

A Simple, Affordable, Do-It-Yourself Method for Measuring Soil Maximum Water Holding Capacity

Background/Objective

- Water holding capacity (WHC), the amount of water soil can hold per unit mass, is a metric of a critical soil ecosystem service that compositely measures soil texture, organic matter, and structure.
- The standard method for measuring WHC via a pressure chamber (WHC_{PC}) requires specialized equipment that may be unavailable to community scientists.
- Here, researchers compared an accessible method for measuring maximum water holding capacity via the funnel, filter paper, and drainage method ($MWHC_{FFPD}$) against WHC_{PC} .

Approach

$MWHC_{FFPD}$ and WHC_{PC} methods were compared across 10 soils with a wide variety of textures (4-55% clay). The $MWHC_{FFPD}$ was also tested for sensitivity to methodological variations pertinent to community scientists: drainage time, covering, filter type, and water source.

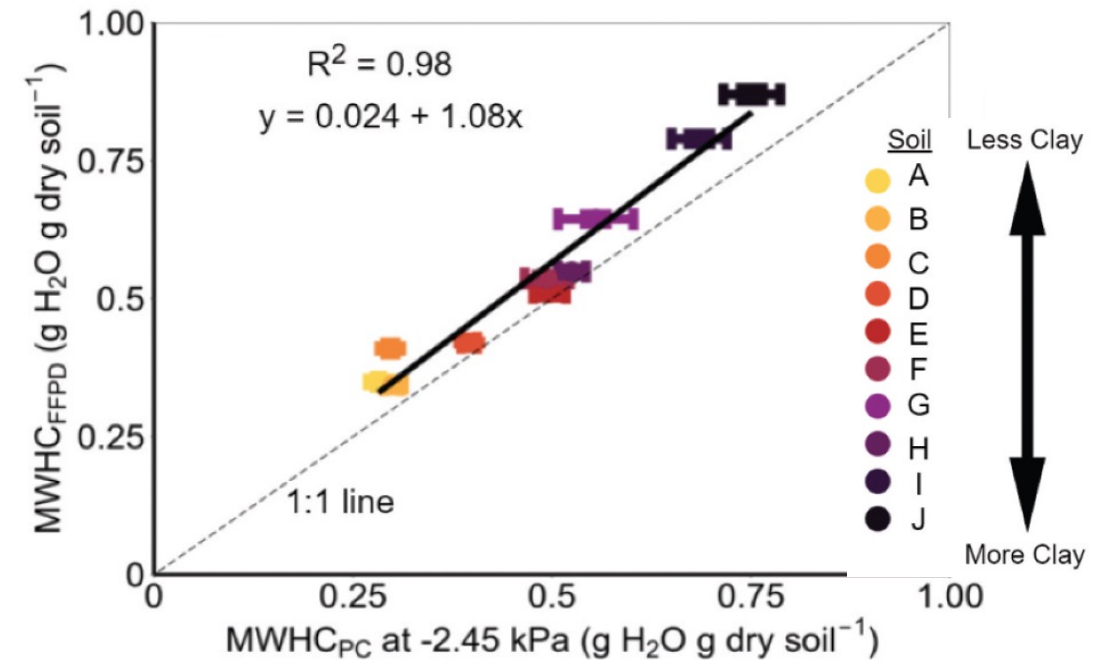
Results

The two methods were comparable in precision and $MWHC_{FFPD}$ best correlated to WHC_{PC} at water pressure of -2.45 kPa ($R^2 = 0.98$). $MWHC_{FFPD}$ was mostly insensitive to the methodological variations tested, although somewhat sensitive to water source.

Significance/Impacts

$MWHC_{FFPD}$ is a simple and affordable test of sieved soil structure and organic matter and has the potential to expand capacity for soil health monitoring including, for example, monitoring changes in soil structure in response to planting perennial bioenergy crops such as *Miscanthus x giganteus*.

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$MWHC_{FFPD}$ correlates with WHC_{PC} at -2.45 kPa.