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Water Table Level as Influenced by Tiling Method

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Water Table Level as Influenced by Tiling Method

Abstract

Sections of the research farm were tiled in the fall of 1979. The primary reason for the tiling was to provide a good soil environment for large tillage trial plots that had been previously established. This was also used as an opportunity to install a comparison of tile installation with a conventional (at that time) trenching machine and a relatively new system of installing the tile with a trenchless "tile plow" machine. The tile plow inserted plastic tile using a mole approach, which opened the soil and inserted the tile without leaving an open trench, that would later require backfilling. The heaving of the soil by the tile plow did require packing and some soil manipulation to allow cropping. The primary reason for using this type of installation was cost. At the time of this installation, the cost of tiling could be reduced substantially (in some cases by over 50%) by using the plow method rather than the trench.

Disciplines

Agricultural Science | Agriculture

Water Table Level as Influenced by Tiling Method

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Introduction

Sections of the research farm were tiled in the fall of 1979. The primary reason for the tiling was to provide a good soil environment for large tillage trial plots that had been previously established. This was also used as an opportunity to install a comparison of tile installation with a conventional (at that time) trenching machine and a relatively new system of installing the tile with a trenchless “tile plow” machine. The tile plow inserted plastic tile using a mole approach, which opened the soil and inserted the tile without leaving an open trench, that would later require backfilling. The heaving of the soil by the tile plow did require packing and some soil manipulation to allow cropping. The primary reason for using this type of installation was cost. At the time of this installation, the cost of tiling could be reduced substantially (in some cases by over 50%) by using the plow method rather than the trench.

Materials and Methods

Four-inch plastic subsurface drainage tile was professionally installed in sets of three by contractor machines so that the water table

depth could be measured at intervals from the middle tile. Groundwater table depth observation wells were installed, and records of the depths to water table (to a 5-foot depth) have been maintained through 2002.

Results and Discussion

Figure 1 shows the water table measurements and weekly rainfall for 1998–2002. It is generally believed that when the water table is at least 12 in. below the surface, it does not interfere with machine traffic or plant growth. Using that as a standard, it is easy to see that there were very few times in the five years when the water table depth was less than 12 in. from the surface. Those times were early April, late May, and early June in 1999 and early May in 2001. The plow method tends to have somewhat higher water tables than the trench, but it seems that any extra cost for the trench may not be justified by the performance difference. There were times in both 1998 and 2000 when the methods differed markedly from each other, with each method showing a shallower water table in one year. Crop rotation differences (i.e., low water use requirement for oat/alfalfa seeding in August above the tile plow treatment in 1998, large water use requirement for alfalfa above the plow treatment in 2000) may explain the tile method differences in those years.

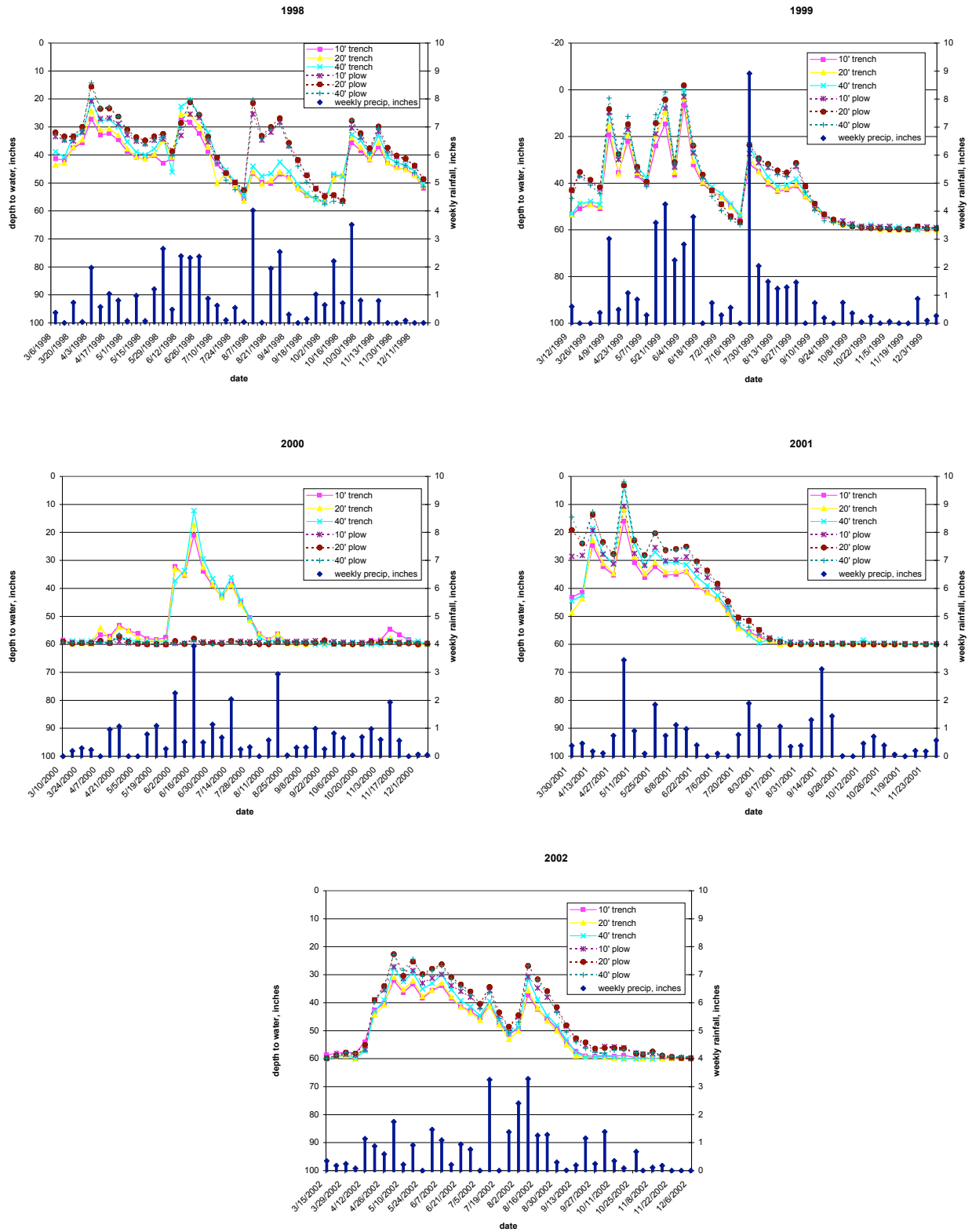


Figure 1. Comparisons of water table depths for two tile installation methods, two decades later.