Foot Traffic's Impact on Corn Maze Soil Conditions

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Abstract

Soil compaction is detrimental to crop health and yield, lowering beneficial soil qualities, like soil organic matter (SOM) content and soil aggregate stability. Compaction is often heavily influenced by farm equipment, such as the tiller in conventional tilling systems. Therefore, the objective of this research was to evaluate the effect of several years' foot traffic on compaction and the percentage of organic matter within the soil. The field analyzed in the study has been used as a corn maze for 15 years. Only the last five years were considered in this study First, ten compaction meter readings were taken from six different sites on the field, each at successive years of foot traffic overlap. The sites were scaled from no path overlap to the most path overlap, with site 1 having no overlap and site 6 having 5 years of overlap. Next, soil organic matter (SOM) was analyzed through six soil samples collected from the same six sites. In total, there were 60 compaction readings measured, and 36 soil samples taken, from which SOM, aggregate stability, and microaggregate SOM were analyzed. The soil compaction ranged from 280 PSI and 215 PSI, with the greatest amount being in site six, and the least amount being in site three. The SOM was observed between 7.03% and 5.40%, the most being in site four and the least being in site one. The aggregate stability in the study was found between 60.61% and 28.68%, with the maximum percentage measured in site two, and the minimum percentage in site three. The SOM in microaggregates varied from 8.66% and 6.43%, with site one having the highest percentage, and site two having the lowest percentage. In general, the results demonstrate the last two sites had higher compaction and lower SOM, aggregate stability, and macroaggregate SOM. The results of this study will be beneficial for crop producers and agronomists that consider livestock and other animals in crop fields, and their impact on soil compaction.

Keywords: Aggregate Stability, Livestock Traffic, Macroaggregate, Organic Matter, Soil Compaction