compared with the wheat-fallow rotation (Table 1). The higher sediment and PM10 flux from the oilseed rotation was likely due to lower biomass of crop residue following the oilseed versus wheat crop.

Table 1. Horizontal sediment flux measured after sowing wheat into a winter wheat-summer fallow and winter wheat-camelina-summer fallow rotation at Lind, Washington and a winter wheat-summer fallow and winter wheat-safflower-summer fallow rotation at Ritzville, Washington.

Location	Year	Sediment flux (g m^{-1} min^{-1})	
		Wheat	Oilseed
Lind	2011	68	201
	2012	310	696
Ritzville	2011	344	674
	2012	232	634

Wind erosion and PM10 emissions may be accentuated by growing oilseeds in the low precipitation drylands of the Pacific Northwest. Therefore, the practice of conservation tillage and no-tillage for residue retention will be paramount to controlling wind erosion and PM10 emissions from oilseed cropping systems in the region.

Safflower Cropping Systems Experiment in the Low-Precipitation Zone

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Acronyms used: SAF, Safflower; SW, Spring wheat; TF, Tilled fallow; WW, Winter wheat

The objective of this study is to evaluate safflower production potential when grown in a 3-year winter wheat-safflower-tilled summer fallow (WW-SAF-TF) rotation compared to several cereal-only rotations. The WW-SAF-TF rotation is incorporated in long-term dryland cropping systems experiment on the Ron Jirava farm located west of Ritzville, WA. Annual precipitation at the site over the past 15 years has averaged 10.6 inches.

We compare the WW-SAF-TF rotation with another 3-year rotation, winter wheat-spring wheat-tilled fallow (WW-SW-TF) and the traditional 2-year rotation of winter wheat-tilled fallow (WW-TF). Each phase of all rotations is present each year and there are four replicates. Size of individual plots is 500 ft x 30 ft. Soil water is measured in all plots after grain harvest, in early April, and from fallow in early September. Treflan, a soil-residual herbicide, is applied in March to be rain incorporated into plots that will be sown to safflower. Safflower is direct seeded (Fig. 1) at a rate of 40 lbs/acre + fertilized into standing and undisturbed winter wheat stubble in April. Grain yield is determined with a commercial-sized combine and a weigh wagon.

Fig. 1. Safflower is direct-seeded into standing and undisturbed winter wheat stubble. These safflower plants were still in the juvenile stage of growth in mid-May 2012, but grew rapidly thereafter.

Grain yield of safflower averaged 880 lbs/acre in 2012. For comparison, grain yield of spring wheat and spring barley (also planted recrop, i.e., no fallow) at the site averaged 30 bushels/acre and 1960 lbs/acre, respectively. Safflower was planted on April 9, 2012. Air and soil temperatures were cold throughout the month of April and safflower seedlings were still emerging well into the month of May. In the 2013 crop year, we chose to wait until late April to plant safflower. This allowed an additional glyphosate herbicide application just before planting and likely promoted more rapid and uniform emergence. Soil water dynamics, weeds, and effects of safflower on subsequent winter wheat grain yield are measured. Winter wheat grain yield in 2012 in the WW-SAF-TF, WW-SW-TF, and WW-TF rotations was 62, 79, and 75 bushels/acre, respectively.