Integrated practices improve weed control in flax

Seeding a tall cultivar at 80 seeds/ft² in early May along with the application of an in-crop wild oat herbicide resulted in the greatest stand establishment and crop biomass, as well as the lowest weed biomass in flax.

Flax is a poor competitor with weeds, and with limited herbicide options, research looked at practices that could enhance crop competition to improve weed management. The objective was to see if seeding a tall cultivar at a high seeding rate in early May and using an in-crop herbicide would result in improved flax production and decreased weed competition. Crop establishment, crop height, weed biomass, yield, and thousand kernel weight were measured.

Field experiments were conducted from 2014 through 2016 at Ellerslie, Alberta, two sites near Saskatoon at the Kernen and Goodale Research Farms, and Carman and Morden, Manitoba. The Morden site had to be terminated in 2015 due to excessively high green foxtail populations and the experiment was repeated at this location in 2016 for a total of 10 site years.

At Kernen, Goodale and Ellerslie, flax was seeded on 9 inch (23 cm) row spacing. At Carman, a row spacing of 7.5 inch (19 cm) was used, while Morden was seeded on 10 inch (25 cm) rows. Fertilizer
was applied based on soil test recommendations to attain a target crop yield of 37 bushels/ac (2350 kg/ha).

Short (Prairie Grande) and tall (CDC Sorrel) flax varieties were seeded at 40 or 80 seeds per square foot (400 or 800 seeds/m²) in early or late May.

Wild oats were the target weed population for the study, but were supplemented in 2016 with tame oat seeded across the plots. Clethodium (Select) was used for wild oat control in the herbicide treatment, and compared to a non-herbicide treatment. Broadleaf species were controlled across all replications using a tank-mix of clopyralid (Lontrel) + MCPA or bromoxynil.

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The tall cultivar consistently produced a higher flax population than the short cultivar with or without an herbicide application. The greatest stand establishment with the tall cultivar occurred with early seeding and a high seeding rate along with an in-crop herbicide application.

Where an herbicide was not applied, flax populations for the short cultivar at the high seeding rate was 31% higher compared to the low seeding rate. Similarly, the tall cultivar had 33% greater stand establishment at the high seeding rate compared to the low seeding rate.

When an herbicide was applied, weed biomass was reduced by 45% with the tall cultivar compared to the short cultivar. However, in the absence of herbicides, cultivar height did not have a significant effect on weed biomass indicating the poor competitiveness of flax.

When a wild oat herbicide was used, there were no significant differences in yield between the combinations of cultivar height and seeding rate for either the short or tall cultivar. However, when an herbicide was not applied, the tall cultivar yielded significantly higher at both seeding rates than the short cultivar. The tall cultivar seeded at low and high densities produced flax yields about 4 bushels/acre higher compared to the short cultivar.
The combined effect of herbicide application, seeding rate and cultivar height on crop yield.

Kurtenbach et al. 2019.

The researchers concluded that the combination of several cultural factors with herbicide application could effectively improve the competitive ability of flax. If adjustments in seeding dates, seeding rates, and cultivar height/varietal choice can benefit a poorly competing crop such as flax, then these principles may also be applied to other crop species to help improved crop competitiveness with weeds.

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