



Strip-tillage: A conservation alternative to full-width tillage systems

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Historically no-till management has been a challenge for maize production in the Midwestern USA because crop residue slows the warming of the soil in the spring and can physically impair planting by plugging the planter. After trying no-till, producers often return to more aggressive tillage operations to address residue concerns; however these systems can cause soil erosion and can increase the cost of production. An alternative system known as strip-tillage has been suggested as a compromise between no-till and full-width tillage. This practice utilizes implements that loosen the soil and allow warming in the row area, yet maintain nearly as much residue as no-till. Strip-tillage is generally understood to be a single pass with a separate implement in the fall, although spring strip-tillage is possible if soil moisture and conditions permit. Strip-tillage can be accomplished in a shorter time, with lower energy and equipment inputs compared to full-width tillage.

The first of two studies that examined the merits of strip-tillage was conducted the University of Wisconsin Lancaster Agricultural Research Station (42.84, -90.80). Natural runoff collectors were installed in a field having a silt loam soil with an 8% slope in fall chisel and fall strip-tillage system. The measured soil loss in a year that experienced substantial rainfall prior to canopy closure was 10.6 Mg ha⁻¹ in chisel vs. 0.64 Mg ha⁻¹ in strip-tillage. Soil loss was much less for both systems in the second year when early season rainfall was minimal.

A second, ten year study was conducted at the University of Wisconsin Arlington Agricultural Research Station (43.30, -89.36) that compared fall strip-tillage with fall chisel/spring field cultivator and no-till systems in both a continuous maize and soybean-maize rotation. This work showed equal maize grain yield in maize after soybean when comparing chisel and strip-tillage. No-till yield was about 5 % lower. Yield in continuous maize was highest in the chisel system, being about 4 % greater than strip-tillage and 8 % greater than no-till. An economic analysis of this data showed that the benefit to strip-tillage is greatest in maize following soybean. Strip-tillage is a system that can optimize both economic and environmental return for maize production and should be implemented more widely, especially on erosive soils.