

MINNESOTA– Tillage & Cover Crop Management on Soil Compaction in Continuous Corn Silage

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Research trials often face difficulty even with optimum conditions, but the 2019 growing season posed more than its fair share of challenges. With this trial, hinging on environmental conditions being just right, timing was nearly always off. But all is not lost; valuable data can still be achieved.

Corn silage is a staple of U.S. cattle operations; over 360,000 acres of it are chopped annually in MN (~8M tons). Current production practices are leading many to continuous corn systems with minimal or no tillage practices. There is growing concern about increased soil compaction resulting from uninterrupted wheel traffic associated with corn production and silage harvesting. As conservation tillage practices become more prevalent to conserve resources and lower production costs, relieving wheel traffic-induced soil compaction is more difficult to manage. Cover crops may be a solution. This trial evaluated interactive effects of tillage practices and cover crop management on wheel-traffic-induced soil compaction of continuous corn silage systems.

Strip trials were established this spring, in a field cropped for corn silage in 2018. The trial focused on three tillage systems: no-till, minimum tillage (strip), and conventional tillage. Interactively, the cover crop management systems studied were broadcasting a cover at the time of corn top-dress and a cover crop drilled post-corn silage harvest. Each cover crop plan consisted of planting 3 types of covers: cereal rye, brassica, and a cereal rye/brassica mix. The late spring thaw and rains delayed planting ~4 weeks. Initial soil compaction measurements and soil samples were taken May 1. Soil was amended per test results and fertilized once at planting, and top-dressed with urea along with broadcast cover crop treatments at V5/Early V6. Trial was planted May 31. Prior to planting, on the same day, three tillage treatments were applied. Plots were sprayed July 1 for weed control. The first cover crop treatments were planted July 18, a broadcast application at V5/Early V6 during nitrogen top-dress. Warm, humid, wet weather accelerated corn growth, tightening the canopy quickly and having a negative impact on cover crop establishment in all three mixes.

Mother Nature caused a delay in silage harvest to October 7, two weeks later than planned. This affected drill planting of the three cover crop treatments, which occurred October 10. Cover establishment appears to be minimal, suffering from cool weather and an overabundance of rain.

The interactive nature of this trial will still allow us to confirm the effect tillage practices have on soil structure and compaction. The bulk of the soil compaction measurements collection will take place next spring. We may find more interactions between tillage and cover crop management have taken place, but only a winter between now and then will tell.

Photo 1. Planting and tillage plot treatments May 31, 2019.



Photo 2. Plots around one week before herbicide treatment June 24, 2019.



Photo 3. Plot cover crops being drilled post silage harvest on October 10, 2019.



Photo 4. Plots post cover crop planting on October 24, 2019.

