Evaluation of Native Plant Density in Reducing Soil Compaction

By Steven E. Yergeau, Ph.D., Rutgers Cooperative Extension of Ocean/Atlantic Counties

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Soil compaction, the hardening of soil due to compressing soil particles closer together, is a problem that obstructs the growth of plant roots, which in turn, affects the health of crops, pastures, and landscape vegetation. Compacted soils can also hinder water infiltration, creating excess stormwater runoff and increasing flooding. Many methods for reversing compaction are available, but one option that has not received much evaluation is the use of vegetation after soils are compacted. The objective of this study is to determine if increasing the number of native plants in a small area can reduce soil compaction. By increasing the number of plants in a small area, it is predicted that the number of plant roots

Fig. 1.   Test beds of native switchgrass (*Panicum virgatum*) at Georgian Court University (Lakewood, NJ). Photo credit Steve Yergeau.
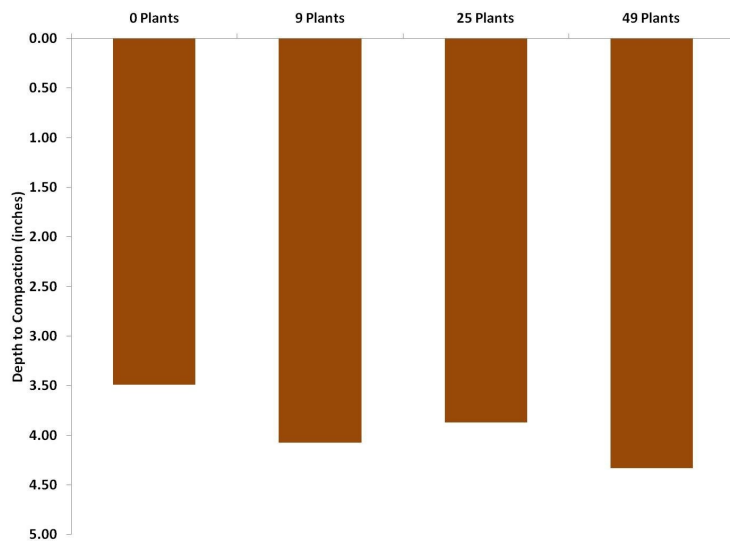

Fig. 2.   Average depth to compaction for plots based on number of plants. The average depth to compaction with 0 plants was 3.49 inches, with 9 plants it was 4.07 inches, with 25 plants it was 3.87 inches, and with 49 plants it was 4.33 inches. The deeper the measurement, the less compacted the soil.

will be high enough to break through the compacted soil.

In partnership with Georgian Court University, three test beds were planted (Figure 1) with four different densities of switchgrass at 0 (bare soil), 9, 25, and 49 plants per square meter in each test bed. Soil compaction was measured during the summer and fall of 2015.

Compaction was estimated using a handheld static cone penetrometer and reported as the depth when a soil resistance of 300 pounds per square inch was reached (Figure 2). First year results indicate that plots with plants had reduced compaction more than plots with 0 plants (bare soil) at the end of sampling (Figure 2).Future work will continue into additional growing seasons and additional research plots, and use other methods to assess this management strategy.

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