

THE SLAKE DEMONSTRATION OF SOIL AGGREGATE STABILITY



THE SLAKE TEST demonstrates a soil's resilience to the breakdown of larger soil aggregates into smaller microaggregates when they are exposed to an extreme wetting event.

WHAT YOU ARE SEEING: The slake test compares management effects on the stability of soil aggregates. More aggregate stability increases resistance to erosion and a soil's ability to maintain structure, and is better at providing water and air for plants and soil biota.

- **Unstable aggregates** “slake” (melt) through the sieve and move to the bottom of the jar seen to the left.
- **Stable aggregates** stay together and rest in the sieve seen to the right.

POOR AGGREGATE STABILITY AND SLAKING result in fine, detached soil particles that settle into pores, cause surface sealing, reduced infiltration and plant available water which increases runoff, erosion and nutrient loss and minimizes resilience to extreme events.

FACTORS AFFECTING

SLAKING

- ✓ Soil texture
- ✓ Organic Matter %
- ✓ Wetting rate
- ✓ Pore space and variety of size
- ✓ Pressure of entrapped air
- ✓ Swelling of clay particles

Slaking

happens with:

- Low organic matter
- Absence of biotic ‘glues’ to bind smaller aggregates and form and maintain larger aggregates.

The ‘melting’ of aggregates leads to:

- Surface crusting, reduced infiltration
- Surface compaction, limited water and air movement through soil

Thus increasing:

- Runoff
- Erosion
- Nutrient loss

Slaked, smaller aggregates settle together, resulting in smaller pore spaces:

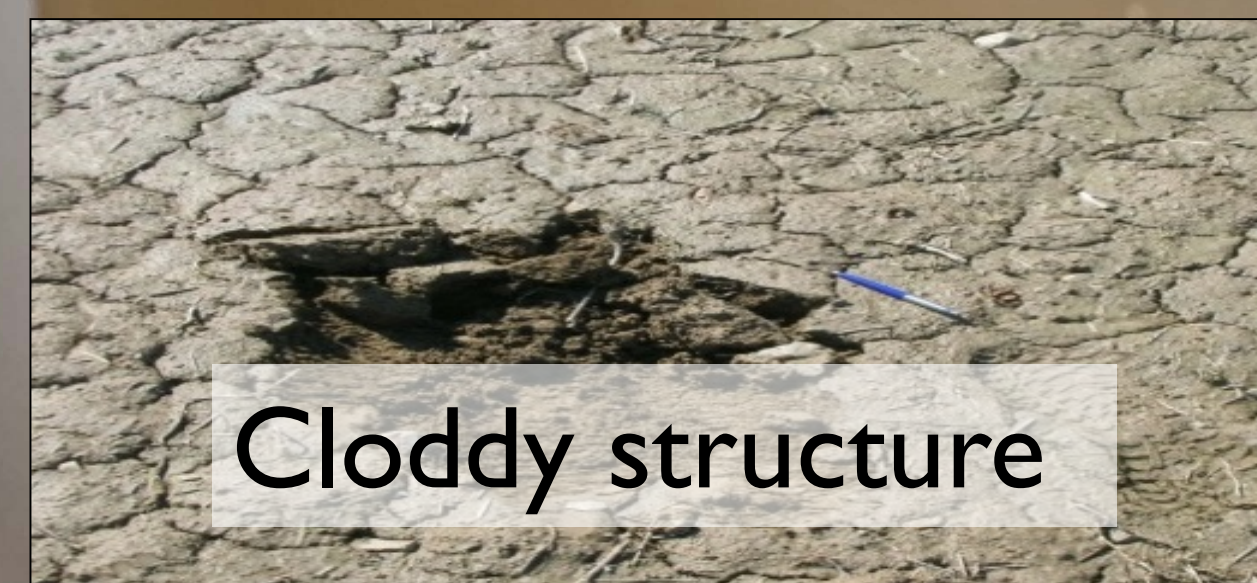
- Pore volume reduced
- Ability of plants to use water stored in pore spaces altered
- Particles may end up in waterways and effect water quality

Collamer Silt Loam

One Field with TWO Contrasting Management Histories

Intensive cropping
Moldboard plow
Annual small grains
Low organic matter

Perennial sod
Grassed pasture
High organic matter



MANAGEMENT PRACTICES

TO MINIMIZE SLAKING

- ✓ Crop rotation
- ✓ Cover crops
- ✓ Addition of organic amendments
- ✓ Residue and tillage management
- ✓ No soil disturbance
- ✓ Continuously covered soil

Stable Aggregates

happen with:

- High organic matter
- Promotion of biotic activity that live, respire and die in the soil which produces biological ‘glues’ binding soil particles.

Stable aggregates lead to:

- Enhanced friability and crumbliness
- Less dense, “lighter” soil

Thus improving:

- Workability of soil with less fuel
- Infiltration, drainage and resistance to erosion
- Resilience to extreme weather

For more information visit our website:

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