



No-Till Organic Effects

A Level II Case Study

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<p>Name: Dr. Joel Gruver & Andy Clayton Location: Western Illinois University, Macomb, Illinois Site: Allison Farm, Southwest Warren County. (18 miles Northwest of Macomb, IL.)</p>	<p>Resource Concerns/Benchmark: 77 acre certified organic and research demonstration farm. Principal method of controlling weeds and competing vegetation is done via tillage and hand rogueing. By agricultural measures, it would be considered tillage intensive farming.</p>
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Conservation Treatment:

The establishment of organic no-till soybeans. This is accomplished by planting a cover crop of cereal rye or triticale preceding soybeans planted without tillage. The cover crop reduces weed germination and growth, and buffers soil temperature and moisture fluctuations. In addition, the cover crop reduces labor and time expended for weed control, and reduces the number of passes across the field with a tractor and tillage tool. All of these factors combined provide better timeliness of operations, and increases the weather resilience of the soybean crop.


Positive Effects	Negative Effects
<p>Increased Revenue (per acre)¹</p> <p>2.5 bu/A x \$22.61/bu² \$56.52</p> <p>Reduced hand rogueing by 1.5 hours per acre \$22.50</p> <p>Reduced rotary hoeing by 2 passes \$11.00</p> <p>Reduced row cultivating by 2 passes \$21.20</p> <p>Reduced weed pressure significantly in subsequent years.</p> <p>Improved soil structure and crop resilience.</p> <p>Increased timeliness.</p> <p>Total Direct Dollar Benefits \$111.22/ac</p>	<p>Increased Cost (per acre)⁴</p> <p>Cover Crop Seed Mix \$26.70</p> <p>Cover Crop Seeding \$13.10</p> <p>Roller-Crimper \$12.10</p> <p>Planting, No-till Drill (additional above planter cost) \$ 5.70</p> <p>Increased Seeding Rate \$15.00</p> <p>Soil moisture depletion by the cover crop can be a concern in dry springs.</p> <p>Inconsistent cover crop establishment³</p> <p>Total Direct Dollar Costs \$72.60/ac</p>

Net Direct Dollar Benefits = \$38.62/ac

Analysis of these costs and benefits shows that this conservation management strategy had a strong net return to the landowner, increased the conservation effects, and increased soil health; while still leaving a significant allowance for negative risk factors.

Indirect Benefits—There are a number of indirect benefits and costs that are recognized, but are not quantified or monetized. These factors are important, but due to a lack of values and standards for measurement, are only recognized in the Case Study, and are not a part of the direct costs and benefits. These may be considered as risk factors; which can be positive or negative for the operation.



<p><i>Notes:</i> ¹ Averages were calculated using data provided by Western Illinois University; comparing organic tillage and no-till plots. No-tillage out yielded conventional 4 out of 6 years in comparison. (only 1 year significantly less).</p> <p>² Reported price per bushel of organic soybeans. This is a four year average of prices received by WIU.</p> <p>Actual positive effect may have been higher if 2012 drought had not had such a negative effect on the no-tillage soybeans (due to moisture depletion by cover crop).</p> <p>³ comparisons were not done in 2013 and 2014 due to a poor stand of cereal rye.</p> <p>⁴ Actual costs reported by Joel Gruver and Andy Clayton for organic cereal rye seed, drill cost and other fieldwork costs based on prices at the University of Illinois FarmDoc.</p> <p>This document is a companion to “No-Till Organic”, released May, 2017 by USDA/NRCS, Illinois.</p>	 <p style="text-align: center;">No-till soybeans into triticale</p> <p style="text-align: center;">Photo courtesy of Andy Clayton</p>
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*WIU/Allison Organic Research Farm
Organic No-till Soybean Yields Summary*

Year of Study	Field #	Soybean Company/Variety	Soybean Drilling Date	Soybean Drilling Rate	Method of Crimping Rye*	No-Till Soybean Average Yields	Conv.-Till Comparative Yields	Notes
2009	2B West	BRH 34A7	June 6 th	250,000/a	Culti-mulcher 1 week prior to drilling beans	53.8 bu/a	55.2 bu/a (fld 2B West)	Field w/ low weed pressure
2010	1B	BRH 34A7	June 7 th	230,000/a	1 pass drill	44.4 bu/a	37 bu/a (fld 1B)	4" rain immediately following planting prevented crimping



2011	1A	BRH 34A7	June 8 th	220,000/a	15' metal drum crimper post drilling beans	42.9 bu/a	33.0 bu/a (fld 1A control)	Very wet spring
2012	3-4	BRH 34A7	May 10 th	220,000/a	2 pass drilling & 15' metal drum crimper	34.6 bu/a	61.2 bu/a (fld 3-3)	Severe drought
2015	4-4	BRH 34A7	May 28 th	218,000/a <i>(intended 220,000/a)</i>	2 pass drilling & culti-mulcher	61.0 bu/a	57.7 bu/a (fld 4-1/4-2)	Very wet summer (Yields from 4 out of 5 reps)
2015	4-4	BRH 39C4	May 28 th	213,000/a <i>(intended 220,000/a)</i>	2 pass drilling & culti-mulcher	65.1 bu/a	N/A	Very wet summer (Yields from 4 out of 5 reps)
2016	3-3	BRH 34A7	May 31 st	197,000/a <i>(intended 220,000/a)</i>	Culti-mulcher just prior to drilling	70.8 bu/a	58.5 bu/a (fld 3-2)	The no-till beans were stunted by a lack of moisture in June
2016	3-3	BRH 39C4	May 31 st	235,000/a <i>(intended 220,000/a)</i>	Culti-mulcher just prior to drilling	70.2 bu/a	58.2 bu/a (fld 3-2)	The no-till beans were stunted by a lack of moisture in June

	<u>No-Till</u>	<u>Tilled</u>
Yield Averages:	53.95	51.42
Yield Advantage:	2.53	N/A

The 2015 BRH 39C4 is not included in the average listed due to a lack of a tillage comparison.