

Part II

This study focused on the ability of several cultivators to loosen a compacted soil. Treatments were applied September 5, 1986 on a Michigan State University intramural field. The three cultivators used in this study were the Aer Way, Toro and Verti-Drain units. The Aer Way unit creates a triangularly shaped slot in the soil with the tip of the triangle reaching approximately the 4.5 inch soil depth. The Toro unit utilized 5/8 inch diameter hollow tines which penetrated to the 3 inch depth. The Verti-Drain unit utilized hollow and solid tines on 2.5 and 4 inch spacings. Soil penetration varied from 6 to 9 inches with Verti-Drain cultivator. Soil resistance measurements were taken on September 19, 1986 with a soil penetrometer.

The Aer Way unit was limited in its ability to significantly loosen the soil surface 4 inches. This was due to the relatively wide spacings of tines on the Aer Way cultivator. Several passes over an area would be necessary with the Aer Way unit for it to effectively alleviate soil surface compaction. The Toro aerifier provided significant loosening of the surface 3 inches of soil, as a result of the close tine spacing. Neither the Aer Way or the Toro unit provided significant soil loosening beyond the 3 inch soil depth. The Verti-Drain unit equipped with hollow tines was the most effective treatment in loosening the soil. Soil disruption was detected at the 8 inch depth with hollow tines and the 7 inch depth with solid tines as measured with the soil penetrometer. The 2.5 inch tine spacing on the Verti-Drain unit tended to have lower soil strength values than the 4 inch tine spacing, however, this was not statistically significant.

These results demonstrate the need to evaluate your particular compaction problem and equipment capabilities. Soil surface compaction can be adequately managed with standard cultivation equipment which will penetrate through the compacted soil zone. Aerifiers with widely spaced tines will require more than one pass to adequately modify the soil surface. Subsurface and/or deep soil compaction can be affected only by using equipment which will penetrate to deeper depths. Utilization of aerifiers which reach different depths could be a creative means of loosening deeply compacted soils. This research will be continuing.