

Methods comparison for determining wet aggregate stability in organic, compost-treated, semi-arid, calcareous soils

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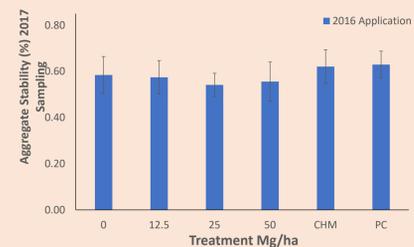
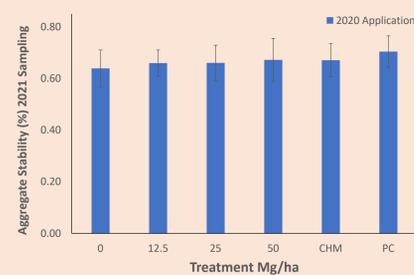
INTRODUCTION

Aggregate stability

- Is a key physical soil health indicator
- Is challenging to measure in semi-arid calcareous soils.

Rationale

Previous analysis showed a decrease in aggregate stability in compost amended plots despite improved soil aggregation visible in the field. It is unclear whether this is due to compost weakening aggregates in calcareous soils or methodological problems.



Objective

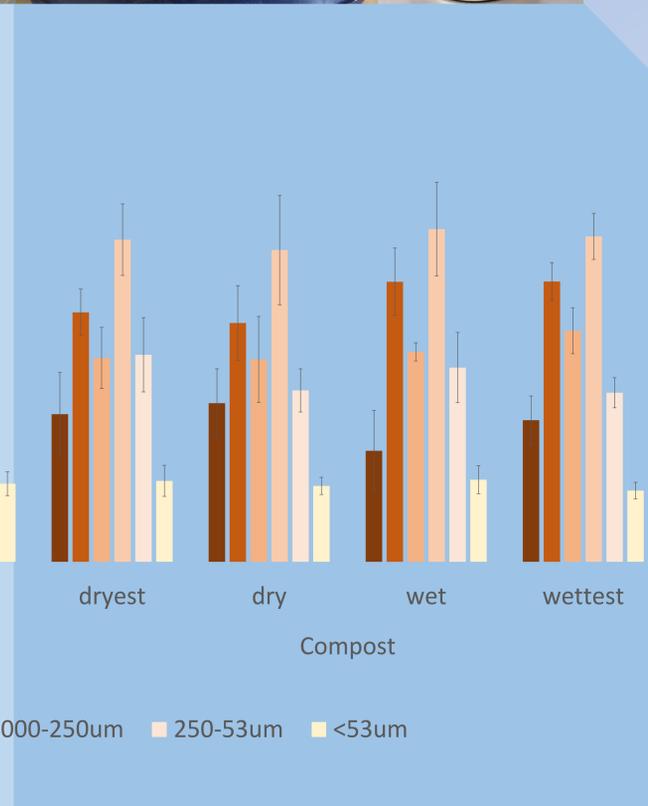
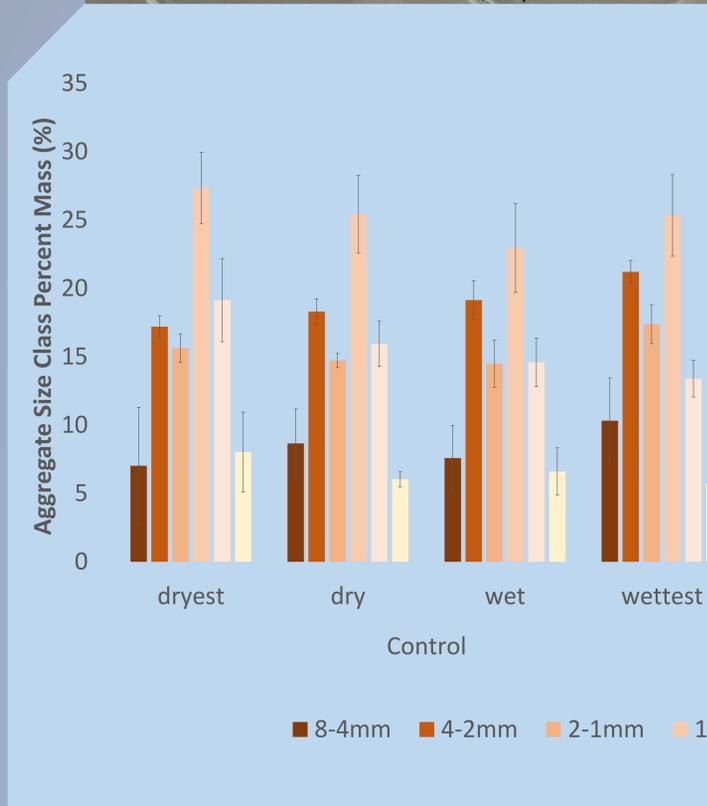
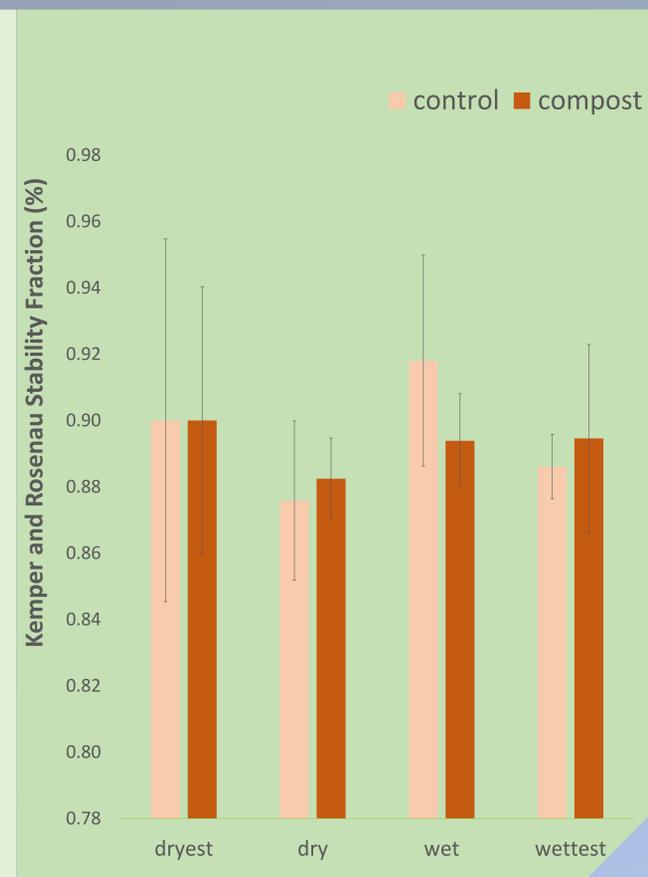
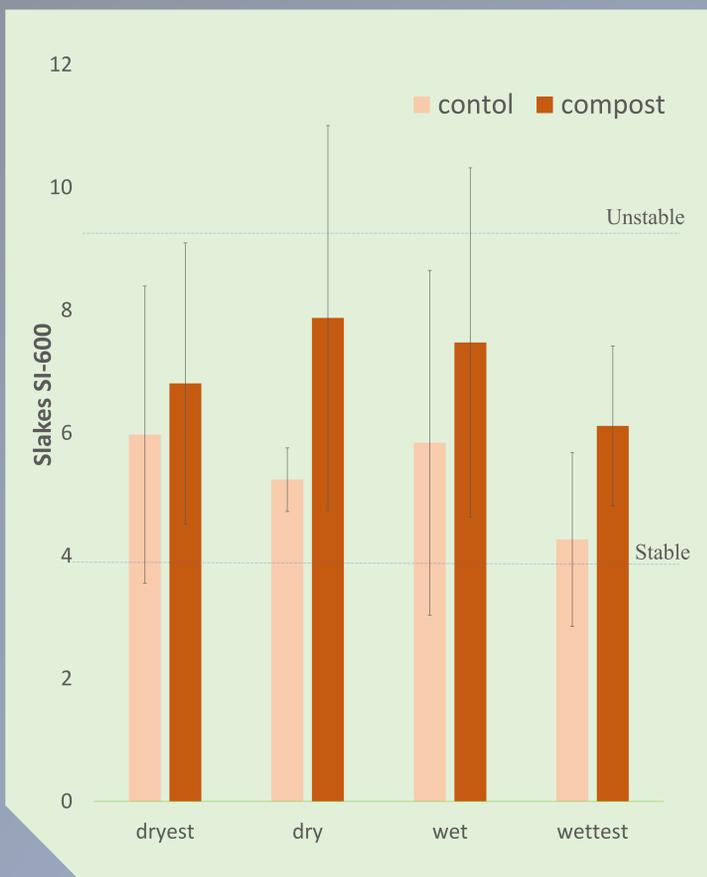
The aim of this study was to compare the sensitivity of aggregate stability methods across a moisture gradient.

METHODS

The following methods were compared:

- Wet sieve method (Kemper & Rosenau 1986)
- Dry sieve method
- Slake's smart phone application

Samples were collected from the Greenville Farm in Logan, UT mapped as a Millville soil series (Coarse-silty, carbonatic, mesic Typic Haploxerolls) Treatments included a moisture gradient with and without compost applied at 50 Mg/ha DW.



CONCLUSION

We found few clear differences between methods for measuring aggregate stability. Formal statistical analysis is pending.

This reflects the past trends found when using the Kemper and Rosenau method.

The dry sieve method suggests a slight increase in stability due to compost application.

Future research

We will add the Cornell sprinkle infiltrometer to the methods comparison.

We will run more in-depth statistics on Cornell sprinkle infiltrometer, Slakes, wet sieve, and dry sieve methods.

We will assess Slake's smartphone method using pre-moistened aggregates for more accurate sensitivity in another trial.

Citations

Kemper and Rosenau, 1986Kemper, W.D., Rosenau, R.C., 1986. Aggregate stability and size distribution. In: Methods of Soil Analysis, Part 1. Physical and Mineralogical Methods. Agronomy Monograph no. 9. Society of Agronomy/Soil Science Society of America, pp. 425–442.

Flynn, K. D., Bagnall, D. K., & Morgan, C. L. (2020). Evaluation of SLAKES, a smartphone application for quantifying aggregate stability, in high-clay soils. Soil Science Society of America Journal, 84(2), 345–353. <https://doi.org/10.1002/saj2.20012>

Acknowledgements

This project was funded by the USDA NIFA OREI Award 2019 51300 30476

