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Course organic matter distribution and soil moisture retention capacity

Organic matter (OM) is a critical component of the soil in agriculture in arid or semi-arid regions in particular because of its ability to retain water in the soil. This raises the question, how does spatial distribution of OM in soil play a role in efficiency of soil moisture retention. The purpose of this experiment was to recreate three treatments, mimicking different ways OM is incorporated into the soil in an agricultural setting, along with a control which has no additional OM. To do this, the first treatment had OM fully submerged beneath the soil surface to show an increase of OM content compared to the control. The second treatment had 80% OM buried and 20% sticking out, mimicking a tilled agricultural setting. The final treatment had OM 80% buried with 20% stubble sticking out with intact root systems, to mimic summer fallow. To measure water retention, each pot was $\frac{1}{4}$ submerged under water overnight to fully saturate the soil. After saturation, the pots were weighed and then placed in a drying oven. The pots were periodically re-weighed at time 0, 0.5, 1, 2, 4, 8, 12, 24, 36, 48, 60, 72, 96, 120, 144, 168, 192, 216, 336 hours. Preliminary results show the fallow treatment had the most loss in water, followed by the unamended soil control, tilled soil treatment, and the most water retention was in the soil with an increased OM content. This study suggests that additionally completely buried OM has the highest water retention.