Long-term Camelina Cropping Systems Experiment at Lind

1Bill Schillinger, 2Brenton Sharratt, 3Stewart Wuest, 1John Jacobsen, 1Steve Schofstoll, and 1Bruce Sauer
1Dept. of Crop and Soil Sciences, WSU Lind; 2USDA-ARS, Pullman; 3USDA-ARS, Pendleton, OR

We have completed seven years of a 9-year dryland cropping systems experiment at the WSU Dryland Research Station at Lind to evaluate camelina in wheat-based systems. The experiment compares a 3-year winter wheat-camelina-fallow (WW-C-F) rotation versus the standard 2-year winter wheat-fallow (WW-F) rotation. Experimental design is a randomized complete block with four replications. Individual plots are 30 x 250 feet with a total of 20 plots.

Camelina seed is direct drilled into the standing and undisturbed stubble of the preceding winter wheat crop in the last week of February or first week of March. Winter wheat is planted into fallow in late August. We conduct extensive soil water measurements in all plots three times every year. We measure weed pressure, surface residue retention, grain yield, and surface soil characteristics.

Camelina is a very hardy plant, but is susceptible to frost in the early seedling (i.e., cotyledon) stage of growth. We had a complete loss of camelina stands from two separate planting dates in both 2013 and 2015 due to hard frosts in March and early April. Camelina yields have ranged from 300 to 635 lb/acre and have averaged 450 lb/acre (Figure 1). Winter wheat tends to yield slightly, but not significantly, lower in WW-C-F versus WW-F (Figure 1) due to retaining about 0.5 inches less soil water from early April to late August during the fallow period compared to WW-F. The significantly greater (35 versus 27 bu/acre) WW yield in the WW-C-F rotation in 2015 was due to the frost kill of camelina in 2013 that resulted in these plots having two years or “double” fallow to accumulate soil moisture. We expect to generate several additional research reports and journal articles from this experiment within the next few years.
Figure 1. Winter wheat grain yield in the 3-year winter wheat-camelina-fallow rotation versus the standard 2-year winter wheat-fallow rotation. Numerical values above the bars are camelina seed yield (lb/acre). Winter wheat yield values followed by a different letter in 2015 indicates significant differences at the 5% probability level. ns = no significant difference. †The 7-year camelina yield average does not include 2013 and 2015 when camelina stands were killed by hard spring frosts.