Phosphorus Fertility Management for Canola

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Research have found that phosphorus (P) deficiency in canola can result in poor root development, thin stems, narrow leaves, fewer and smaller branches, leaf drop earlier. P application in low P soils can increase yield and promote earlier maturity, but knowledge on how P sufficiency affect seed oil content is unclear. In addition, there is limited literature on P fertilizer recommendations based on soil test or crop removal. The objectives of this research were to (1) study winter and spring canola yield, quality, and economic response to P fertilizer in eastern Washington; (2) calibrate soil test P and establish critical soil test P level for eastern WA; (3) investigate the appropriate soil sampling depth and soil test method for the soil test calibration.

The two-year study was established in fall 2019 and 2020 for winter canola and spring 2020 and 2021 for spring canola on Washington State University Wilke Research and Extension Farm in Davenport, WA. The P management factors studied including rate (0, 20, 40, 60, 80 lbs/acre), timing (fall, split), and interaction with zinc (P fertilizer with/without zinc fertilizer). We will establish two on-farm small plot research with similar design in Pullman, WA in 2021. Soil samples were taken before and after P fertilization at 12 inch deep and each soil core was separated into 0-6 and 6-12 inch segments. Samples were tested for P using Olsen method. Plant samples were taken at major growth stages for measuring total P uptake. We will start analyzing data after harvest in fall 2021. The results will be presented to farmers via presentations at workshops and extension publications in 2022 and 2023.

Phosphorus fertility study trial for winter canola. Photo taken by Keith M. Curran on May 10, 2021

Companion Crops as a Method for Improving Winter Canola Stand Establishment and Winter Survival

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Companion cropping is the practice of cropping two different plant species near each other to benefit each other in some way. In production agriculture, companion cropping typically consists of a cash crop and one or more "companion" crops. The goal is that the companion crops will benefit the cash crop in some way. A cropping system of interest is using spring oats as a nurse crop for winter canola to provide better establishment and winter survival potential for the canola crop. This cropping system is especially of interest to growers with livestock as the oats can improve the feed value of the forage in a grazing situation. We established an experiment comparing monocrop canola to a canola-oat

crop near Davenport, WA on July 10th of 2020. This was planted into fallow using a Fabro double disc drill achieved excellent stand counts. Fall stand counts did not show a significant difference in canola establishment between the two treatments (Fig. 1). The canola oat crop did have a higher average stand count of canola at 4.74 plants/ft^2 than monocropped canola at 3.83 plants/ft^2 and showed less variability in stand establishment. There was also no significant difference in winter survival percentage between treatments in both our overall stand counts and individual plants (Figs. 2 & 3). Mono-cropped canola had an average winter survival of 26.5 percent while the companion cropped system had an average just over 24 percent. This disappointing survival rate may be contributed to drought stress caused by excessive overall plant populations that depleted the soil water supply during early fall. The fact there appears to be no significant advantage to mono-cropped canola and that oats may increase stand establishment of winter canola is encouraging for the prospects of companion cropping in eastern Washington. This especially holds true for growers interested in integrating livestock to their cropping systems. We intend to pursue future research into the seeding rates of both canola and oats in a companion crop system as well as the impact of grazing livestock in the system as well.

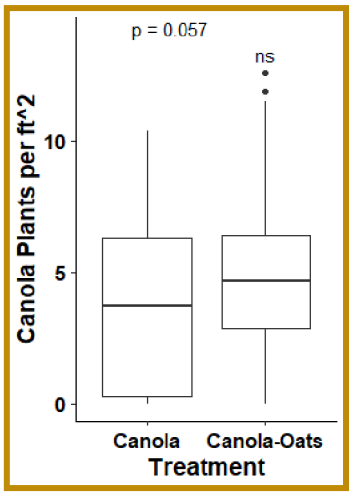

Figure 1.

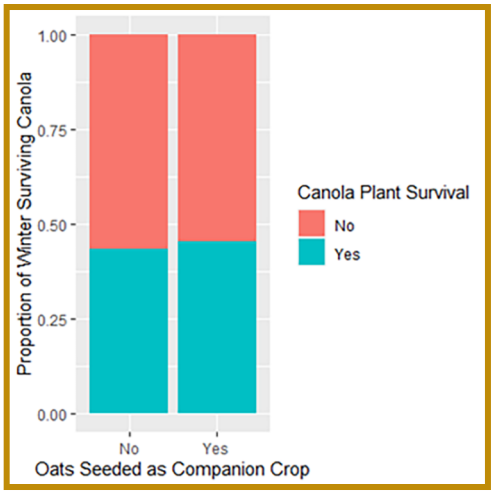

Figure 2.

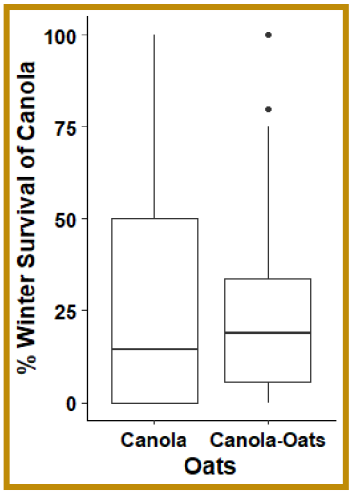

Figure 3.

Peaola Intercropping as a Pest and Beneficial Insect Management Tactic

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Monoculture production systems dominate modern industrial agriculture. However, intercropping cash crops may increase productivity while reducing fertilizer input through the inclusion of legumes. One intercrop of interest in the inland Pacific Northwest is peaola (pea-canola). Peas and canola have complimentary above and below ground architectures and have been successfully intercropped at the field scale in Canada. Most intercropping research has focused on seeding rates and fertility. Intercropping strategies have additional benefits as pathways to manage pest insects, pathogens, and beneficial species. By providing pollinator resources and two very different host plant species, peaola intercropping may support more beneficial species while also reducing the risks of pest outbreaks. In 2020 we completed field surveys from a replicated large scale peaola trial near Colfax, WA where we measured the abundance of pests and beneficials among pea, canola, and intercropped peaola. To complete these surveys, in June 2020 we used