

Numbers That Will Make You Think Twice Before Tilling: Dramatic No-tillage vs. Clean Tillage Research Results from North Carolina

Charles William Raczowski

**Associate Professor
Department of Natural Resources
North Carolina A&T State University**

Conservation tillage protects soil against soil erosion. Of particular importance is to determine how these systems perform during high intensity rains that generate significant runoff. I will present results from a study that evaluated the effectiveness of a no tillage application compared with a clean-tillage approach of row-cropped land under natural rainfall conditions for six continuous years. Runoff and soil loss were continuously monitored from May 1995 to April 2001 from erosion plots installed in clean-tillage and no-tillage plots under a corn-soybean rotation in a sandy clay loam soil at a North Carolina Piedmont location. Runoff was less for no-tillage than for clean-tillage in three of the six study years. Overall, no-tillage produced 34% less runoff than clean-tillage (see figure 1A). The tolerable soil loss level of 3.1 tons/acre/yr was always exceeded in clean-tillage (figure 1B), while annual no-tillage losses were consistently below. The six-year average soil loss was 33 tons/acre and 1.2 tons/acre for clean-tillage and no-tillage, respectively. Excluding the soil loss generated during highly erosive storms, the soil loss rate in clean-tillage was slightly above the tolerable level at 3.7 tons/acre. Collectively, the six-year data indicated that highly erosive storm events were responsible for generating most of the soil loss in clean-tillage. In contrast, no-tillage was highly effective at protecting against soil loss during the same highly vulnerable times.

Figure 1. Runoff (A) and soil loss (B) totals in clean tillage (CT) and no-tillage (NT) during the six-year period.

