

**Organic no-till soybeans**

**Arlington Agricultural Research Station WI**

**2017 / 2018 Research updates**





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## Site description



Very deep and well drained

65% Silt  
27% Clay  
8% Sand  
4% OM

USDA NRCS

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## I. Cover-Crop Based Rotational Tillage System

- Initiated fall 2016
- 4 x 6 acres fields
- 15 x 200 ft per treatment
- Manure as main source of nutrients

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## No-till soybeans

<p><b>2017</b></p> <ul style="list-style-type: none"> <li>• <b>Cover crops</b> Rye – Aroostook and Spooner Triticale – NE426GT and 815 No cover</li> <li>• <b>Planting strategy</b> Early planted vs. Late planted</li> <li>• <b>Cover crop termination</b> (early planted only) At cover-crop anthesis At soybean's V1 stage</li> </ul>	<p><b>2018</b></p> <ul style="list-style-type: none"> <li>• <b>Cover crops</b> Rye – Aroostook and Spooner Triticale – NE426GT Wheat - Emerson No cover</li> <li>• <b>Planting strategy</b> Early planted vs. Late planted Early planted vs. Early drilled</li> <li>• <b>Closing wheels</b> (late planted only) M-Series Curvetine™ (<i>Dawn equipment</i>) 6200 Paddle™ (<i>Yetter farm equipment</i>) Martin Spikes (<i>Martin-Till</i>)</li> </ul>
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## Three closing wheels



6200 Paddle™  
(Yetter farm equipment)



Martin Spikes  
(Martin-Till)

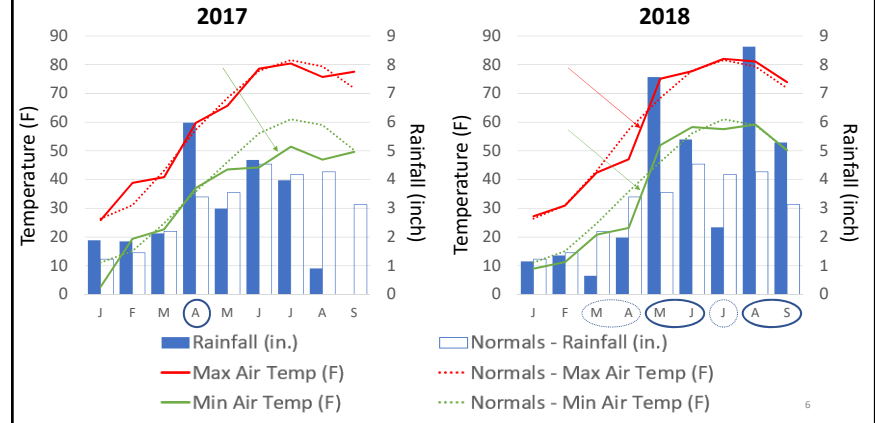


M-Series Curvetine™  
(Dawn equipment)

=> No impact on soybean stand count in 2018

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## Climate



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## Field operations

	2017	2018	Specs.
<b>Cover crop planting</b>	(2016) Sept 19th - triticale Sept 26th - rye	(2017) Oct 2 <sup>nd</sup>	3bu/acre = 2.5 to 3.5 M spa
<b>Early soybean planting</b>	May 12th - rye & no cover May 20th - triticale 20 days	May 24th - rye & no cover May 29th - triticale June 4th - wheat 13 days	225,000 spa
<b>Late soybean planting</b>	June 1st - rye & no cover June 8th - triticale	June 6st - rye & no cover June 11th - triticale June 14th - wheat	
<b>Harvest</b>	Oct 20th - 12% moist.	Oct 25th - 13% moist.	

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## Crimping winter wheat ?



'Emerson' wheat  
11 days after crimping



'Aroostook' rye  
19 days after crimping

June 25th

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# Key results

Rye vs. Triticale vs. No cover. Late planted treatments only.

	2017			2018		
	No Cover	Aroostook	NE426GT	No Cover	Aroostook	NE426GT
Biomass(lbs DM/ac)	/	11,212	15,137	/	5,892	5,832
Stand (plants/ac)	148,000	116,000	94,000	183,666	136,416	144,361
Weed Biomass (lbs DM/ ac)	In rows	0	56	37	608	87
	Bet. rows	0	19	95	2	23
Yields (bu/ac 13% moist.)	46	42	39	57	55	35
Volunteer y + 1 (no heads/ ac)	0	2,189	472	/	/	/

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# No-till vs. Till

Soybeans planted into Triticale

Soybeans planted into bare ground



**No nodules/ plant:** **2017** No Cover - 71 Aroostook - 45 NE426GT - 62 **2018** No Cover - 86 Aroostook - 45 NE426GT - 33

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# Key results

Early vs. late – no-tilled Aroostook treatments only

	2017		2018		
	Early	Late	Early	Late	
Stand (plants/ac)	82,666	116,000	128,917	136,416	
Weed Biomass (lbs DM/ ac)	In row	208	56	35	87
	Bet. row	181	19	14	23
Yields (bu/ac 13% moist.)	33	42	53	55	
Volunteer y+1 (no heads/ ac)	13,411	2,189	/	/	



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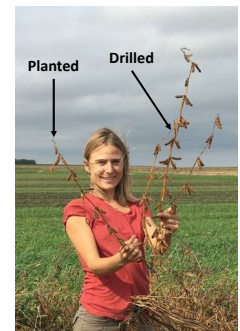
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# Key results

Early planted vs. Early drilled – all no-till treatments

	2018	
	Early Planted	Early Drilled
Stand (plants/ac)	140,278	133,685
No trifoliolate leaf/ plant	16	18
Weed Biomass (lbs DM/ ac)	661	911
Regrowth (no tillers/ ac)	181,299	240,499
Yields (bu/ac 13% moist.)	42*	37*

\*Planted treatment harvested with a 2 row plot combine, drilled treatments with Gleaner combine



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# Mowing between the rows?

Dawn equipment « row-mow » first prototype's trial, July 3rd 2018



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# II. No-till soybean variety trial

## 3 varieties of soybeans

- O.1706N - Albert Lea Seeds – 1.7 maturity group
- BR 17C2 - Blue River – 1.7 maturity group
- Bluestem 1809N - Bluestem Farm Supply, LLC – 1.8 maturity group

## 2 cover crops, one control

- 'Spooner' rye
- 'NE426GT' triticale
- No cover



Soybeans in triticale, 20 days after planting

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# Dawn ZRX roller/crimper



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# Variety trial - Results

**Cover crop planting date**  
September 15, 2017

	Stand (plants/ac)	Yield (Bu 13% moist.)
AL O.1706N	148,926 a	48 a
BR 17C2	150,148 a	48 a
BS 1809N	139,074 a	51 a

**Cover crop biomass**  
- 7,794 lbs DM/ac rye  
- 9,735 lbs DM/ac triticale

**Soybean planting date**  
- June 1st, 2018 rye & no cover  
- June 4th, 2018 triticale

	Stand (plants/ac)	Yield (Bu 13% moist.)	Bushels/ 10,000 plants
No Cover	182,407 a	51 a	2,8
Spooner	103,111 c	51 a	4,9
NE426GT	152,629 b	45 b	3,0

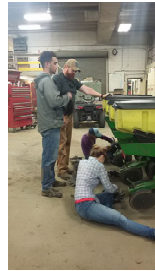
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## Next steps

**Conservation Innovation Grant** - “Innovations in Cover Crop-Based Organic No-Till Systems to Improve Soil Health and Nutrient Management”

- **3 growing seasons** (2019 – 2021); **2 crops** – corn and soybeans
- **9 locations** - farms and research stations
  - University of Wisconsin – Madison - Dr. Brian Luck & Dr. Erin Silva  
Arlington and Marshfield agricultural research stations  
Grand Marsh, Cuba City, Evansville and East Troy
  - Rodale Institute – Pennsylvania - Jeff Moyer
  - Iowa State University - Dr. Kathleen Delate



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## Next steps

**Conservation Innovation Grant** - “Innovations in Cover Crop-Based Organic No-Till Systems to Improve Soil Health and Nutrient Management”

- **Termination trial**
  - Cover crop planting date September vs. October
  - Rodale roller crimper vs. Dawn roller crimper vs. Both vs. Mower + Tedder
  - Roller crimper followed by flame weeder or not
- **Planter trial**
  - Two closing wheels
  - With or without row cleaners
  - Straight vs. wavy coulters
  - Heavy or light down pressure



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## Next steps

**North Central Region SARE Grant** – “A Decision Support Tool for Adaptive Management of Cereal Rye in No-till Organic and Conventional Soybeans.”

- University of Illinois/USDA, Purdue, UW-Madison, non-profits and consultants
- Model variability in cereal rye biomass across regions and growing conditions

Planted September 15th      ‘Spooner’ rye, April 25th      Planted October 2nd



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Thank you for  
your attention

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