Green-seeding Soybean into Living Cereal Rye

On-Farm Large Plots

ON-FARM RESEARCH NETWORK
MINNESOTA WHEAT

Planting and termination

Dorothy

- Fall 2019
  - 1 pass harrow, chisel
  - Rye 9-6-19, 20 lbs/ac, hoe drill
- Spring 2020
  - 1 pass Salford (rye + control)
  - 5-24-20 Pioneer P0184X
  - Hoe drill, 10” spacing, 12” sweeps
- Rye Termination
  - 6-20-20
  - Roundup + dicamba + Zidua

Warren

- Fall 2019
  - 1 pass chisel, supercoulter
  - Rye 9-8-19, 20 lbs/ac, hoe drill
- Spring 2020
  - No field prep
  - 5-24-20 Asgrow 03X7
  - Row planter, 22” disc openers
- Rye Termination
  - 6-16-20
  - Roundup + Engenia

Fall rye growth prior to freeze-up

Dorothy 10-24-2019

Warren 10-24-2019

Spring rye growth at planting

Rye dry biomass at planting and termination

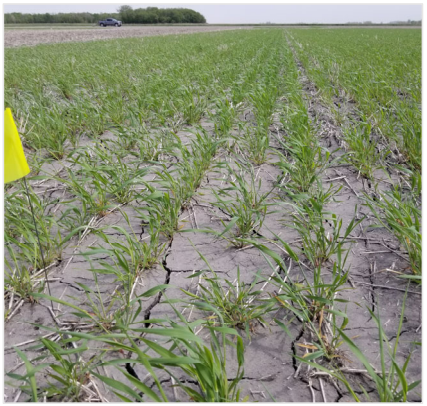
Dorothy

Planting May 24
347 lbs/ac

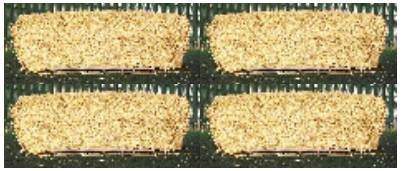
Termination June 20
237 lbs/ac

Warren

Planting May 24
246 lbs/ac



Termination June 18
2,660 lbs/ac



Soil-nitrate prior to soybean planting

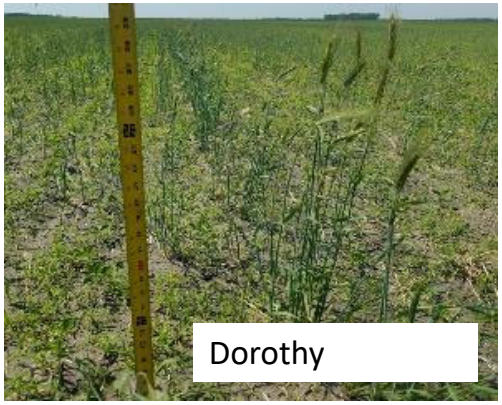
		0-6 in	6-24 in	0-24 in
			--lbs per ac--	
Dorothy	Control	9	24	33
5/20/2020	Rye	7	22	29
	Difference	**2**	--	**5**
	CV (%)	31.4	22.1	23.4
	pvalue	0.058	0.319	0.073

		0-6 in	6-24 in	0-24 in
			--lbs per ac--	
Warren	Control	9	18	27
5/22/2020	Rye	7	15	22
	Difference	--	--	--
	CV (%)	32.9	37.6	33.6
	pvalue	0.250	0.423	0.296

Significant differences calculated at $p<0.10$

Soil-nitrate at rye termination

		0-6 in	6-24 in	0-24 in
			--lbs per ac--	
Dorothy	**Control**	**18**	34	**52**
6/16/2020	Rye	13	26	38
	Difference	**5**	--	**13**
	CV (%)	25.0	36.1	29.9
	p-value	0.001	0.195	0.085



		0-6 in	6-24 in	0-24 in
			--lbs per ac--	
Warren	**Control**	**24**	**29**	**53**
6/18/2020	Rye	7	8	15
	Difference	**17**	**22**	**39**
	CV (%)	59.5	70.1	63.0
	p-value	0.000	0.003	0.001

Significant differences calculated at p<0.10

Soil moisture 0, 2, and 4 weeks after planting

		Pre-plant	2 WAP	4 WAP
			-- % v/v --	
Dorothy	Control	23.2	23.5	22.8
	Rye	22.2	24.0	21.7
	Difference			
	CV (%)	23.6	20.0	22.1
	p-value	0.483	0.778	0.458

		Pre-plant	2 WAP	4 WAP
			-- % v/v --	
Warren	**Control**	26.2	**20.3**	27.2
	Rye	27.2	17.6	27.9
	Difference		**2.7**	
	CV (%)	11.8	27.0	9.4
	p-value	0.332	0.031	0.438

Significant differences calculated at $p<0.10$

Weeds per square yard

		Soybean planting	2 WAP
		-- weeds per sq. yard --	
Dorothy	Control	22.4	241.7
	Rye	6.7	149.4
	Difference	15.8	92.3
	CV (%)	122.6	56.0
	p-value	0.021	0.074

		Soybean planting	2 WAP	4 WAP
			-- weeds per sq. yard --	
Warren	Control	3.3	12.1	1.7
	Rye	0.8	2.0	1.5
	Difference	--	10.2	--
	CV (%)	137.6	94.2	79.5
	p-value	0.169	0.031	0.851

Significant differences calculated at p<0.10

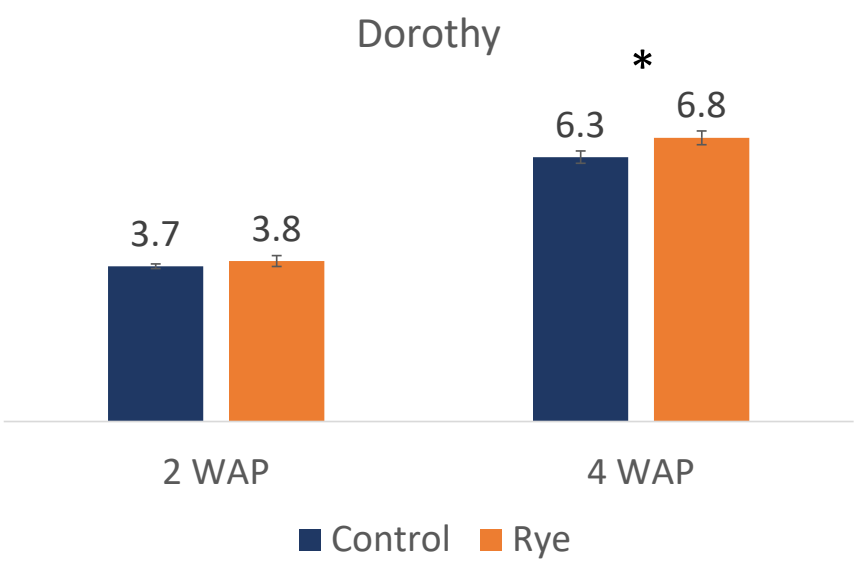
Dorothy 2 WAP – Control

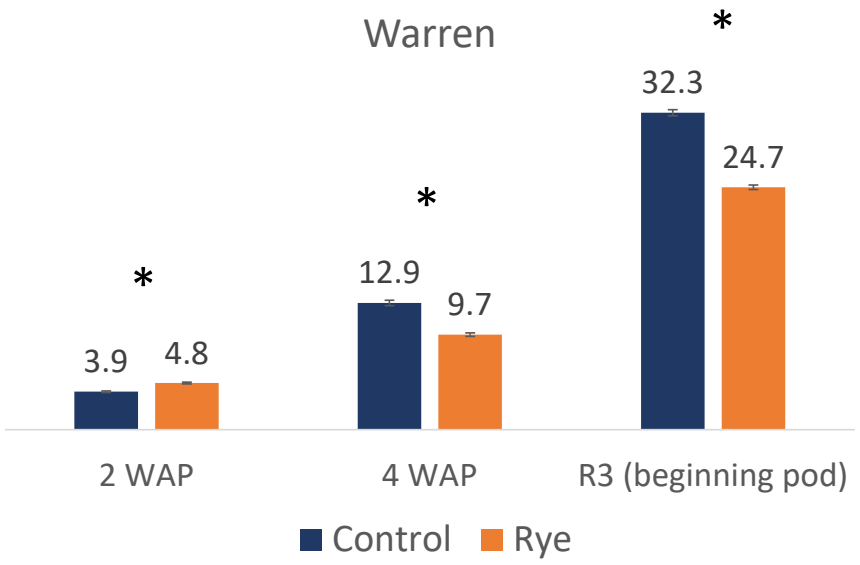
Control Rye

Yellow beans – IDC, N, both?

Warren – July 9

Soybean plant height





∗ = statistically significant at p<0.10

Soybean yield and quality

		Yield	Protein	Oil	Moisture	TW
		-- bu /ac --	-- % --	-- % --	-- % --	-- lb /bu --
Dorothy	Control	14.7	33.7	18.8	15.7	54.9
	Rye	18.2	33.5	18.9	14.3	56.9
	Difference	--	--	-0.1	--	-2.0
	CV (%)	18.4	0.6	0.5	9.6	2.9
	p-value	0.219	0.293	<.0001	0.175	0.086

Dorothy suffered from poor soybean stand establishment

		Yield	Protein	Oil	Moisture	TW
		-- bu /ac --	-- % --	-- % --	-- % --	-- lb /bu --
Warren	Control	55.6	34.2	17.9	9.4	57.4
	Rye	48.6	34.0	17.6	9.4	57.8
	Difference	6.9	0.2	0.3	--	-0.3
	CV (%)	7.7	0.4	1.1	0.7	0.4
	p-value	0.004	0.092	0.049	0.638	0.041

Significant differences calculated at $p<0.10$

IDC Rating

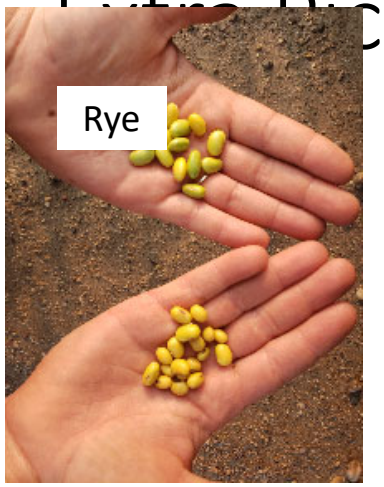
		2 WAP	4 WAP
Dorothy	Control	1.9	2.2
	Rye	1.9	2.3
	Difference		
	CV (%)	18.6	24.3
	p-value	0.981	0.948

		2 WAP	4 WAP
Warren	Control	1.0	1.2
	Rye	1.0	2.9
	Difference		
	CV (%)	--	45.7
	p-value	--	0.199

Significant differences calculated at $p<0.10$

- Soybean IDC was rated on a scale of 1-5 according to the NDSU IDC rating scale
- These data were not shared with producers since it isn't for certain that IDC was the cause of the yellowing at Warren

Extra Pictures



Control

5-11-20

5-11-20

Control Rye

Control Rye

Rye Control

Warren – July 13