



Winter pea crop rotation study at Ritzville, WA

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A long-term winter pea (WP) cropping systems experiment was initiated at the Ron Jirava farm near Ritzville, WA, in the summer of 2010. The objective of the experiment is to determine

IMPACT

Winter pea is a low-input crop that shows good yield potential in the typical winter wheat, summer fallow zone of the inland Pacific Northwest. Average winter pea yield over a three-year period near Ritzville, WA, was 2,288 pounds per acre. Farmers have expressed interest in growing winter pea, and acreage of this crop is expected to increase in the near future.

the suitability of winter peas (Figures 1 and 2) in the low-precipitation zone where winter wheat, summer fallow (WW-SF) has been the dominant rotation for more than 120 years.

The WP variety 'Windham' was selected for inclusion in the experiment based on the experience and

recommendation of Howard Nelson of Central Washington Grain Growers in Wilbur, WA. 'Windham' is a feed pea with upright growth habit and good cold tolerance. It can be direct combined with a regular header (that is, swathing and/or a pick-up header are not required). Winter pea has a large seed that is capable of emerging through 5 inches of soil cover.

Two three-year crop rotations were tested in the experiment: (1) WP, spring wheat (SW), SF versus (2) WW-SW-SF. The experimental design is a randomized complete block with four replicates of each treatment. All treatment combinations are present each year, making a total of 24 plots. All plots are 100 feet long.

Yield of 'Windham' WP was 1,958, 2,820, and 2,086 pounds per acre in 2011, 2012, and 2013, respectively, for a three-year average yield of 2,288 pounds per acre. Winter pea was killed by cold temperatures during the winter of 2013-14. We therefore replanted the plots to the edible 'Banner' spring pea on April 3. The yield of



Figure 1. Winter pea (right) and winter wheat (left) in early May. Photo by Bill Schillinger.

spring pea in 2014 was 778 pounds per acre. Spring wheat yield after WP versus WW was 30 versus 32 bushels per acre in 2012, 44 versus 40 bushels per acre in 2013, and 16 versus 15 bushels per acre in 2014 (Table 1).

WP used significantly less soil water than WW (Table 1). However, over the winter months, a higher percentage of precipitation was generally stored in the soil following WW compared to WP (Table 1). The reason for this are: (1) very little WP residue remains on the soil surface after harvest compared to WW, and (2) the drier the soil, the more precipitation will be stored in the soil over the winter. The end result was that when SW was planted in late March, soil water following WP and WW was the same (Table 1).

We will continue this experiment until at least 2017. Winter pea has shown high yield potential in this experiment where average annual precipitation is only 11 inches. We initiated a new long-term study at the Jirava farm in 2014 where we are growing WP in a four-year no-till crop rotation consisting of WP, chemical fallow (CF), winter triticale, CF. In addition, we initiated a replicated WP varietal trial at the WSU Lind Dryland Research Station in 2014.



Figure 2. Winter pea in late May. Photo by Bill Schillinger.

Table 1. Soil water content and grain yield for spring wheat (SW) in two three-year rotations where the preceding crop was winter pea (WP) or winter wheat (WW).

	Timing in fallow period				Grain yield (bushels per acre)
	Beginning (late August)	Spring (mid-March)	Overwinter gain	PSE ¹ (%)	
	Soil water content (in.)				
2013-14					
Rotation					
SW after WP ² in 3-year rotation	7.3	10.6	3.3	49	16
SW after WW ³ in 3-year rotation	6.5	9.5	3.0	45	15
p-value	ns	ns	ns		ns
2012-13					
Rotation					
SW after WP in 3-year rotation	7.4	12.6	5.2	62	44
SW after WW in 3-year rotation	6.4	12.5	6.1	73	40
p-value	0.03	ns	ns		0.01
2011-12					
Rotation					
SW after WP in 3-year rotation	6.8	8.2	1.4	34	30
SW after WW in 3-year rotation	5.3	8.4	3.1	75	32
p-value	0.01	ns	0.02		ns

¹ Overwinter precipitation storage efficiency (PSE): 2011-12 = 4.11 in.; 2012-13 = 8.33 in.; 2013-14 = 6.69in.

² Winter pea yields for 2011, 2012, 2013, and 2014 were 1,958, 2,820, 2,086 and 778 pounds per acre, respectively.

³ Winter wheat yields for 2011, 2012, 2013, and 2014 were 77, 85, 87, and 50 bushels per acre, respectively.

PSE = overwinter precipitation storage efficiency (e.g., the percentage of precipitation occurring from harvest in early August until late March that was stored in the soil).