

COMPARISON OF TILLAGE AND NO-TILLAGE
MANAGEMENT SYSTEMS AS RELATED TO SELECTED
AGRONOMIC FACTORS AFFECTING CORN (ZEA MAYS L.) YIELDS

by

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ABSTRACT

AMORES, FREDDY M. Comparison of Tillage and No-Tillage Management Systems as Related to Selected Agronomic Factors Affecting Corn (*Zea mays* L.) Yields. (Under the direction of MAURICE G. COOK).

Tillage and no-tillage management systems were evaluated in relation to corn grain yield, soil moisture content, and soil nutrient status, in a two-year study on an Appling loamy sand. A winter cover crop (WCC) was grown in the second year in one-half of the initial tillage and no-tillage plots.

In the first year, no-tillage corn yielded higher than tillage corn, and the difference was significant at the 5% level. Although the soil moisture contents in tillage and no-tillage treatments were significantly different (5% level) in only one instance, the corn in the no-tillage treatment visibly appeared to withstand soil moisture stress much better than the corn in the tillage treatment. No-tillage plots showed a trend for more organic matter, higher pH, less NO_3^- , and more available P and available K in the top 15 cm of the soil. No consistent trend was observed in relation to soil NH_4^+ . There were no differences below 30 cm among treatments for the measured soil parameters.

In the second year, no-tillage + WCC corn yielded higher than tillage corn, and the difference was significant at the 1% level. There was delayed germination in all treatments due to low amounts of soil moisture following planting. Seed germination varied among treatments, with no-tillage + WCC being most affected, and tillage corn least affected. Insufficient rainfall at the onset of the corn reproductive

Erosion and Nutrient Losses

Runoff water and sediment were collected after each of four rainfall events in 1981 that produced runoff. Attempts were made to measure the volume of runoff water, the mass of sediment removed with the water, and the nitrogen, phosphorus, and potassium contents of the runoff water and sediment. However, the volume of runoff following each rain exceeded the holding capacity of several of the collector barrels. Undoubtedly, some sediment was in the uncollected runoff water and, thus, was not measured. The N, P, and K contained therein missed detection also. Therefore, we do not feel that the data obtained are sufficiently accurate and reliable to discuss in a meaningful way.

The limited data are presented in Appendix Table 36 for the interested reader. There appears to be a trend for the tillage plots to have more erosion and runoff than the no-tillage plots. It follows that nutrient losses would also be greater from the tillage plots. These trends would be expected and are in line with results cited previously in the literature review.