Tissue Test and Foliar Applications of Micronutrients to Winter Canola

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There are many questions surrounding micronutrients in canola production. In general micronutrients have been studied far less than macronutrients in canola production. The goals of our research were to (1.) evaluate the effects of foliar B, Zn, and Mo applications on canola and (2.) to look for varietal variation in micronutrient uptake. Foliar applications of B, Zn, and Mo were made in the fall when the winter is in the rosette stage and in the following spring at bolting. As can be seen from the initial results micronutrient applications did not increase yield, and at bolting applications appeared to damage yield (Fig. 1). The applications at bolting may have caused injury to the plant as B is known to be toxic to plants at high concentrations. Additionally tissue samples were taken from the canola variety trials and inter-species variation in nutrient uptake. No significant differences between canola varieties were found. However, inter-field variation was found to be high indicating that any difference between varieties may be masked by the heterogeneity of the soil supply of micronutrients as can be seen in the example of B uptake (Fig. 2).

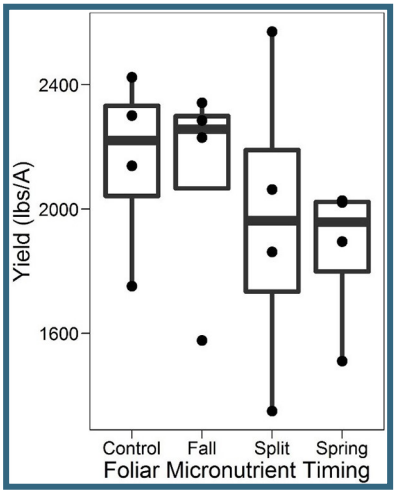

Figure 1. Winter canola yield response to fall, at bolting, and application of foliar B, Zn, and Mo.

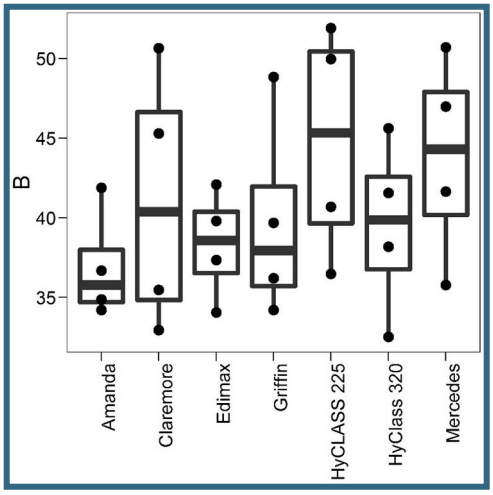

Figure 2. B uptake by different canola varieties within the same field. Demonstrating the effects of inter-field variability out weight the effects of variety in this particular instance.

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.

WSU-WOCS Large-Scale Canola Variety Trials

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A major component of the Washington State Oilseed Cropping Systems (WOCS) Project since 2016 is the large-scale, on-farm winter and spring canola variety trials. With canola acreage increasing annually in Washington state and the Pacific Northwest, the trials are valuable to growers and industry when making not only variety selection decisions, but the full gamut of production components that are part of having a successful crop.