


2022 OGRAIN Research Report

Organic Grain Resource and Information Network
UNIVERSITY OF WISCONSIN-MADISON

Purpose
The purpose of this report is to share our latest findings and provide regular research updates with the organic grain community in Wisconsin. **The information contained within is often preliminary data and does not constitute an endorsement or recommendation of any practice**.

Researchers, collaborators, and authors in this volume
Ben Brockmueller, research specialist, University of Wisconsin-Madison
Erin Silva, associate professor, University of Wisconsin-Madison
Claire Stedden, outreach specialist, University of Wisconsin-Madison
Hannah Francis, outreach specialist, University of Wisconsin-Madison
Francois Anglade, research intern, University of Wisconsin-Madison
Faye Darga, research intern, University of Wisconsin-Madison
Megan Broome, research intern, University of Wisconsin-Madison
Rachael Mclaughlin, research intern, University of Wisconsin-Madison
Katie Tredinnick, research intern, University of Wisconsin-Madison
Matt Ryan, associate professor, Cornell University
Sustainable Cropping Systems Lab, Cornell University
Matt Ruark Lab, University of Wisconsin-Madison
Jessica Drewry, assistant professor, Mississippi State University
Brian Luck, associate professor, University of Wisconsin-Madison

Contact
For more information about the program or our research, contact Erin Silva, Associate Professor, Department of Plant Pathology, University of Wisconsin – Madison at emsilva@wisc.edu or (608) 890-1503. More information can also be found on our website: www.ograin.cals.wisc.edu

Acknowledgements and funding
This work is funded by generous support of federal agencies, other organizations and conducted in partnership with our collaborators. The study of no-till soybean planter setup study was in partnership with Dr. Brian Luck, Department of Biosystems Engineering, UW-Madison, and Dr. Jessica Drewry, Agricultural and Biological Engineering, Mississippi State University, and funded by a USDA Natural Resource Conservation Service Conservation Innovation Grant, Award No. NR183A750008G002. The research into soybeans planted into triticale and seeding rates for no-till dry beans were conducted in partnership with Dr. Matt Ryan, School of Integrative Plant Science Soil and Crop Sciences, Cornell University, and funded by a USDA Organic Research and Extension Initiative Grant No. 2020-51300-32183.

We would like to thank Pureline Seeds, Perdue Agribusiness, Albert Lea Seed and Organic Valley for their support with research projects and/or outreach activities. We would also like to thank the Artisan Grain Collaborative and Michael Fields Agricultural Institute for their collaboration on the Winter Conference and the Midwest GRIT program. We would like to thank the staff at the Arlington Agricultural Research Station in Arlington, WI for their assistance at the research station. We would also like to thank the farmers, researchers and industry experts who generously give their time to support the program, including farmers who hosted field days on their farm: Willie Hughes, Gary Zimmer and Chris Wilson.

Table of Contents

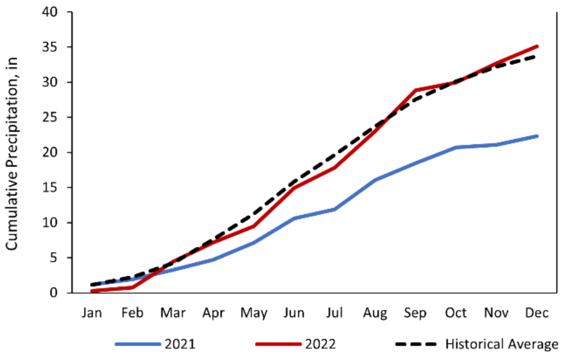
REPORT OVERVIEW

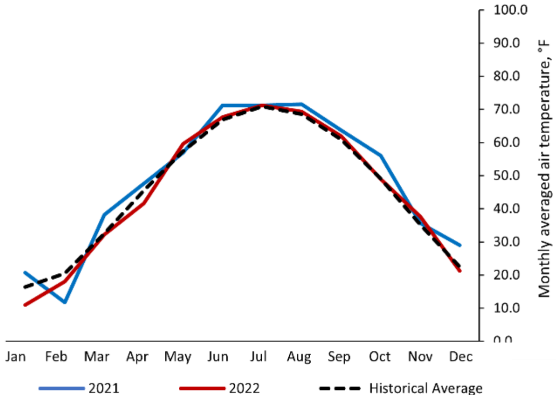
From trials of planter setups, rye varieties and wide-row corn to field days and our winter conference, The OGRAIN program had a great year researching improvements in organic practices and connecting the organic grain community of Wisconsin.

This report includes the preliminary results of selected research projects as well as information about our outreach activities and resource development. **The information contained within is often preliminary data and does not constitute an endorsement or recommendation of any practice.**

There are many ways to connect with the OGRAIN program and stay up-to-date on our research and programming. Visit our website at www.ograin.cals.wisc.edu. Join the listerv by emailing ograin+subscribe@g-groups.wisc.edu. Follow up on YouTube, Twitter, Facebook, or Instagram. Reach out to Erin Silva, associate professor at UW-Madison at emsilva@wisc.edu,

ARLINGTON AGRICULTURAL RESEARCH STATION WEATHER DATA





PUBLICATIONS AND PRESENTATIONS

Some of this work has been presented at the 2022 ASA, CSSA, SSSA International Annual Meeting, as well as at other local conferences. Research from the Silva group was also published in the journal *Frontiers in Sustainable Food Systems,* titled *Spring-seeded winter rye living mulches enhance crop biodiversity and promote reduced tillage organic soybeans*.

TRIAL: YIELD POTENTIAL IN WIDE ROW ORGANIC CORN

Background: Planting corn in 60” rows could increase light interception and allow for cover crops to be integrated into the cropping system, offering forage production, the opportunity to integrate livestock and potentially improve soil health. This work was done in collaboration with Brian Luck and Jessica Drewry.

Objective: To compare corn grain yields in 30” vs 60” row spacing for organic corn.

Trial duration and location: 2020-2021, Arlington Agricultural Research Station, Arlington, WI.

Treatments

	60” rows + high corn population	**60” rows + low corn population**	**30” row control**
2020			
Corn seeding rate (seeds/ac)	28,000	20,000	32,000
Corn variety	Viking O.45-88P	Viking O.45-88P	Viking O.45-88P
Soybean seeding rate (seeds/ac)	205,000	205,000	205,000
Soybean variety	BR e4765	BR e4765	BR e4765
2021			
Corn seeding rate (seeds/ac)	56,000	48,000	32,000
Corn variety	BR 33A16	BR 33A16	BR 33A16
Soybean seeding rate (seeds/ac)	180,000	180,000	180,000
Soybean variety	BR V4520S	BR V4520S	BR V4520S

Field management

Cover Crop	Soybeans were interseeded without intention to harvest as a nitrogen-fixing cover crop.
Fertility	Manure was applied at a rate of 14,400 lb/acre on 12/3/2020 and 13,200 lb/acre on 12/14/2021
Weed management	Prior to planting: 3-4 passes of a row cultivator starting in late April until planting. Post plant tillage: tine weeding and a rotary hoe pass followed by 3 passes of a row cultivator through June
Planting	Corn and soybeans were planted on June 1st in both 2020 and 2021 using a John Deere 1750 planter

Results and Conclusions

60” corn with a soybean cover crop interseeded between corn rows at the Arlington Agricultural Research Station, Arlington, WI.

In both 2020 and 2021, 60” row spacings reduced corn yields by an average of 13% compared to standard 30” row spacings. No yield differences were observed between the low and high seeding rates of the 60” spacing treatments. It is important to recognize the direct risks to corn yields that have been demonstrated across the Midwest for 60” corn. Therefore, producers should be aware of their objectives and how this system fits into their overall farm operation when considering 60” corn rows.

2020 corn yield results

Treatment	Corn Yield bu/ac	Grain Moisture %	Test Weight lb/bu
30” rows 32,000 seeds/ac	199 a	18.9 a	56.1 a
60” rows 20,000 seeds/ac	177 b	18.7 a	56.7 a
60” rows 28,000 seeds/ac	181 b	18.4 a	56.1 a

2021 corn yield results

Treatment	Corn Yield bu/ac	Grain Moisture %	Test Weight lb/bu	Ear Length mm	Ear Width mm	Ear Pollination %
30” rows 32,000 seeds/ac	203 a	20.7 a	56.7 b	191 a	48.4 a	93.7 a
60” rows 48,000 seeds/ac	177 b	20.1 a	57.3 a	168 b	47.1 a	89.7 ab
60” rows 56,000 seeds/ac	170 b	20.4 a	57.0 ab	149 c	44.1 b	84.7 b

Different letters indicate treatments are significantly different at $p > 0.10$

2021 corn and interseeded soybean plant stand results

Treatment	Corn Plant Stand plants/ac	Soybean Plant Stand plants/ac
30” rows 32,000 seeds/ac	30,867 b	NA
60” rows 48,000 seeds/ac	44,467 a	168,300 a
60” rows 56,000 seeds/ac	47,133 a	164,500 a

TRIAL: NO-TILL SOYBEAN PLANTER SETUP

Background: Interseeding winter cereal rye with soybeans as a living mulch to suppress weeds while eliminating in-season soil cultivation could be a beneficial system for organic production. Initial research trials on this system were promising; however, the trials were implemented with two field passes. Adapting this system to a single-pass operation would make it more agronomically favorable.

Objective: To investigate the effect of single and multiple implement planting of soybean and rye on soybean stand count, rye biomass, weed pressure, and yield.

Trial duration and location: 2021, Arlington Agricultural Research Station, Arlington, WI.

Field management

Field preparation	The field was prepared by stalk chopping (4/26/21), disked to a depth of 8” (4/29/21), and cultivated at a 4” depth to encourage pre-season weed emergence (5/13/21, 5/24/21, and 5/26/21).
Equipment	Great Plains BD7600 drill; 6-row John Deere planter. The tractor utilized was equipped with RTK guidance to ensure the desired offsets between rows when planting with multiple pieces of equipment.
Varieties and seeding rate	Rye: Hazlet, planted at 0.75 inches at 112 lb/acre. Soybeans: Blue River 13P8, planted at 1.25 inches at 180 ksds/acre.
Planting date	Both rye and soybeans were planted on May 26, 2021.
Weed management	Plots were hand weeded the fourth week of June. On 8/2/21 a Weed Zapper (Annihilator 16R30, Sedalia, MO) was used at 15,000 volts.
Harvest	6-row combine (John Deere 9400) on 10/19/21

Treatments

		1-pass drill	**15” drill**	**2-pass drill**	**Drill-planter**
1st pass	**Rye**	Drilled, 7.5” rows, except soybean rows	Drilled, 7.5” rows, except soybean rows	Drilled on all 7.5” rows	Drilled on all 7.5” rows
	Soybeans	Drilled, 30” rows	Drilled, 15” rows	n/a	n/a
2nd pass	**Rye**	n/a	n/a	Drilled, 7.5” rows, except soybean rows	n/a
	Soybeans	n/a	n/a	Drilled, 30” rows	Planted, 30” rows

Results and conclusions

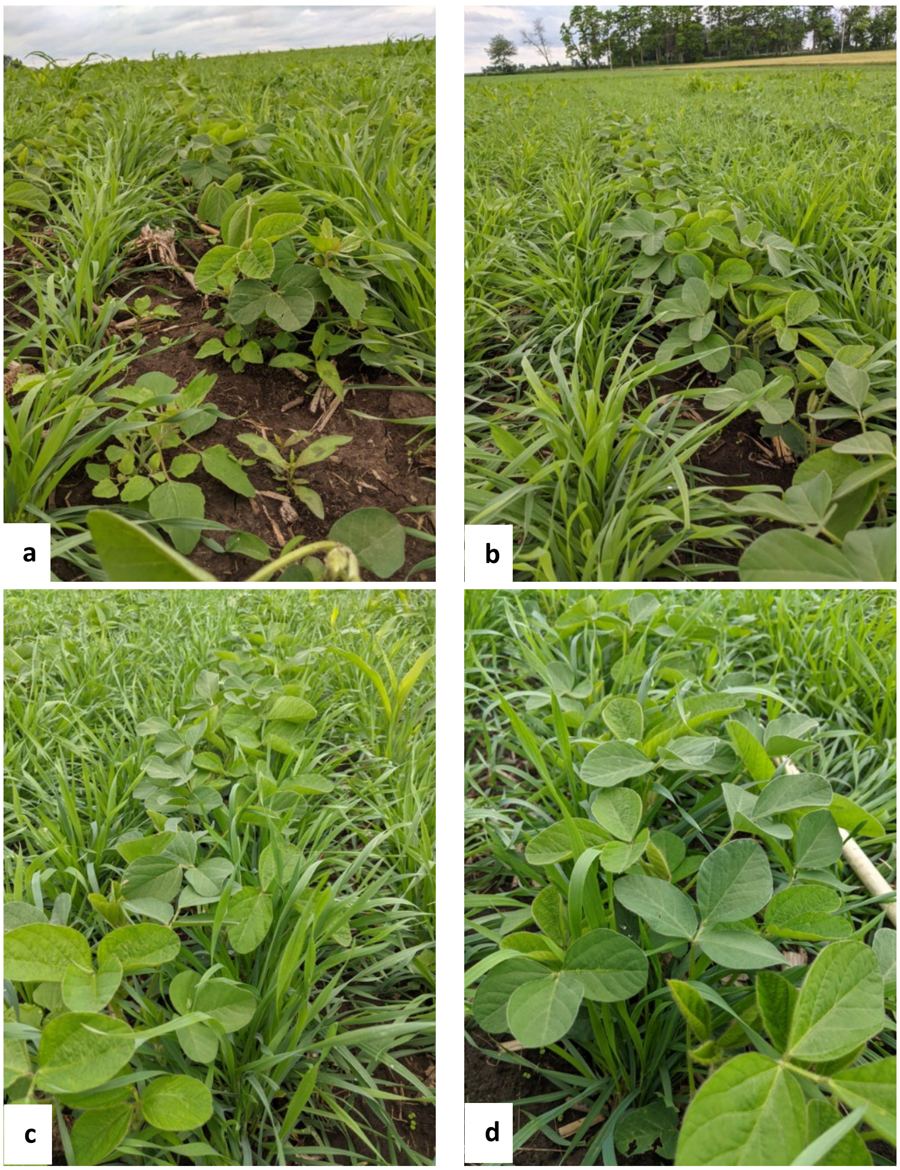
The Great Plains BD7600 drill achieved higher soybean stands and yield than a two-pass operation using a drill and planter to establish soybeans and spring planted rye. Using a 2-pass drill operation to increase the density of rye (same seeding rate), did not result in a significantly higher soybean stand or yield as compared to the 1-pass drill operation. High weed pressure limited yield in all tested configurations. Rye biomass and spacing appear to be important factors in weed suppression and thus yield. Overall, the data suggests that the Great Plains BD7600 drill can be used as an alternative to a planter to establish soybean and spring rye in a single pass; however, weed pressure must be reduced to achieve higher yield and crop quality. Higher seeding rates, different rye varieties, and in-season management may improve these issues.

Stand counts

Stand counts were conducted on June 23, 2021 when soybean plants were at the V2 growth stage, 28 days after planting (DAP). Stand was found to be significant by treatment type (p=0.0005). Soybean stand was positively correlated with yield r(7)=0.62, p=0.011.

Treatment	Mean Soybean Stand (plants/ acre)
1-Pass Drill	177,813 a
15" Drill	145,833 b
2-Pass Drill	164,913 a
Drill + Planter	143,563 b

Means with different letters are significantly different at an α = 0.05.



Images of the treatments on June 23 during stand counts. The 15” drill (a), 30” drill (b), 2-pass drill (c), and drill-planter (d), clockwise. Due to the closer spacing of the two-pass treatments, some rye was present in the rows.

Weeds, rye biomass and rye plant height

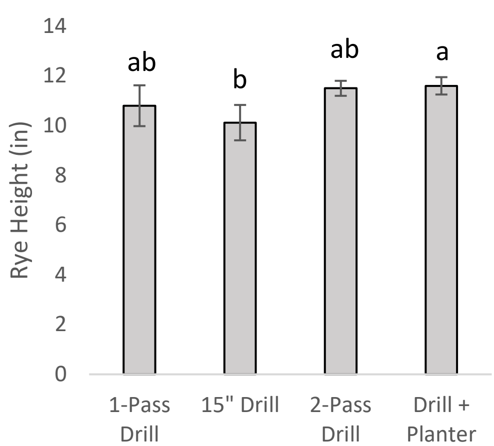
Weed and rye biomass were collected on 7/30/21 (65 DAP). For the 15” drill treatment, rye biomass was significantly lower, weed biomass was significantly higher and weed ratings were higher compared with the other treatments. Rye biomass was found to be positively correlated with soybean yield $r(7)=0.67$, $p=0.0046$ and negatively correlated with weed biomass $r(7)=-0.71$, $p=0.0022$. Weed biomass was found to be negatively correlated with final yield $r(7)=-0.75$, $p<0.001$. This study found that the single densely planted row of rye provided less weed control than the three less densely planted rows.

Treatment	Mean weed biomass (lb/ac)	Mean rye biomass (lb/ac)
1-Pass Drill	1342 b	1368 a
15" Drill	2718 a	574 b
2-Pass Drill	1103 b	1585 a
Drill + Planter	1743 ab	1406 a

Means with different letters are significantly different at an α = 0.05.

	Weed pressure ranking (0-5)	
Treatment	1-Jul	30-Jul
1-Pass Drill	1.75	3.75
15" Drill	4.25	4.75
2-Pass Drill	1.50	3.75
Drill + Planter	2.25	3.75

The height of rye plants was assessed on 7/1/21. Rye height was found to be negatively correlated with collected weed biomass $r(7)=-0.63$, $p=0.0089$.



Means with different letters are significantly different at an α = 0.05.

Yield

The highest yields were seen in the 1-Pass drill treatment. This treatment coincided with lower weed pressure and higher stand counts.

Treatment	Mean Soybean Yield (bu/ac)
1-Pass Drill	48.2 a
15" Drill	33 c
2-Pass Drill	42.6 ab
Drill + Planter	41.2 b

Means with different letters are significantly different at an α = 0.05.

Research in partnership with Dr. Brian Luck, Department of Biosystems Engineering, UW-Madison, and Dr. Jessica Drewry, Agricultural and Biological Engineering, Mississippi State University. Project was funded by a USDA Natural Resource Conservation Service Conservation Innovation Grant, Award No. NR183A750008G002

TRIAL: INCLUSION OF POLE BEANS IN AN ORGANIC CORN SILAGE SYSTEM

Background: We hypothesized that the addition of a leguminous pole beans to a corn silage system could raise overall harvestable biomass and increase silage quality and crude protein levels offering a higher quality feed with greater tonnage per acre. This trial was implemented though a partnership with Pureline Seeds.

Objective: To gain practical insights on the ability of pole beans to provide improved feed quality as well as the ideal corn seed rate to maximize feed quality and silage biomass.

Trial duration and location: 2021, Arlington Agricultural Research Station, Arlington, WI.

Treatments

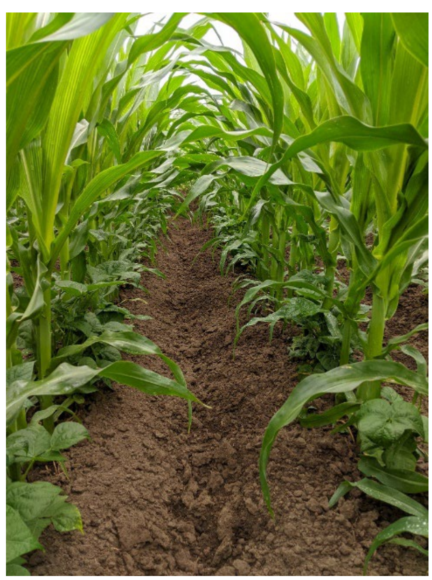
	Seeding rate (seeds/ac)				
	Control 1	**Control 2**	**Treatment 1**	**Treatment 2**	**Treatment 3**
Corn	30,000	40,000	30,000	35,000	40,000
Pole bean	0	0	18,000	18,000	18,000

Field management

Fertility	12,000 gal/ac dairy manure on April 14
Weed management	Early season weeds were controlled prior to planting by three tillage passes between mid-April and June 1st. A field cultivator further controlled weeds on three separate occasions during June and July.
Planting	Pole beans (Organic Cinteo) and a 92-day maturity corn (Blue River 1719856) were interseeded in the same row on June 1st by hand mixing seed within the planter (John Deere 1750) seed boxes.
Sampling	Stand counts were taken on July 9th. Silage was harvested using a Klaas 950 chopper on September 14 once corn dropped below 70% moisture content

Results and Conclusions

The results of this trial over one year indicate that both interseeding pole beans with corn and increasing corn seeding rate did not improve silage feed value as observed through measures of crude protein, fibrous components, and overall digestibility. Harvestable corn silage was further lowered by the adding pole beans to the system. These results suggest that further modifications to this system will be necessary to optimize pole bean and corn interseeding for silage production.



Silage harvest measurements
Harvestable silage biomass decreased with the addition of pole beans interseeded with corn.

Treatment	Silage Biomass	Corn Ear Width
	Tons/ac	Inches
30K Corn, 0K Beans	8.32 ab	2.09 ab
40K Corn, 0K Beans	8.63 a	2.05 bc
30K Corn, 18K Beans	7.74 b	2.11 a
35K Corn, 18K Beans	7.90 ab	2.03 bc
40K Corn, 18K Beans	7.66 b	2.00 c
p-value	0.013	0.003
% CV	3.68	1.12

Corn and pole bean plant stands
The ratio of corn to pole bean plants were measured against the target ratios of 1.67, 1.94, and 2.22 for the 30K, 35K, and 40K corn seeding rate treatments respectively. The number in parenthesis shows the standard deviation. A higher standard deviation indicates less uniformity in corn and pole bean distribution.

Treatment	Corn Stand	Pole Bean Stand	Total Plant Stand	Corn:Bean Ratio
	Plants/acre	Plants/acre	Plants/acre	
30K Corn, 0K Beans	27100 bc	NA	27044 d	NA
40K Corn, 0K Beans	38850 a	NA	38878 c	NA
30K Corn, 18K Beans	25667 c	16933 a	42600 bc	2.36 b (0.16)
35K Corn, 18K Beans	33933 ab	12200 b	46133 ab	4.43 a (0.45)
40K Corn, 18K Beans	38200 a	10467 b	48667 a	4.35 a (1.48)
p-value	<0.0001	0.10	<0.0001	0.09
% CV	7.18	7.18	4.76	25.1

Crude protein and fibrous components of silage
No difference in crude protein amounts were seen between the treatments.

Treatment	CP	ADF	aNDF	ADL
	----------------% of DM	------------------		
30K Corn, 0K Beans	7.76 a	23.5 b	44.6 a	3.12 b
40K Corn, 0K Beans	7.58 a	25.3 ab	46.7 a	3.50 ab
30K Corn, 18K Beans	7.68 a	26.3 ab	47.9 a	3.61 a
35K Corn, 18K Beans	7.87 a	26.4 ab	48.4 a	3.56 ab
40K Corn, 18K Beans	7.53 a	27.3 a	49.5 a	3.62 a
p-value	NS^{+}	0.10	NS	0.07
% CV	7.76	5.07	4.14	4.78

CP (Crude Protein), ADF (Acid Detergent Fiber), aNDF (Neutral Detergent Fiber), ADL (Acid Detergent Lignin), NS (Not statistically significant)

Mineral Components of silage
Few differences in the concentrations of Phosphorus (P), Calcium (Ca), Potassium (K), or Magnesium (Mg) were observed between the treatments.

Treatment	P	Ca	K	Mg
	-----------------% of DM----------------			
30K Corn, 0K Beans	0.224 a	0.252 ab	1.02 a	0.254 a
40K Corn, 0K Beans	0.225 a	0.256 b	1.02 a	0.244 a
30K Corn, 18K Beans	0.223 a	0.257 ab	1.05 a	0.255 a
35K Corn, 18K Beans	0.227 a	0.270 a	1.11 a	0.253 a
40K Corn, 18K Beans	0.225 a	0.267 ab	1.09 a	0.249 a
p-value	NS	0.08	NS	NS
% CV	0.84	3.35	3.60	3.40

P (Phosphorus), Ca (Calcium), K (Potassium), Mg (Magnesium), NS (Not statistically significant)

Fat content and digestibility of silage sample components

Both fat content and non-fiber carbohydrates (NFC – measure of soluble carbohydrates) were reduced at higher seeding rates and with the addition of pole beans.

Treatment	Fat	NFC*	NDFD 30
	---% of DM---		% of aNDF
30K Corn, 0K Beans	2.41 a	42.3 a	53.5 a
40K Corn, 0K Beans	2.38 a	40.4 ab	52.6 ab
30K Corn, 18K Beans	2.21 a	39.1 ab	52.0 ab
35K Corn, 18K Beans	2.21 a	38.2 ab	51.8 b
40K Corn, 18K Beans	2.16 a	37.7 b	52.6 ab
p-value	0.08	0.10	0.05
% CV	4.90	4.42	1.07

NFC (Non-fiber Carbohydrates), NDFD 30 (Neutral Detergent Fiber Digestibility)

Energy measurements from silage samples

The net energy for maintenance (NEm), net energy for gain (NEg), and milk per ton were not significantly different by treatment.

Treatment	NEm	NEg	Milk/Ton
	----Mcals/lb----		lb
30K Corn, 0K Beans	0.67 a	0.40 a	2894 a
40K Corn, 0K Beans	0.65 a	0.39 a	2817 a
30K Corn, 18K Beans	0.63 a	0.37 a	2731 a
35K Corn, 18K Beans	0.61 a	0.35 a	2640 a
40K Corn, 18K Beans	0.62 a	0.35 a	2673 a
p-value	NS*	NS	NS
% CV	4.87	7.54	4.52

NEm (Net Energy for Maintenance), Neg (Net Energy for Gain), NS (Not statistically significant)

TRIAL: RYE VARIETY TRIALS FOR WEED SUPPRESSION IN AN ORGANIC NO-TILL SOYBEAN SYSTEM

Background: Winter rye cover crops are frequently used as a weed suppression tool that allows for tillage reductions in organic soybeans. Managing rye for high biomass and uniform soil coverage improves weed suppressive abilities.

Objective: We sought to understand the influence of rye varietal selection and seeding rates on rye morphological factors that could impact weed suppression in reduced tillage organic soybeans.

Trial duration and location: 2021-2022, Arlington Agricultural Research Station, Arlington, WI.

Results and conclusions
For this trial in 2021-2022, Aroostook and ND Gardener yielded the highest biomass. Seeding rate did not impact total biomass production in either year of this study likely due to increased tillering at lower seeding rates. While lodging was inconsistent by year, thinner stems and taller stature of Aroostook may make it on average more likely to lodge as demonstrated by results obtained in 2021.

Rye variety results
Measurements taken at anthesis.

Rye variety	Rye seeding rate (seeds/ac)	Rye biomass (lb/ac)	Stem length (inches)	Stem diameter (mm)
Aroostook	1,500,000	10544 a	53.2 ab	3.33 bcd
	2,250,000	10533 a	55.0 a	3.25 cd
	3,000,000	10585 a	50.8 abcd	3.15 d
ND Gardener	1,500,000	10286 a	52.5 abc	3.50 abc
	2,250,000	9806 a	53.1 ab	3.53 abcd
	3,000,000	10077 a	52.7 ab	3.38 abc
Spooner	1,500,000	9665 a	54.5 a	3.88 ab
	2,250,000	9943 a	52.9 ab	3.78 abc
	3,000,000	9472 a	49.9 bcd	3.73 abc
Danko	1,500,000	9175 a	48.1 cd	4.08 a
	2,250,000	9249 a	47.2 d	3.70 abcd
	3,000,000	10175 a	46.4 d	3.73 bcd
Rye Variety (V)		***	***	***
Seeding Rate (SR)		NS	***	*
Year (Y)		***	***	***
*V*SR*		NS	NS	NS
*V*Y*		*	*	***
*SR*Y*		NS	NS	**
*V*SR*Y*		NS	NS	NS
CV		10.4	5.11	9.32

* Significant at $p < 0.1$, **Significant at $p < 0.05$, ***Significant at $p < 0.01$.

TRIAL: SUNFLOWER VARIETY TRIALS

Background: Incorporating sunflowers into crop rotations allows for the potential to diversify crop rotations in the Upper Midwest.

Objective: We implemented an oilseed sunflower variety trial to compare sunflower yields across early maturing and mid-maturing groups.

Trial duration and location: 2022, Arlington Agricultural Research Station, Arlington, WI.

Field management

Weed management	Tine weeding, rotary hoeing, and interrow cultivation as necessary throughout the growing season
Planting	Seeded on June 2nd at 26,000 seeds/ac
Harvesting	Harvested with a combine using a corn head with soybean sieves. A substantial amount of seed loss from the combine was noted; therefore, a subsample of each plot was hand harvested prior to machine harvesting

Results

Early-maturing sunflower varieties

Measured on July 21, 2022. Means and standard deviations presented.

Sunflower variety	Plant stand (plants/ac)	Yield (hand harvest; lb/ac)	Yield (combine harvest; lb/ac)	Test weight (lb/bu)
CP455E	21217 ± 1781	3095 ± 412	1636 ± 102 a	27.7 ± 0.50 b
N4H302E	21290 ± 932	2658 ± 243	924 ± 16 b	25.9 ± 0.51 bc
P32D23	18386 ± 2484	2644 ± 195	1282 ± 464 ab	25.2 ± 0.54 c
Cobalt II	18422 ± 1446	2314 ± 737	818 ± 178 b	31.1 ± 1.61 a
p-value	NS†	NS	**	***
CV	7.96	17.8	20.0	3.02

**Significant at $p < 0.01$; ***Significant at $p < 0.001$.
†Significant at $p < 0.05$ but means do not separate out using Tukey's procedure.

Mid-maturing sunflower varieties

Measured on July 21, 2022. Means and standard deviations presented.

Sunflower variety	Plant stand (plants/ac)	Yield (hand harvest; lb/ac)	Yield (combine harvest; lb/ac)	Test weight (lb/bu)
CP455E	19403 ± 2701 ab	3379 ± 574	1742 ± 421 ab	28.7 ± 1.60
P42N21	19566 ± 3290 ab	2452 ± 1015	1938 ± 264 a	29.1 ± 0.61
N4H470CLP	22016 ± 2255 a	2342 ± 327	784 ± 377 c	29.4 ± 0.67
P46W21	11664 ± 1220 b	2043 ± 220	940 ± 111 bc	27.5 ± 0.45
p-value	**	NS	**	NS
CV	25.1	27.3	20.0	3.00

**Significant at $p < 0.01$.

TRIAL: SOYBEANS PLANTED INTO TRITICALE

Background: Successful termination of triticale is dependent on triticale reaching anthesis which delays soybean planting as compared to cultivated soybeans without cover crops. Forage harvesting of triticale has potential to further increase system profitability by allowing a double crop system of triticale forage and soybeans but increases risk of weed breakthroughs by removing ground cover.

Objective: To examine alternatives to planting soybeans at triticale anthesis using two different triticale termination methods. Effect on weed prevalence, soybean development, and soybean grain yield were examined.

Trial duration and location: 2022, Arlington Agricultural Research Station, Arlington, WI.

Treatments

Forage harvested	Triticale forage harvested and soybeans planted at boot stage on May 25th.
Roller crimped	Soybeans planted into standing triticale at boot stage on May 25th.Triticale terminated with a roller crimper at anthesis when soybeans were at the unifoliate stage on June 15.
Tilled control	No cover crop control

Results and conclusions
Overall, there were significant yield reductions in the triticale treatments compared with the cultivated control due to intense weed pressure in the forage harvested treatment and stand establishment challenges in the roller crimped treatment.

Treatment	**Triticale Biomass**	**Weed Biomass**	**Soybean Biomass**	**Soybean Stand**	**Test Weight**	**Soybean Yield**
	----------------------(lb/ac)---------------------			**(plants/ac)**	**(lb/bu)**	**(bu/ac)**
Tilled Control	0.00±0.00 c	161±322 b	5806±678 a	114875±10451 a	57.0±0.17 a	51.5±16.2 a
Forage Harvested	5541±605 b	3180±2476 a	2792±1351 b	110375±15834 a	56.8±0.37 a	31.4±17.5 b
Roller Crimped	10697±2500 a	6.50±13.0 b	882±192 b	38875±8797 b	55.7±0.64 b	20.7±4.31 b
p-value	***	**	***	***	*	**
CV	29.3	63.7	28.5	11.3	0.78	24.4

* Significant at $p < 0.05$; **Significant at $p < 0.01$; ***Significant at $p < 0.01$.

This research was conducted in partnership with Dr. Matt Ryan, School of Integrative Plant Science Soil and Crop Sciences, Cornell University. The project is funded by a USDA Organic Research and Extension Initiative Grant No. 2020-51300-32183.

TRIAL: NO-TILL DRY BEAN SEEDING RATES

Background: Black beans, a profitable cash crop with similar morphology to soybeans, may benefit from organic no-till systems.

Objective: To examine the effect of black bean seeding rate on weed suppression and grain yield within a no-till roller crimped system.

Trial duration and location: 2022, Arlington Agricultural Research Station, Arlington, WI.

Treatments

Seeding rate (seeds/ac)	Black bean variety	Planting
75000	Zorro	Planted into a roller crimped winter rye cover crop on June 3
150000		
225000		
300000		
375000		

Results and conclusions

Winter rye biomass suppressed weeds throughout the experiment exceptionally well with an average of only 55 lb/ac of weed biomass across plots. Black bean emergence through the rye residue averaged 45% across treatments. Observational weed ratings indicated a trend towards lower weed prevalence as black bean planting populations increased. No differences in black bean biomass or grain yield were noted at harvest, likely as a result of treatments with lower plant stands compensating for yield by increasing branching and pods per plant similar to soybeans.

Treatment	Soybean Stand	Weed Biomass	Crop Biomass	Grain Yield	Weed Rating	Lodging Rating
seeds/ac	plants/ac	-------------------------lb/ac---------------------			----------(0-5 scale) -----	
75,000	34917 ± 1988 c	6.60 ± 7.63	4226 ± 1544	3820 ± 799	2.25 ± 0.50	3.50 ± 0.58
150,000	76750 ± 6707 bc	160 ± 208	4295 ± 1108	3795 ± 397	1.50 ± 0.58	2.00 ± 0.00
225,000	126000 ± 17263 ab	0.00 ± 0.00	4180 ± 1488	3543 ± 377	1.25 ± 1.26	3.00 ± 0.82
300,000	123167 ± 43370 ab	109 ± 129	4876 ± 1296	3328 ± 618	1.00 ± 0.82	3.25 ± 0.50
375,000	174250 ± 27907 a	0.00 ± 0.00	4393 ± 984	3592 ± 444	0.75 ± 0.96	3.75 ± 0.50
p-value	***	NS	NS	NS		
CV	22.6	163	30.9	14.6		

This research was conducted in partnership with Dr. Matt Ryan, School of Integrative Plant Science Soil and Crop Sciences, Cornell University. The project is funded by a USDA Organic Research and Extension Initiative Grant No. 2020-51300-32183.

2022 OUTREACH ACTIVITIES

Field days

Farmers, researchers and industry experts gathered for four fields days held across Wisconsin in 2022. Field days were held at the UW-Madison's Arlington Agricultural Research Station to share university research and at local farms to showcase the innovative practices Wisconsin organic grain growers are using and how the research translates to their fields. These were generously hosted on the Hughes Farm with Willie Hughes, at Otter Creek Farm with Gary Zimmer and with Chris Wilson at the Wilson Organic Farm with co-sponsorship by Organic Valley.

Winter conference

Our winter conference brings together local organic grain growers, researchers, industry experts and other interested parties along the grain chain. The event was held January 27-29, 2022 at the Gordon Dining and Event Center in Madison, WI. There was also a No-Till Gathering on Thursday, sponsored by Michael Fields Agricultural Institute. On Friday, Rick Clark delivered the keynote address to share his experience with organic no-till. Topics ranging from marketing and crop insurance to weed zapping, cover crops and incorporating livestock were covered. The program can be found here and recordings are on YouTube.

Fact Sheet Series 22-2

GRAIN

Blind Cultivation for Early-Season Weed Control in Organic Grains

SUMMARY

INTRODUCTION

Resource development

New OGRAIN fact sheets were created this year to share information about topics of interest to organic grain growers of Wisconsin including, blind cultivation, sunflower production, and small grain marketing. They were developed with our collaborators, including: Joel Gruver, Western Illinois University; Mirk Garland, Purdue Agribusiness; and Lauren Asprooth, University of California-Davis. All fact sheets and additional OGRAIN resources, including videos, planning tools, conference presentations, webinars, and the OGRAIN Compass, can all be found at our website www.ograin.cals.wisc.edu.

Midwest GRIT (Grains Resource & Immersive Training)

Midwest GRIT is a program focused on strengthening diverse small and mid-size Midwest food-grade grain farmers. A program of Michael Fields Agricultural Institute (MFAI), in partnership with the Artisan Grain Collaborative (AGC), and OGRAIN, Midwest GRIT supports farmers through three key areas: education, peer-to-peer learning and relationship development, and resource sharing.