

Using the Slake Test to Determine Soil Crusting

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An easy to use test can be done to predict potential soil crusting on farm fields. All you need is some chicken wire, water, a glass jar, and a dry clump of soil. When you immerse the clump of soil in the jar of water, the longer it holds together, the better the soil structure to resist crusting.

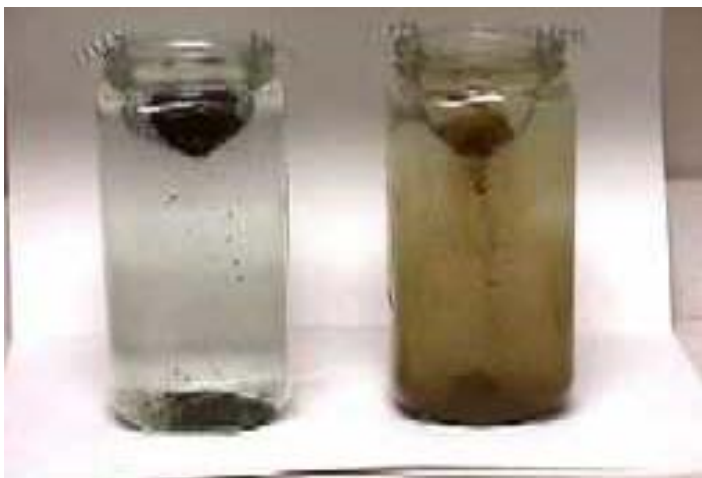
The slake test compares two chunks of topsoil in water to see how well and how long they will hold together. Here are the steps according to NRCS Newsletter article #14:

1. Collect a chunk of topsoil—a size that would fit in your hand—from an area where you do not till, like a fencerow, or a field you have no tilled or had in grass for many years.
2. Get a second spade-full or chunk of soil from a field you have tilled consistently. It should be the same soil type as the first sample. Both soil chunks need to be air-dry.
3. Find two glass jars, canning jars or some kind of clear glass jars large enough to hold the chunks of soil.
4. Put together some type of wire mesh that you can hook at the top of each jar that will allow the soil to be submerged in the water, yet be held within the top half of the jar. Chicken wire works well.
5. Insert the wire meshes into each jar.
6. Fill the jars with water.
7. At the same time, submerge the tilled sample in one jar, and the untilled sample in the other.
8. Watch to see which soil holds together and which one falls apart. The soil with poor structure is the one that will begin to fall apart.

Poor structure soil that easily falls apart will form small soil aggregates, which collect at the soil surface and will dry into a hard crust. Crusted soil will make it difficult for seed emergence and will limit future rainfall infiltration and cause runoff and erosion.

Slaking indicates the stability of soil aggregates resistance to erosion and suggests how well soil can maintain its structure to provide water and air for plants and soil biota when it is rapidly wetted. Limited slaking suggests that organic matter is present in soil to help bind soil particles and micro aggregates into larger, stable aggregates. During heavy rainfall events, a soil with good aggregate stability will maintain pore space and allow water to be absorbed into the soil.

Conservation tillage systems, such as no-till, reduce slaking by reducing soil-disturbing activities that break aggregates apart and accelerate decomposition of organic matter. No-till and residue management lead to increased soil organic matter and improved aggregate stability and soil structure, particularly when cover crops or sod-based rotations provide an additional source of residue. So observe what happens during heavy rainfall events. Does your field flood or can it absorb the water?



Well-structured soil on the left can resist crusting.

Resources

- Why is Soil Organic Matter So Important? Hatfield et al., Crops & Soils Magazine, March-April 2018, pg 4-8.
- Healthy Soils Are: Well-structured. NRCS Newsletter article #14
ydaa.purdue.edu/natural_resources/Soil,Health/Activities/SlakeTest,NRCS.pdf
- Soil Quality for Environmental Health, Slaking
soilquality.org/indicators/slaking.html