ABSTRACT

A field experiment was conducted to determine the effectiveness of remediation techniques to alleviate soil compaction and increase infiltration. Deep tillage and compost addition are two techniques commonly used in agricultural practices to reduce the level of soil compaction. These techniques were implemented on three sites in the metropolitan area. Each site was divided into three plots: tilled, tilled with compost addition, and a control plot for comparison. To determine the effectiveness of each remediation technique, before and after measurements of saturated hydraulic conductivity (Ksat), soil bulk density, and soil strength were used to assess the level of compaction.

Deep tillage was effective at reducing the soil strength. Soil strength was approximately half that of the control plot in the first six inches of soil. However, tilling did not significantly improve the bulk density of the soil. At two of the sites, tilling was ineffective at improving the infiltration capacity of the soil. Tilling may have damaged natural pathways in the soils, thus reducing the permeability. Tilling was effective at remediating the soil at one site, which may not have had as extensive a network of natural pathways as the previous two sites. The geometric mean of Ksat was 2.1 to 2.3 times that of the control plot.

Compost addition was the most effective soil remediation technique. Similar reductions in soil strength were found in the tilled plot. Soil bulk densities on the compost plots were 18-37% lower than the control plots. The infiltration capacity of the soil was improved. The geometric mean of Ksat on the compost plots was 2.7 to 5.7 times that of the control plots.

The results of these findings will be useful in revising stormwater Best Management Practices to include guidelines on soil compaction prevention and remediation of compacted sites.