Tensile Strength Gradients Within Soil Aggregates from Contrasting Ecosystems. (S01-smucker200706-Poster)

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Abstract:

Soil aggregate strength contributes to the stability of a friable soil structure in sustainable agroecosystems. Soil aggregate tensile strengths were determined by crushing whole aggregates and aggregates modified by removing 15, 33, 45, and 67% of their surface layers. Erosive energies, required to remove surface layers were determined by applying a constant centrifugal force to aggregates encased within soil aggregate erosion (SAE) chambers. Tensile strengths (165 KPa) required to crush aggregates from the conventionally tilled (CT) Wooster series were three-fold those of native forest (NF) aggregates. Tensile strengths (352 KPa) required to crush CT aggregates from Hoytville series were 48% those from the NF. Tensile strengths increased as 15 - 33% of the exterior layers were removed from Wooster CT aggregates and there were no significant differences among tensile strengths of peeled aggregates when > 33% of the exterior layers had been removed. Erosive energies of aggregate layers were directly proportional to their tensile strengths. Erosive energies needed to remove surface regions of peeled aggregates increased as the aggregates became smaller.

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