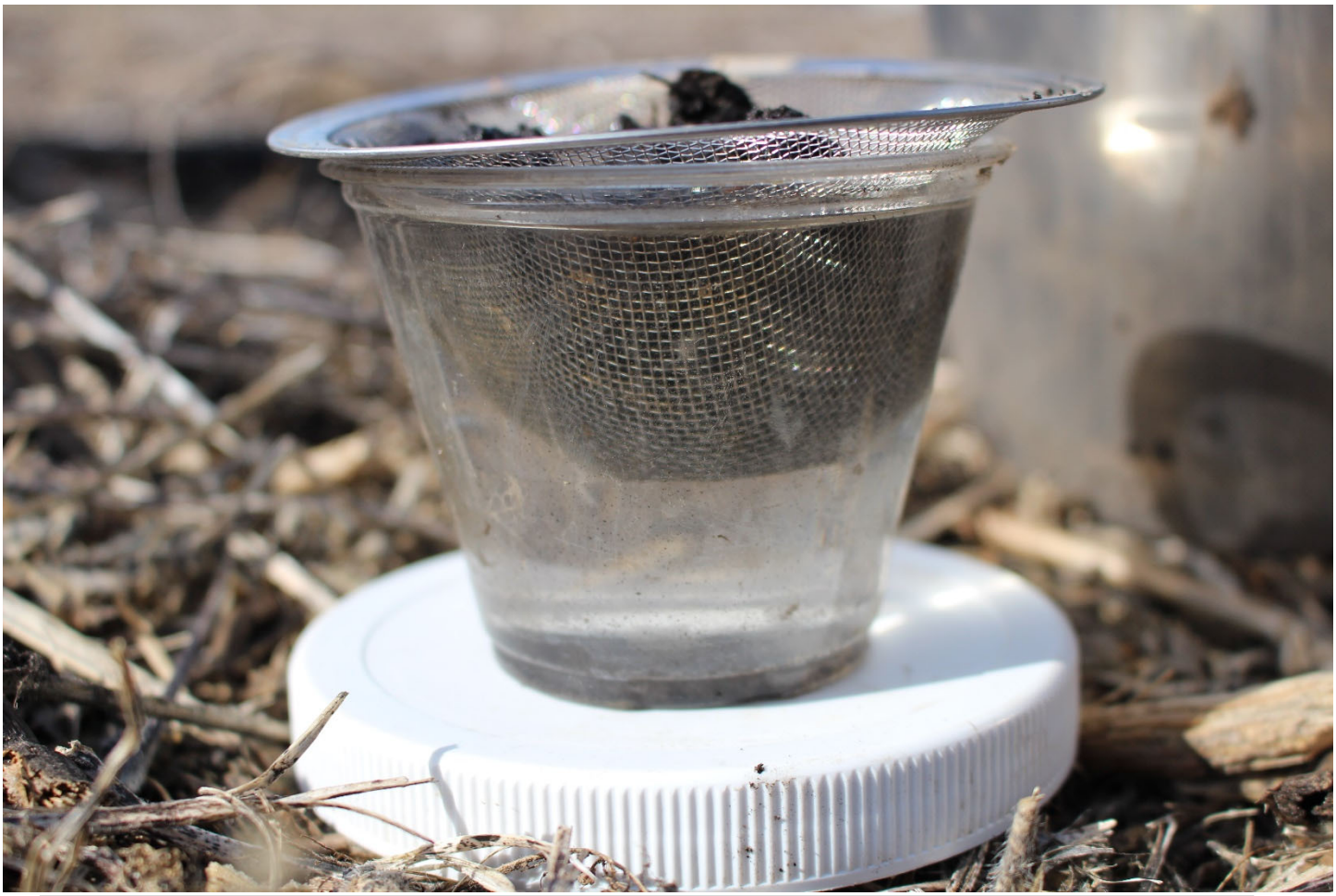
Aggregate Stability Assessment -Also known as **The Slump Test**

The stability of soil aggregates in the presence of water is important for many reasons. This includes water infiltration, air exchange, soil organism habitat, plant root growth, protecting soil organic matter, decreasing soil erodibility as well as many other reasons.

Soil aggregates are groups of soil particles that bind to each other more strongly that to adjacent particles. Particles of sand, silt and clay bind around and to soil organic matter creating aggregates. When we talk about aggregate stability, it is referring to the ability of a soil aggregate to resist disintegration when disruptive forces associated with disturbances such as tillage, wind or water erosion are applied.

The Slump test is an assessment where we take a larger soil aggregate and gently crumble that aggregate down into smaller aggregates, about the size of BB's. The aggregates are then placed into a sink strainer or small wire colander and the strainer is placed in water, allowing the soil to become fully saturated (about 1 minute). After the soil is saturated, the strainer is taken out of the water and turn it over onto a flat surface.



Picture of a sink strainer containing BB sized soil aggregates soaking in water

Soils with good aggregate stability will maintain their structure and keep the same shape and size as the soil aggregates crumbled into the strainer before it was wetted. Soils with poor aggregated stability will slump and the aggregates will disintegrate and melt. Soils with good aggregate stability can be referred to as 'chocolate cake' whereas soils with poor aggregate stability can be referred to as pudding.

No-Till with Cover Crop Plot

Picture of a slumps from No-Till with Cover Crops Plot

In these photos of the No-Till with Cover Crops plot, you can see how the slump stands up and holds together. In the photo on the right, the plate is tipped almost completely vertical and the soil slump is holding together on the plate. A little water has flowed out but the soil particles themselves are staying cohered to each other. The shape of the individual aggregates have softened around the edges a bit but you can still see their shape. The aggregates have melted a little bit but not much.

No-Till Plot, no cover crops

Picture of a slumps from No-Till Plot

In these photos of the No-Till plot, you can see very distinctly shaped aggregates. Even after being in the water, the individual aggregates look almost the same as they did before they went in the water. The slump has held together well. In the picture on the right, the slump has been opened up by running my finger through the slump. Notice the distinct aggregates and that there is no water pooling between the aggregates.

Strip-till with Cover Crop Plot

Picture of a slumps from Strip-Till with Cover Crop Plot

In these photos of the Strip-Till with Cover Crops plot, you can see some aggregates throughout the slump. If you look closely at the bottom of the slump in the left photo, you can see that the aggregates are more disintegrated and have melted. The photo on the right shows the slump after I ran my finger through it and opened it up. You can get a better view of the individual aggregates and how they are still holding their shape. Notice how there is little to no water pooling between the aggregates in this photo

Strip-till Plot, no cover crops

Picture of a slumps from Strip-Till Plot

In these photos of the Strip Till plot, you can see the slump on the left that didn't hold it shape as well and when you tip the plate just slightly vertical, the soil slides across the plate and leaves a trail of soil behind it. I like to call these skid marks! Soil is coming out with the water and it is more difficult to distinguish the individual aggregates in the slump. In the photo on the right, the plate was shook slightly to see how the slump would hold together. The slump collapsed and spread out with water oozing out all around the edges.

Conventional Till with Cover Crop Plot

Picture of a slumps from Conventional Till with Cover Crop Plot

In these photos of the Conventional Till with Cover Crops plot, you can see that the slump is holding its shape but that you can barely see individual aggregates. The aggregates are very small and it almost lost like one mass of soil. In the photo on the right, as the plate is being tipped from side to side, you can see the slump is holding together but is starting to leave soil particles trailing behind it.

Conventional Till Plot, no cover crops

Picture of a slumps from Conventional Till Plot

In these photos of the Conventional Till plot, you can see that the slump is spreading out immediately after being flipped over. As you tilt the plate side to side the slump slides back and forth leaving pools of water and soil particles. In the photo on the right, the plate was shook slightly to see how the slump would hold together. Notice how the slump collapsed and spread out with water oozing out around the edges and water pooling in the middle of the slump.