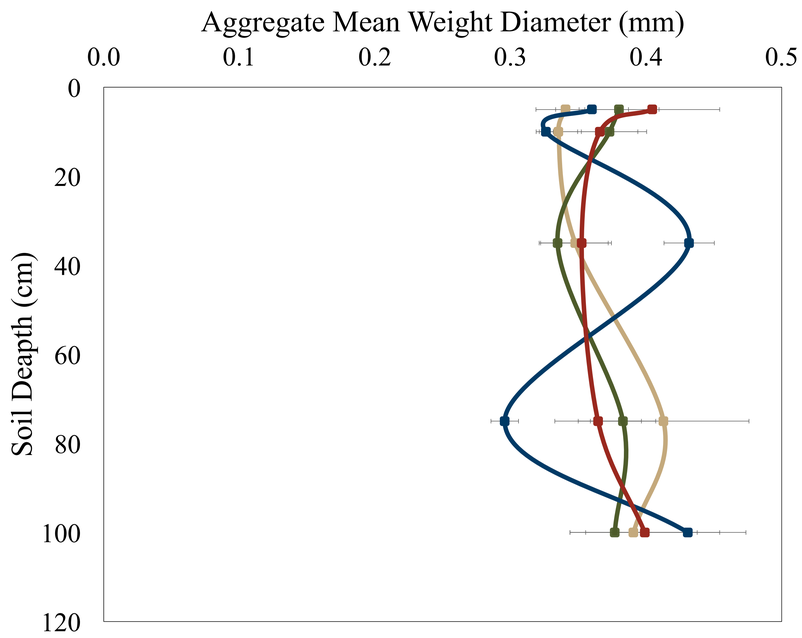

Figure 2. *Soil aggregate mean weight diameter using the wet sieve method from 0-100 cm depth below the soil surface for four management systems. There was no difference between treatments at any sampling depth at α=0.05 (0-5 cm, P=0.4511; 5-10 cm, P=0.295; 10-35 cm, P=0.356; 35-75 cm, P=0.612; and 75-100 cm, P=0.872).*

Discussion-

- Aggregate stability measurement was vastly different depending on methodology using a RO-TAP® sieve shaker
- Aggregate mean weight diameter (MWD) was significantly greater using the dry sieve method compared to the wet sieve
- The dry aggregate stability method tended to produce similar trends in MWD regardless of management practice compared to the wet aggregate stability method
- The wet aggregate stability method did not produce similar trends in MWD regardless of management practice in contrast to the dry aggregate stability method. This was true for similar management practices (RNT vs MNT)
- Statistical differences between management practices at depth were determined using the dry aggregate stability method but not with the wet sieve method
- Comparison between the RO-TAP® wet aggregate stability method and other established wet sieve methods should be evaluated to determine the source of this variation

The Take Home

Measurements for aggregate mean weight diameter still need calibration for sandy soils in semi-arid cropping regions. Care should be taken prior to soil health indicator adoption nationally.

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