

Soil Tillage Impact on Growth and Yields of Corn in Rotation with Energy Beet and Soybean

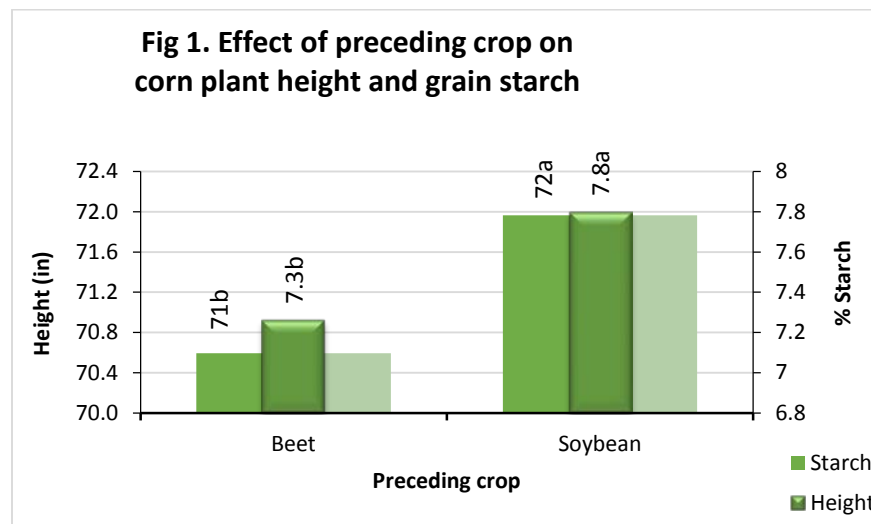
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Objective: To assess the impact of energy beet as a preceding crop on corn yields

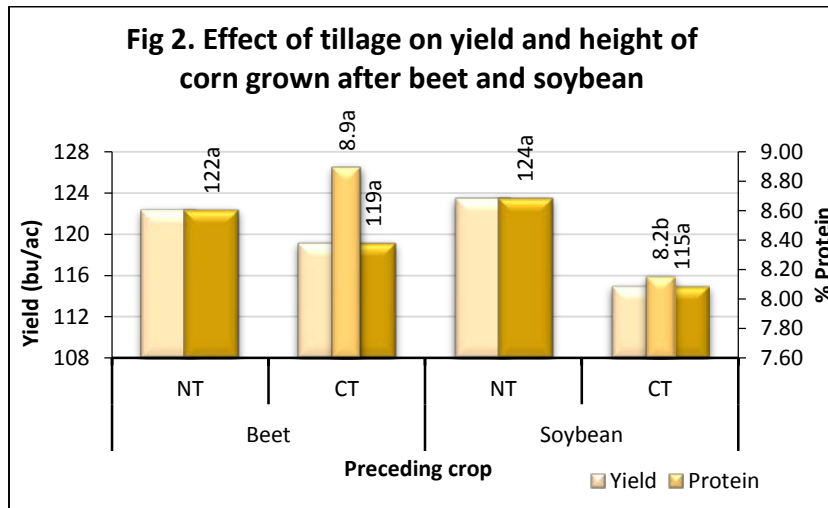
Materials and Methods: This study began in 2014 with four crops planted with the following crop rotation cycles: beet/corn/soybean/wheat (Rotation 1); soybean/corn/soybean/wheat (Rotation 2), and beet/corn/beet/wheat (Rotation 3). All crops within each rotation are planted at every entry point, annually. Each rotation was arranged in a randomized complete block design with four replicates. Each plot measures 40 ft wide by 50 ft long. Following crop harvests in 2014, tillage was conducted the following spring on 25 ft by 50 ft strips of every plot, and the remaining 15 x 50 ft left to no-till. Corn plant heights were measured close to maturity, and ear leaf tissue samples were taken to be analyzed with grain for P content following harvest. Soil samples have been collected about every two weeks from select replicated energy beet plots in rotation 3, to monitor nitrate leaching. Soil water content is being measured weekly to 36 feet from these beet plots and from single wheat, corn, and soybean plots for comparisons. Preliminary results are presented for corn response to beet and soybeans as the preceding crop in rotation, and for wheat yield response to corn and soybeans as preceding crops. This project will continue for at least two additional years.

Results

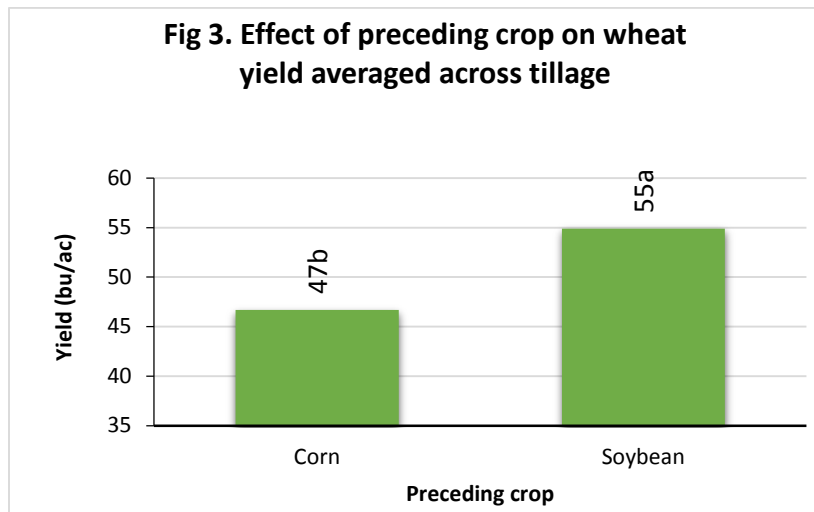
Early corn growth, between V3 and V6, showed widespread leaf purpling in plots preceded by energy beets, a clear symptom of P deficiency in corn. Observed differences in corn height at early growth stages persisted until harvest, and that was significant as shown in figure 1. The increased height differences also enhanced starch production for corn grown after soybeans, compared to after energy beet. Yield differences were not significant and could not be explained by preceding crop or tillage (figure 2). Protein was significantly higher following energy beet than soybeans. This is likely due to higher N content in energy beet leaves and less N credits in the soil compared to soybeans. When wheat was grown after corn in rotation, yield differences were significant, about 8 bushels less than the yields following soybeans (figure 3). Diseases common to corn and wheat may have caused lower yields in wheat, though no diseases were abundant in the 2015 wheat plots.



a, b Values followed by different letters are significant at $P < 0.05$.



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