IWM boosts returns in a wheat-canola zero-till rotation

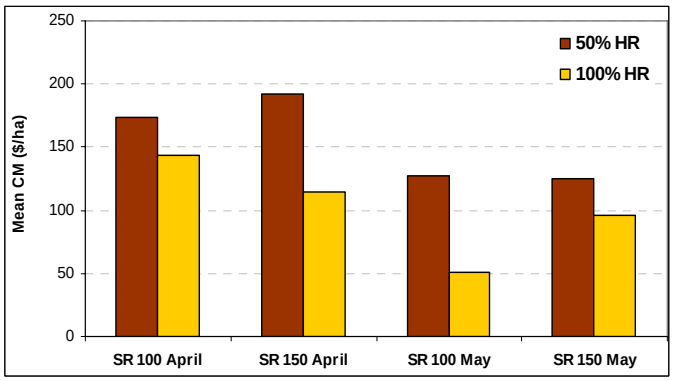
A research study by Agriculture and Agri-Food Canada shows that establishing a competitive crop can increase contribution margin (CM) in a wheat-canola rotation. The field experiment was conducted at Lethbridge, Alberta and Scott, Saskatchewan to determine the combined effects of seed date (late April or late May), seed rate (recommended or 150% of recommended), fertilizer timing (applied in fall or spring), and in-crop herbicides (50% or 100% of recommended) on weed growth and crop yield.

Agronomically, the study found that combining the practices of early seeding, higher seeding rates, and spring-applied fertilizer allowed greater flexibility in herbicide use, and that crop yield, weed biomass, and the weed seed-bank were often similar at 50% or 100% herbicide rates.

AAFC researchers subsequently analyzed the CM (returns over variable production costs). At Lethbridge, it was more profitable to use 50% of recommended herbicide rates and to seed both wheat and canola early, with an early seeding date being more crucial for canola. The CM of this IWM system was $48/ha ($19.43/ac) higher than current common practices. There was also a trend towards higher CM with higher seeding rate, 50% herbicide rate and early seeding date, although it was not significant.

At Scott, the wheat - canola system was more profitable with spring fertilizer application, 50% of the recommended herbicide rate, and an early seeding date for canola. The best IWM system had a CM $15 to $75/ha ($6.07 to $30.36/ac) higher, depending on the year, compared to common practices.

At Scott with the 150% of recommended seeding rate, the canola yield increases were not enough to cover higher seed costs, while the additional wheat yield did cover these higher seed costs. Early seeding of canola was most profitable, while early seeding of wheat was at least as profitable as late seeding.



Mean contribution margin trend by interaction of seeding date, seeding rate and herbicide rate in a wheat-canola rotation at Lethbridge (1999-2000).

Note: The seeding date by seeding rate by herbicide rate was significant at P=0.063, and is presented to show trends.
Legend: SR100 = recommended seeding rate; SR150 = 150% of recommended seeding rate; April = early seeding; May = late seeding; 50% HR = 50% of recommended herbicide rate; 100% HR = recommended label rate.
Conversion: $/ac = $/ha divided by 2.47.
Source: Smith, E. G., Upadhyay, B. M., Blackshaw, R.E., Beckie, H. J., Harker, K. N, and Clayton, G. W. 2006. Economic Benefits of Integrated Weed Management Systems for Field Crops in the Dark Brown and Black Soil Zones of Western Canada. Can. J. Plant Sci. 86: 1273-1279.

Implementing IWM strategies

The best IWM strategy of early seeding, high seeding rates and 50% herbicide rate was $141/ha ($57.09/ac) higher at Lethbridge, compared to the standard practice of May seeding with recommended seeding and herbicide rates. While this interaction was not significant, the trend bears further investigation. The Scott trends were less clear.

An advantage of $85/ha ($34.41/ac) at Lethbridge and up to $78/ha ($31.58/ac) at Scott has accompanied a move by producers to seed canola earlier. The best crop timing, based on this on other studies indicates seeding canola and field pea first, then wheat, and barley last.

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