



Determining the Ideal Cover Crop Termination Timing for Soybean

Trial Objective

- The objective of this trial was to identify the ideal timing of cover crop termination before soybean planting and its effects on weed suppression, soybean population stands, and yield potential in a limited rainfall and high-latitude environment.

Experiment/Trial Design

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield (bu/acre)	Seeding Rate (seeds/acre)
Gothenburg, NE	Hord silt loam	Corn	No-till	5/31/2022	10/19/2022	90	160,000

- This trial was established as a randomized complete block design with four replications in a split-plot design where cover crop termination timing was the whole plot and soybean product was the sub-plot. The treatments were as follows:
 - » Cover crop termination:
 - 5 weeks before soybean planting (5 WBP) terminated on 4/22/2022
 - 3 weeks before soybean planting (3 WBP) terminated on 5/6/2022
 - 1 week before soybean planting (1 WBP) terminated on 5/21/2022
 - 1 week after soybean planting (1 WAP) terminated on 6/7/2022
 - » XtendFlex® Soybean products with the following maturity groups (MG) were planted:
 - 2.2 MG
 - 2.5 MG
 - 2.8 MG
- A winter wheat cover crop was seeded on November 12, 2021, at 100 lbs of seed/acre.
- A base fertilizer of 29 lbs nitrogen/acre, 60 lbs phosphorus/acre, 25 lbs sulfur/acre, and 0.25 lbs zinc/acre were strip-till applied on April 12, 2022.
- Cover crops were terminated at the respective date with Roundup PowerMAX® herbicide at 32 fl oz/acre with a spray volume of 15 gallons/ acre.
- All soybean treatments were planted in 30-inch rows.
- Post-emergence herbicide applications were made in all treatments on June 21, 2022, with Roundup PowerMAX® herbicide at 32 fl oz/acre, Section® Three Herbicide at 10 fl oz/acre, Warrant® Herbicide at 48 fl oz/acre, and Xtendimax® herbicide with VaporGrip® Technology, a restricted use pesticide, at 22 fl oz/acre with a spray volume of 15 gallons/ acre.
- A total of 6.48 inches of precipitation accumulated during the growing season and 9 inches of water were applied by sprinkler irrigation.
- Weed suppression and early and late soybean stand assessment notes were also recorded.
- Plots were harvested with a combine and grain moisture content, test weight, and total weight for the plot were determined for yield calculations.



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Understanding the Results

- Weed suppression was greater (99%) when the cover crop was terminated 1 week after soybean planting (1 WAP) and 1 WBP (92%) compared to 3 WBP and 5 WBP (Figure 1). In addition, 3 WBP (33%) had greater weed suppression than 5 WBP (22%). The increased biomass produced by winter wheat as a cover crop likely helped build soil coverage to decrease or delay weed emergence (Figure 3).

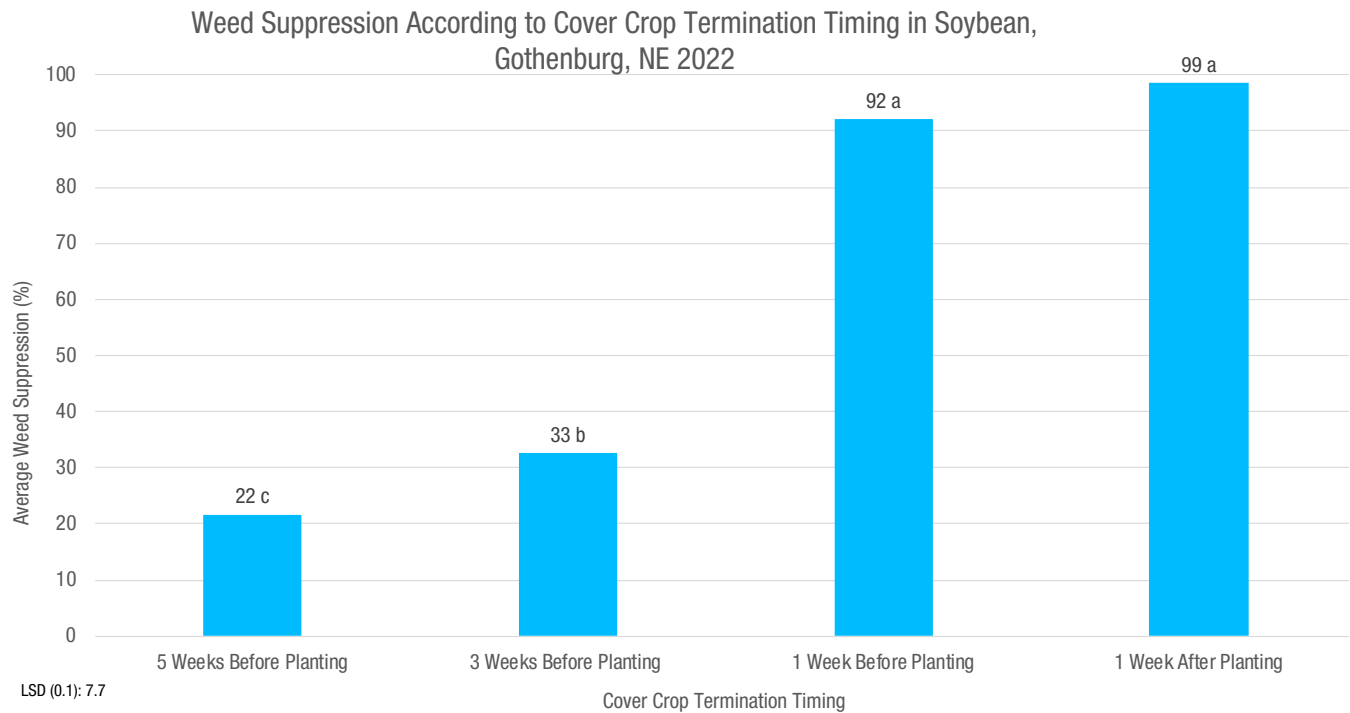


Figure 1: Average weed suppression according to each cover crop termination timing in soybeans, Gothenburg, NE (2022). LSD = least significant difference.

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Soybean Early Stands According to Cover Crop Termination and Soybean Product Selection, Gothenburg, NE 2022



Figure 2. Soybean early stands according to cover crop termination timing and soybean product selection in Gothenburg, NE (2022). LSD = least significant difference.

- Cover crop terminated 1 week after planting (1 WAP) reduced the soybean early stands when compared to other cover crop termination timings (Figure 2). On average, the 1 WAP treatment reduced soybean early stands by -23.4%, -22.8%, and -22.4%, compared to 5 WBP, 3 WBP, and 1 WBP, respectively, regardless of the product selected. Soybean late stands were not affected by cover crop termination timing or soybean product selection (Figure 3).

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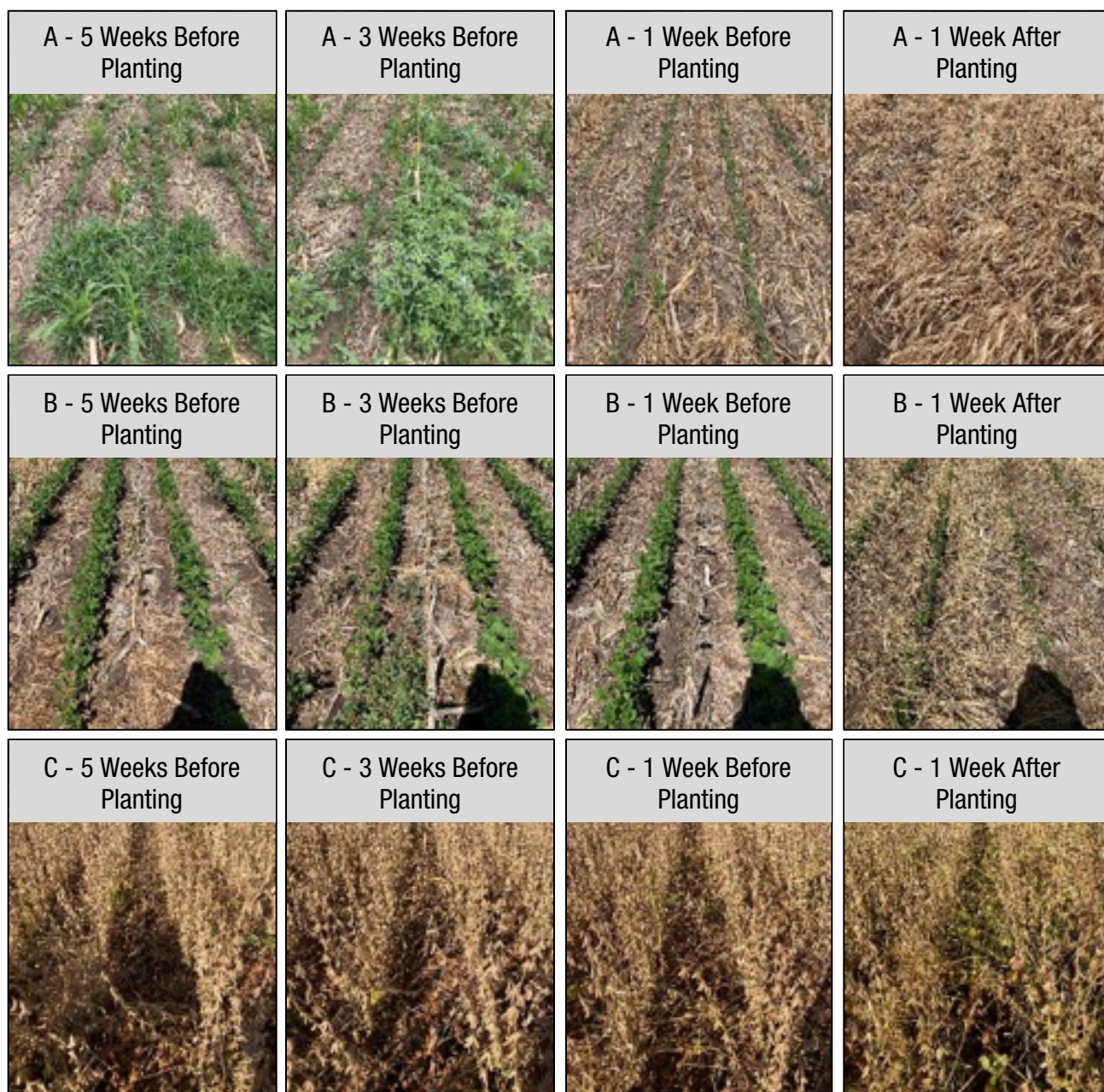


Figure 3. Cover crop termination timings within the same soybean product (2.5 MG) at different moments of the soybean growing season: A) pictures taken before post-emergence herbicide application on 6/21/2022; B) pictures taken after post-emergence herbicide application on 7/8/2022; and C) pictures taken close to harvest on 10/5/2022. All pictures were taken at the Bayer Water Utilization Learning Center near Gothenburg, NE.

Determining the Ideal Cover Crop Termination Timing and Soybean Product Selection

Timing for Soybean

- Cover crop termination timing and soybean product selection did not affect soybean yield in this study (Figure 4). Soybeans possibly achieved similar late stands with late seedling emergence, or compensated yields by branching out and filling the spaces left by missing plants.

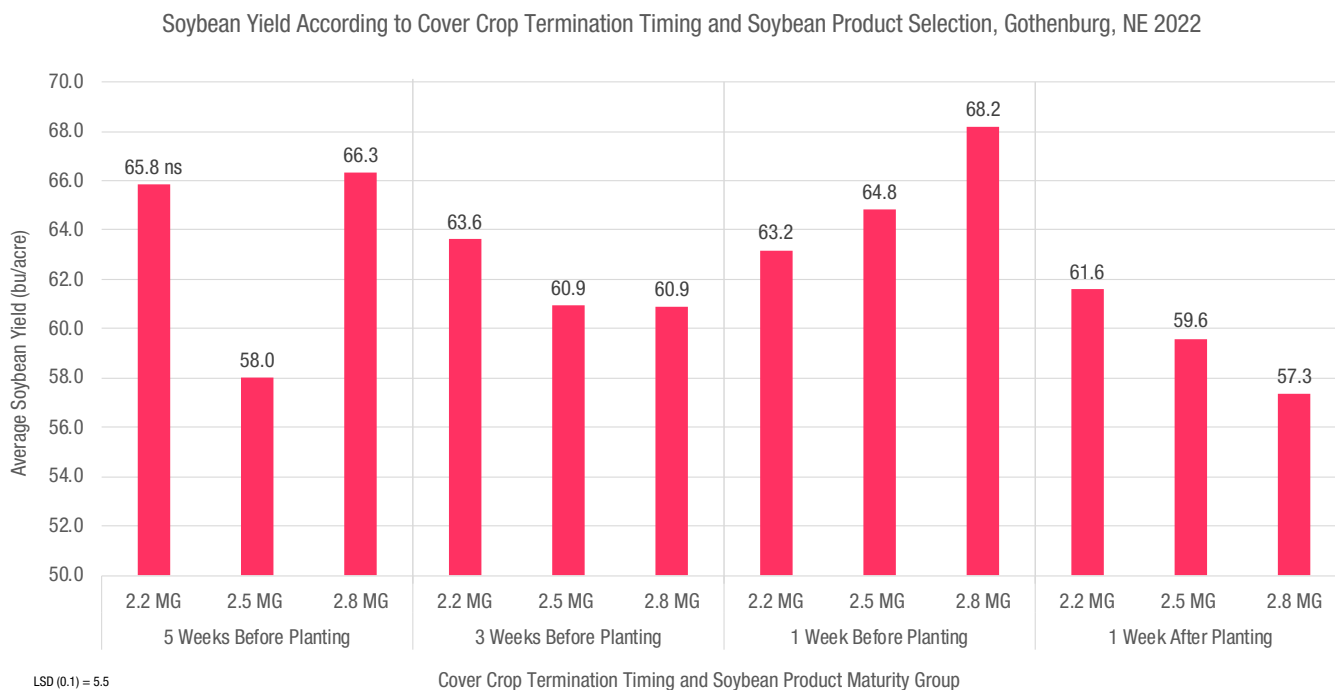


Figure 4. Average soybean yield according to cover crop termination timing and soybean product selection, Gothenburg, NE (2022). LSD = least significant difference.

Key Learnings

- Cover crop growth during the spring can compete against weeds and its residue can provide soil coverage that may help delay weed emergence at the beginning of the summer. A cover crop is a good option as a weed management tool.
- Cover crops can reduce soybean early stands if allowed to grow too long in the spring and terminated after soybean planting. Soybeans can compensate for low stands through increased branching and pod set with low populations still yielding within the optimum range.¹ See other Bayer publications and visit with your Bayer agronomist to decide which soybean population better serves your situation.
- In irrigated systems or locations with good rainfall, soybean production tolerates increased cover crop biomass without any impact on soybean yield. It is important to be cautious in dryland semi-arid environments where too much cover crop growth can affect crops negatively.



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Sources:

¹Staton, M. May 2022. Thin soybean stands can produce surprisingly high yields. Michigan State University Extension. <http://canr.msu.edu>

Legal Statements

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