WSU WILKE RESEARCH AND EXTENSION FARM OPERATION, PRODUCTION, AND ECONOMIC PERFORMANCE FOR 2015

Washington State Oilseed Cropping Systems Series

WSU PEER REVIEWED

TB20

By
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WSU Wilke Research and Extension Farm Operation, Production, and Economic Performance for 2015

Current Situation

The WSU Wilke Research and Extension Farm is a 320-acre facility located on the eastern edge of Davenport, WA, and is split (north and south) by State Highway 2. Washington State University maintains and operates this facility. The focus of this annual technical bulletin is on farmers and crop consultants in the intermediate cropping zone (12 to 17 inches of annual precipitation). It also provides documentation of the operations and production on the Wilke Farm to assist University faculty with small plot research experiments.

The Wilke Farm remains in a direct-seed cropping system utilizing no-till fallow, winter wheat, and spring cereals. Broadleaf crops remain a viable option and are substituted for spring and winter cereals when weed pressures and market prices create opportunities for profitable production. The predominant cropping system practiced by farmers in this region is a 3-year rotation, which includes summer fallow, winter wheat, and spring cereals. Farmers are interested in intensifying rotations to reduce fallow years and increase crop diversity to improve long-term agronomic and economic stability.

The south side of the farm is divided into seven plots; three plots are in a more traditional 3-year crop rotation, and four plots are in an intensified 4-year crop rotation. The north side of the farm remains in an intensified rotation that forgoes summer fallow and is in continuous cereal grain production. In 2010 through 2013, cereal rye (feral rye) infestations caused cropping decisions to be altered on the Wilke Farm, especially in the no-till fallow winter wheat portion of the rotations (these changes are noted in ***red italic*** in the data tables). In the fall of 2013, the no-till fallow winter wheat portion of the rotation was seeded as planned according to the rotation without alteration due to cereal rye.

Soil compaction and wireworm population data are collected each spring from GPS-recorded locations within each plot. Soil samples are also collected from these GPS locations prior to seeding each plot, and fertilizer is applied according to soil sample results and WSU recommendations.

Operation

Winter wheat into fallow was seeded with Crop Production Services Case IH direct-seed hoe drill with Anderson openers on 12-inch spacing, and recrop winter wheat was seeded by Mike Abbot's Case IH direct-seed hoe drill with Kyle openers on 12-inch spacing. The spring crops were seeded with Rob Dewald's 5810 Bourgault hoe drill on 12-inch spacing. The farm was harvested with the farm's John Deere 6622 combine from July 27 through August 4.

Winter Wheat (3-year Plot 2; 4-year Plot 6; Continuous North)

Plot 2 and Plot 6 were seeded to 'Crescent' soft white winter club wheat on September 10, 2014, at 70 lb/acre into no-till fallow. Seed was treated with 1.0 oz/cwt CruiserMaxx Cereals plus Vibrance. Liquid ammonium Thio-Sul, 12-0-0-26, ammonium polyphosphate, 10-34-0-0, and Power Up, 6-18-6-1, were applied at a rate of 9-12.5-1-11 with the seed. In Plot 2, anhydrous ammonia was applied below the seed at 93 lb N/acre. Post-emergence herbicide application was applied on April 20, 2015. This application included 4.75 oz/acre Osprey, 13.5 oz/acre Huskie, 13.5 oz/acre Bison, 64 oz/acre UAN, and 2.0 qt/100 gal non-ionic surfactant. In Plot 6, anhydrous ammonium was applied below the seed at 68 lb N/acre. Post-emergence herbicide application was applied on April 20, 2015. This application included 13.5 oz/acre Huskie, 13.5 oz/acre Bison, 64 oz/acre UAN, and 2.0 qt/100 gal non-ionic surfactant.

Continuous North was seeded to 'Sprinter' hard red winter wheat on October 8, 2014, at 77 lb/acre into ground previously cropped to spring wheat. Seed was treated with 0.33 oz/cwt CruiserMaxx Cereals. Liquid ammonium Thio-Sul and 10-34-0-0 were applied at a rate of 7-10-0-1 with the seed. Anhydrous ammonium was applied below the seed at 47 lb N/acre. Post-emergence herbicide application was applied on April 20, 2015. This application included 4.75 oz/acre Osprey, 13.5 oz/acre Huskie, 13.5 oz/acre Bison, 64 oz/acre UAN, and 2.0 qt/100 gal non-ionic surfactant. Post-harvest herbicide application was applied on August 5, 2015, because of heavy broadleaf weed pressure. This application was applied at 20 gal/acre and included 48 oz/acre Gramoxone, 5 qt/100 gal Class Act, 2 oz/acre Interlock, and 12 qt/100 gal Solution 32.

Spring Wheat (3-year Plot 5; 4-year Plot 1)

Plot 5 was seeded to ‘Glee’ hard red spring wheat into winter wheat residue on April 14 at 70 lb/acre. It was treated with 0.66 oz/cwt CruiserMaxx Cereals. Aqua and ammonium thiosulfate were applied below the seed at 81 lb N/acre and 3 lb S/acre. Liquid ammonium thiosulfate, 10-34, and 6-24 were applied at a rate of 6-11-1-6 with the seed. Liquid boron and zinc were also applied with the seed at 14.6 and 8 oz/acre. Prior to seeding on April 8, 32.0 oz/acre RT3 (glyphosate), 1.5 qt/100 gal Alliance, and 1.0 qt/100 gal Activate were applied. Post-emergence weed control was applied on May 31. This application included 21 oz/acre Weedar 64 and 1 qt/100 gal Activate.

Plot 1 was seeded to ‘Glee’ hard red spring wheat into spring canola residue on April 14 at 70 lb/acre. It was treated with 0.66 oz/cwt CruiserMaxx Cereals. Aqua and ammonium thiosulfate were applied below the seed at 91 lb N/acre and 3 lb S/acre. Liquid ammonium thiosulfate, 10-34, and 6-24 was applied at a rate of 6-11-1-6 with the seed. Liquid boron and zinc were also applied with the seed at 14.6 and 8 oz/acre. Prior to seeding on April 8, 32.0 oz/acre RT3, 1.5 qt/100 gal Alliance, and 1.0 qt/100 gal Activate were applied. Post-emergence weed control was applied on May 31. This application included 21 oz/acre Weedar 64 and 1 qt/100 gal Activate.

Spring Canola (4-year Plot 4)

‘L120’ Liberty Link spring canola was seeded and fertilized in one pass on April 14 into spring wheat residue at 4.5 lb/acre. No fertilizer was applied below the seed, and liquid ammonium thiosulfate, 10-34, and 6-24 were applied at a rate of 6-11-1-6 with the seed. Liquid boron and zinc were also applied with the seed at 14.6 and 8 oz/acre. On June 1, Solution 32 and boron were applied at 20 lb N/acre and 4.6 oz/acre with stream jet nozzles. Prior to seeding on April 8, 32.0 oz/acre RT3, 1.5 qt/100 gal Alliance, and 1.0 qt/100 gal Activate were applied. Post-emergence weed control included 22.0 oz/acre Liberty, 5.0 oz/acre Assure II, 5 lb/100 gal AMS MAX, and 0.6 qt/100 gal Activate on May 31 for both broadleaf and grassy weed control.

No-till Fallow (3-year Plot 7; 4-year Plot 3)

Both plots of no-till fallow were maintained relatively weed free with three herbicide applications. The first application on April 30 and the second application on June 10 were 32.0 oz/acre RT3, 1 oz/acre Sharpen, 4 qt/100 gal Destiny HC MSO, and 1.5 qt/100 gal Alliance. The third and final application on July 15 was 42.0 oz/acre RT3 and 1.5 qt/100 gal Aduro.

Soil Compaction

Soil compaction data are collected with a Spectrum Soil Compaction meter. Data are collected within each plot in the spring of the year prior to seeding and monitor compaction levels over time within a given crop rotation, which assists in potential management decisions. Plot 4 and 5 were deep ripped with a low disturbance Case IH Ecolo-til 2500 to monitor changes over time. Plot 5 had the least amount of compaction with an average of 131 psi/18 inches, and Plot 1 had the greatest average with 219 psi/18 inches (Figure 1). Plots 4, North, 3, 6, 2, and 7 compaction averaged 168, 170, 180, 192, 197, and 202 psi/18 inches, respectively.

Wireworm Populations

Wireworm population data are collected within each plot in the spring of the year prior to seeding using the modified solar bait trap method. This is done to monitor populations over time and better match seed-applied insecticide with wireworm populations. Plot 5 had the least amount of wireworms averaging 0.0/trap, and Plot 4 had the greatest population averaging 6.2/trap. Plots 7, 1, and 3 averaged 0.4, 1.6, and 4.4/trap, respectively.

Soil Samples

All soil samples were collected prior to seeding. Soil samples are used to help determine yield potential and nutrient requirements for the crops each year (Tables 1–8). They are also used as a historical reference for changing soil conditions over time. Soil pH, organic matter, phosphorus, and ammonium nitrogen is collected from the top 12 inches of soil only.

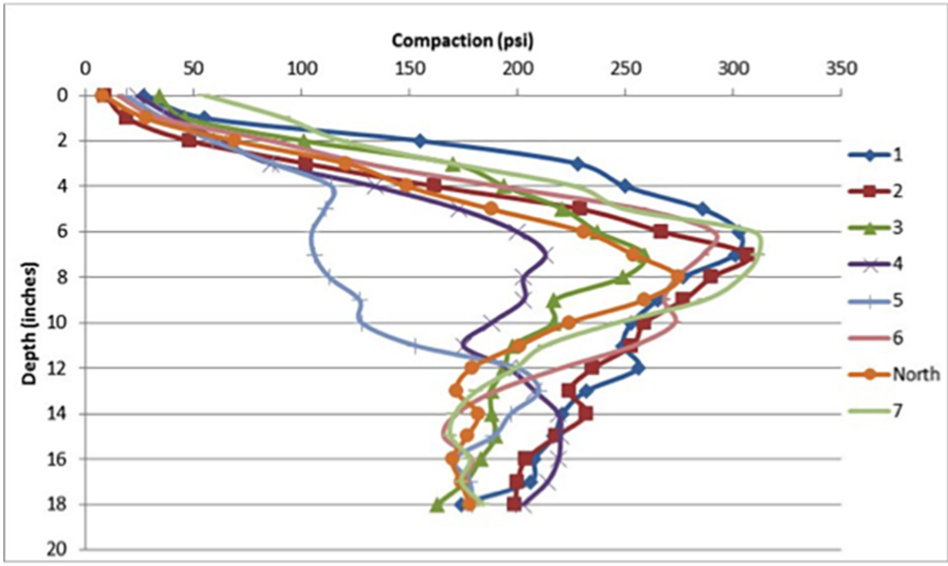

Figure 1. Soil compaction data collected in the spring of 2015 from the plots at the WSU Wilke Research and Extension Farm.

Table 1. Winter Wheat 3-year Plot 2

Soil pH	5.8			**Phosphorus**	15 mg/kg
Organic Matter	2.5% (50 lb/acre N)			**Ammonium N**	6 lb/acre
	Soil Depth (in)				
	0-12	**12-24**	**24-36**	**36-48**	**Total**
Nitrate-N (lb/ac)	72	15	9	7	103
Sulfate-S (mg/kg)	7	3	4	–	13
Moisture (in)	1.8	1.8	1.6	1.6	6.7
Sum of Tested N: 159 lb/acre N					

Table 2. Winter Wheat 4-year Plot 6

Soil pH	5.7			**Phosphorus**	14 mg/kg
Organic Matter	2.0% (40 lb/acre N)			**Ammonium N**	6 lb/acre
	Soil Depth (in)				
	0-12	**12-24**	**24-36**	**36-48**	**Total**
Nitrate-N (lb/ac)	84	32	11	26	153
Sulfate-S (mg/kg)	5	3	3	–	12
Moisture (in)	1.8	1.6	1.3	1.4	6.0
Sum of Tested N: 199 lb/acre N					

Table 3. Winter Wheat Plot Continuous North

Soil pH	5.8			**Phosphorus**	6 mg/kg
Organic Matter	2.0% (40 lb/acre N)			**Ammonium N**	32 lb/acre
	Soil Depth (in)				
	0-12	**12-24**	**24-36**	**36-48**	**Total**
Nitrate-N (lb/ac)	32	7	5	20	64
Sulfate-S (mg/kg)	8	5	5	–	21
Moisture (in)	0.5	0.7	1.0	1.2	3.4
Sum of Tested N: 136 lb/acre N					

Table 4. Spring Wheat 3-year Plot 5

Soil pH	5.9			**Phosphorus**	19 mg/kg
Organic Matter	2.4% (48 lb/acre N)			**Ammonium N**	4 lb/acre
	Soil Depth (in)				
	0-12	**12-24**	**24-36**	**36-48**	**Total**
Nitrate-N (lb/ac)	14	19	21	16	70
Sulfate-S (mg/kg)	9	10	32	–	51
Moisture (in)	2.8	2.0	1.8	1.5	8.1
Sum of Tested N: 122 lb/acre N					

Table 5. Spring Wheat 4-year Plot 1

Soil pH	6.0			**Phosphorus**	17 mg/kg
Organic Matter	2.6% (52 lb/acre N)			**Ammonium N**	4 lb/acre
	Soil Depth (in)				
	0-12	**12-24**	**24-36**	**36-48**	**Total**
Nitrate-N (lb/ac)	14	11	10	5	40
Sulfate-S (mg/kg)	10	8	6	–	24
Moisture (in)	3.0	2.2	1.9	1.4	8.5
Sum of Tested N: 96 lb/acre N					

Table 6. Spring Canola 4-year Plot 4

Soil pH	6.2			**Phosphorus**	13 mg/kg
Organic Matter	2.6% (52 lb/acre N)			**Ammonium N**	4 lb/acre
	Soil Depth (in)				
	0-12	**12-24**	**24-36**	**36-48**	**Total**
Nitrate-N (lb/ac)	12	22	24	15	73
Sulfate-S (mg/kg)	8	8	8	–	25
Moisture (in)	3.0	2.4	1.6	1.3	8.3
Sum of Tested N: 129 lb/acre N					

Table 7. No-till Fallow 3-year Plot 7

Soil pH	6.1			**Phosphorus**	17 mg/kg
Organic Matter	3.2% (64 lb/acre N)			**Ammonium N**	7 lb/acre
	Soil Depth (in)				
	0-12	**12-24**	**24-36**	**36-48**	**Total**
Nitrate-N (lb/ac)	22	13	2	3	40
Sulfate-S (mg/kg)	8	4	5	–	16
Moisture (in)	2.3	1.6	1.0	1.3	6.2
Sum of Tested N: 111 lb/acre N					

Table 8. No-till Fallow 4-year Plot 3

Soil pH	6.2			**Phosphorus**	12 mg/kg
Organic Matter	2.0% (40 lb/acre N)			**Ammonium N**	12 lb/acre
	Soil Depth (in)				
	0-12	**12-24**	**24-36**	**36-48**	**Total**
Nitrate-N (lb/ac)	12	22	47	24	105
Sulfate-S (mg/kg)	7	5	33	–	45
Moisture (in)	2.8	2.4	1.6	1.2	8.0
Sum of Tested N: 157 lb/acre N					

Table 9. 2015 Nitrogen Use Efficiency

	Plot 1	Plot 2	Plot 5	Plot 6	North
Soil Test Nitrogen†	90	159	101	199	136
Applied Nitrogen	97	102	87	77	54
Total Nitrogen	187	261	188	276	190
Grain Yield	23.0	51.5	24.5	50.1	24.4
Grain Protein	16.0%	12.3%	15.7%	12.3%	15.0%
Lb N/bu	8.1	5.1	7.67	5.5	7.3
Nitrogen Uptake Efficiency	**26%**	**36%**	**27%**	**33%**	**27%**

† Soil test nitrogen is calculated using soil test results in combination with the WSU Dryland Wheat Nitrogen Fertilizer Calculator.

Production and Economic Performance

Nitrogen uptake efficiency across the farm was well below 50 percent across all crops (Table 9). This implies the farm was greatly over fertilized across all crops for harvested yields and grain protein and a large amount of nitrogen should be available in the soil for next year's production.

The WSU Wilke Farm grain marketing plan begins once the crop has emerged using forward contracts and post-harvest selling. All grain is marketed by November 15. The average marketing window for winter wheat is about 13 months, and 7 months for spring crops. Forward contract values do not exceed the crop revenue insurance coverage value. The potential for a forward contract is evaluated monthly and is based on a targeted rate of return on investment based on estimated expenses. Market grades for each crop are provided as these also impact final market price.

Despite average input costs at the WSU Wilke Farm being down 9.5% over the last 3-year average, economic returns over input costs were 85.3% less than the previous 3-year average and were the lowest in over ten years. This is caused by both low yields from hot, dry weather conditions and low commodity prices.

Tables 10–15 summarize the rotation, production, and economic performance of the 3-year rotation, 4-year rotation, and continuous cropping system at the Wilke Farm in 2015.

The 3-year crop rotation returns above input costs averaged $36/acre, 77% less than the 3-year average. The 4-year crop rotation returns above input costs averaged $31/acre, 82% less than the previous 3-year average. The continuous cropping system returns above input costs averaged $2/acre, 99% less than the previous 3-year average. Crop insurance was purchased on the farm and was collected on all crops, but this revenue is not included in the plot summaries to maintain consistency over years and results based specifically on crop production only.

Summary

A summary of WSU Wilke Research and Extension Farm economic returns over input costs using 3-year averages is shown in Figure 2. Over the last three years (2013 to 2015), the 3-year rotation, 4-year rotation, and continuous cropping have averaged returns above input costs of $113, $90, and $62/acre, respectively. Over the last six years, the 3-year rotation and 4-year rotation have averaged returns above input costs of $174 and $195/acre, respectively. These are both significantly greater than $138/acre return above cost of the continuous cropping system.

Table 10. 3-year cropping rotation sequence at the Wilke Farm from 2011–2016

Year	Plot 2	Plot 5	Plot 7
2011	*Spring Barley* (1.97 ton/acre)	Winter Wheat (87.4 bu/acre)	DNS Wheat (43.8 bu/acre)
2012	*HWSW* (46.4 bu/acre)	DNS Wheat (45.7 bu/acre)	No-till Fallow
2013	DNS Wheat (60.9 bu/acre)	No-till Fallow	Winter Wheat (85.5 bu/acre)
2014	No-till Fallow	Winter Wheat (51.7 bu/acre)	HWSW (19.8 bu/acre)
2015	**Winter Wheat (51.5 bu/acre)**	**DNS Wheat (24.5 bu/acre)**	**No-till Fallow**
2016	Spring Cereal	No-till Fallow	Winter Wheat

Red italicized crops are those that have been altered for cereal rye management.

Table 11. 3-year crop rotation production at the Wilke Farm, 2015

	Plot 2	Plot 5	Plot 7
Cropping Specifics			
Acreage	22.2	26.1	30.1
Crop	'Crescent' SWWW club	'Glee' DNS wheat	No-till Fallow
Crop Production			
Yield	51.5 bu/acre	24.5 bu/acre	–
Mkt Grade	#2 WHC 57.1 0.7% 12.3%	#1 DNS 59.5 0.5% 15.7%	–
Gross Economic Return†			
Mkt Price	$5.17/bu	$5.85/bu	–
Gross Return	$266.14/acre	$143.49/acre	–
Input Costs			
Seed	$20.48/acre	$21.57/acre	–
Fertilizer	$83.61/acre	$68.61/acre	–
Herbicides	$33.61/acre	$9.06/acre	$38.35/acre
Fungicide	–	–	–
Total	$137.69/acre	$99.24/acre	$38.35/acre
Summary			
Return over Costs	$128.45/acre	$44.25/acre	–$38.35/acre
3-Year Rotation Return over input Costs‡		**$36.38/acre**	

†Revenue does not include crop insurance revenue.
‡Costs do not include fixed costs associated with the farm.

Table 12. 4-year cropping rotation sequence at the Wilke Farm from 2011–2016

Year	Plot 1	Plot 3	Plot 4	Plot 6
2011	DNS Wheat (51.2 bu/acre)	*Spring Barley* (1.76 ton/acre)	*DNS Wheat* (47.0 bu/acre)	Winter Wheat (84.4 bu/acre)
2012	*Spring Canola* (1,542 lb/acre)	*HWSW* (53.1 bu/acre)	Spring Barley (1.45 ton/acre)	*DNS Wheat* (38.4 bu/acre)
2013	*SWSW* (65.7 bu/acre)	*Spring Canola* (1,748 lb/acre)	No-till Fallow	DNS Wheat (50.4 lb/acre)
2014	Spring Canola (701 lb/acre)	SWSW (23 bu/acre)	Winter Wheat (55.9 bu/acre)	No-till Fallow
2015	***DNS Wheat* (23.0 bu/acre)**	**No-till Fallow**	**Spring Canola (479 lb/acre)**	**Winter Wheat (50.1 bu/acre)**
2016	No-till Fallow	Winter Wheat	Spring Cereal	Spring Canola

Red italicized crops are those that have been altered for cereal rye management.

Table 13. 4-year crop rotation production at the Wilke Farm, 2015

	Plot 1	Plot 3	Plot 4	Plot 6
Cropping Specifics				
Acreage	28.9	26.4	27.8	29.4
Crop	'Glee' DNS wheat	No-till Fallow	*'L120 Liberty Link'* (Canola)	*'Crescent'* SWWW (club)
Crop Production				
Yield	23.0 bu/acre	–	479 lb/acre	50.1 bu/acre
Mkt Grade	#1 DNS 58.3 0.5% 16.00%	–	#1 Canola 4.4%	#3 SWC 56.7 0.7% 12.20%
Gross Economic Return†				
Mkt Price	$5.85/bu	–	$0.146/lb	$5.87/bu
Gross Return	$134.48/acre	–	$69.97/acre	$294.07/acre
Input Costs				
Seed	$21.57/acre	–	$52.88/acre	$20.48/acre
Fertilizer	$74.01/acre	–	$37.09/acre	$70.13/acre
Herbicides	$23.21/acre	$38.35/acre	$30.19/acre	$16.09/acre
Fungicide	–	–	–	–
Insecticide	–	–	–	–
Pod Sealant	–	–	–	–
Total	$118.79/acre	$38.35/acre	$121.16/acre	$106.70/acre
Summary				
Return over Costs	$15.69/acre	–$38.35/acre	–$51.19/acre	$187.37/acre
4-Year Rotation Return over input Costs‡	**$31/acre**			

†Revenue does not include crop insurance revenue.
‡Costs do not include fixed costs associated with the farm.

Table 14. Continuous crop rotation sequence at the Wilke Farm from 2011–2016

Year	North Side
2011	Spring Wheat (50.0 bu/acre)
2012	*Spring Wheat* (41.7 bu/acre)
2013	Spring Barley (1.73 ton/acre)
2014	DNS Wheat (21.0 bu/acre)
2015	**HR Winter Wheat (24.4 bu/acre)**
2016	Spring Barley

Red italicized crops are those that have been altered for cereal rye management.

Table 15. Continuous crop rotation production at the Wilke Farm, 2015

	North Side
Cropping Specifics	
Acreage	66.7
Crop	'Sprinter' Hard Red Winter Wheat
Crop Production	
Yield	24.4 bu/acre
Mkt Grade	#3 HRW 57.0 1.8% 15.0%
Gross Economic Return†	
Mkt Price	$4.71/bu
Gross Return	$115.09/acre
Input Costs	
Seed	$21.02/acre
Fertilizer	$41.45/acre
Herbicides	$50.85/acre
Fungicide	–
Total	$113.31/acre
Summary	
Continuous Rotation Return over input Costs‡	**$1.78/acre**

†Revenue does not include crop insurance revenue.
‡Costs do not include fixed costs associated with the farm.

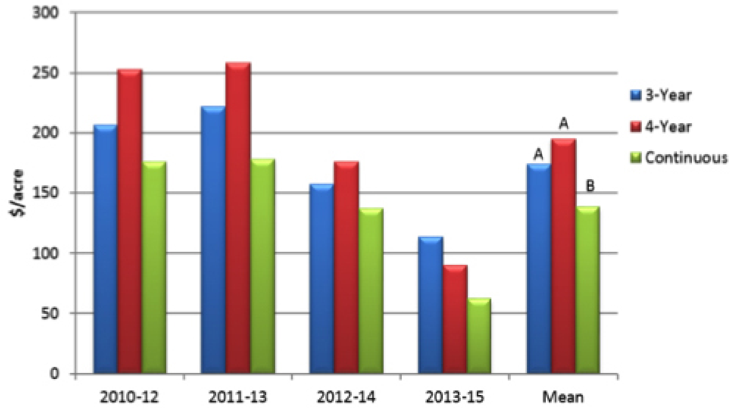

Figure 2. Three-year average economic return over input costs of 3-year, 4-year, and continuous cropping systems at the WSU Wilke Research and Extension Farm. Costs do not include fixed costs associated with the farm. Means within columns assigned different case letters are significantly different (P < 0.10).

Special Thanks

Crop Production Services

Mike Abbot. Custom seeding and Ecolo-til work.

Rocky Top Ranch. Use of grain truck at harvest.

Rob Dewald. Custom seeding.

Weather Data

Tables 16 and 17 provide weather data for Davenport, WA, in 2015 and 2014, respectively.

Table 16. Weather data for Davenport, WA, in 2015 (Crop Year Summary: 09/01/2014 to 08/31/2015).

	Temperature					
Month	High	Low	Mean	Degree Days*	Rain Fall	Rain Days
9	75.0	47.0	61.0	870	0.05	2
10	62.1	41.1	51.2	608	1.25	13
11	40.8	26.3	33.0	160	1.29	10
12	36.9	26.9	31.5	91	1.43	11
1	33.8	26.1	29.7	39	1.56	9
2	46.9	31.2	38.2	200	1.34	8
3	55.3	34.1	44.3	394	1.86	7
4	58.7	32.9	46.7	414	0.41	3
5	71.5	45.7	59.0	825	1.43	7
6	84.5	53.9	70.8	1116	0.00	0
7	86.9	57.0	73.5	1239	0.05	2
8	85.0	55.2	70.8	1180	0.06	1
Total				**7136**	**10.73**	**73**

*Degree days calculated using 32° base.

Table 17. Weather data for Davenport, WA, in 2014 (Crop Year Summary: 09/01/2013 to 08/31/2014).

	Temperature					
Month	High	Low	Mean	Degree Days*	Rain Fall	Rain Days
9	72.9	49.3	60.7	874	1.46	12
10	57.2	33.2	43.9	409	0.14	3
11	40.8	26.7	33.1	101	1.27	8
12	29.7	17.1	23.2	10	0.54	8
1	32.6	24.6	28.6	27	0.44	5
2	31.4	19.3	25.2	39	1.42	9
3	48.4	29.4	38.2	252	1.95	13
4	57.7	33.2	45.9	404	1.15	7
5	69.2	42.4	56.5	737	0.78	5
6	72.7	46.7	60.7	831	1.24	4
7	88.9	57.3	74.1	1274	0.02	1
8	84.3	55.5	70.3	1175	0.50	5
Total				**6133**	**10.91**	**80**

*Degree days calculated using 32° base.

AGWEATHERNET STATION located at the Wilke Research and Extension Farm.

You can access Wilke weather data at http://wilkefarm.wsu.edu/. AgWeatherNet link on the widget takes you to a map of weather stations throughout the state.

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WOCS
WASHINGTON OILSEED CROPPING SYSTEMS
Part of the Washington State Biofuels Initiative

REACCH
Regional Approaches to Climate Change –
PACIFIC NORTHWEST AGRICULTURE

WASHINGTON STATE UNIVERSITY EXTENSION

Use pesticides with care. Apply them only to plants, animals, or sites as listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.