

Camelina: Ten Years of Cropping Systems Research at Lind

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Overview: Camelina is a short-season annual oilseed crop in the *Brassicaceae* family. Interest in camelina has increased substantially during the past 15 years because the oil is an excellent feedstock for producing low-carbon-emission biofuel and has a unique fatty acid profile as a potential edible oil. Camelina has been promoted as an alternative crop in low-precipitation dryland regions because of its low fertilizer requirement and drought tolerance. A 10-yr field experiment was conducted from 2008-2017 at the WSU Dryland Research Station near Lind, Washington to compare a 3-yr winter wheat (WW)-spring camelina-summer fallow (SF) rotation with the traditional 2-yr WW-SF rotation. Annual crop-year (Sept. 1-Aug. 31) precipitation ranged from 7.6 to 14.8 inches and averaged 11.1 inches. Camelina seed yield ranged from 302 to 1049 lbs/acre and averaged 574 lbs/acre (Fig. 1). Mean WW yield of 40 bu/acre in the 3-yr rotation was significantly lower ($p=0.046$) compared to 43 bu/acre in the 2-yr rotation. Soil profile water was significantly lower ($p<0.001$) after harvest of camelina compared to after WW harvest in the 2-yr rotation. This soil water reduction was consistently measured throughout the ensuing 13-month fallow cycle. There are no labeled in-crop broadleaf weed herbicides for camelina and populations of Russian thistle and tumble mustard were higher in camelina than in WW. This was likely a factor in the deep extraction of soil water in the camelina plots to a depth of six feet. Data from this study suggest that, with current varieties and management practices, camelina is not yet agronomically or economically stable or viable in a 3-yr WW-camelina-SF rotation in the low-precipitation (<12 inch annual) rainfed cropping region of the Inland Pacific Northwest.



Figure 1. The lowest camelina yield of 302 lbs/acre occurred in 2014 (left) when only 7.6 inches of precipitation occurred during the crop year. Note the infestation of Russian thistle. The highest camelina yield of 1049 lbs/acre (right) was in 2016 when 14.8 inches of precipitation fell during the crop year.

Conclusions: Regional farmers did not consider camelina either agronomically or economically attractive. Growing camelina in a wheat-based rotation did not enhance the subsequent WW yield compared to the 2-yr WW-SF rotation. Although the ability to effectively control grass weeds in camelina is a big benefit, the lack of in-crop broadleaf herbicides as well as lack of federal crop insurance are detriments. Interest in growing camelina would likely improve as new varieties, agronomic and management practices, and government programs are developed and refined. For example, during the past ten years, winter canola production in the PNW dryland region has rapidly expanded due to a focused multidisciplinary research and extension effort by university, USDA, and private-company scientists, the development of varieties with herbicide tolerance/resistance and other attributes, and the availability of federally-subsidized crop insurance.