

Understanding how herbicide-tolerant canola systems fit with IWM

Integrated weed management (IWM) requires a focus on the tactical use of several tools over a long term to help control weed populations while protecting yield potential. At Lacombe, Beaverlodge and Lethbridge, scientists with Agriculture and Agri-Food Canada conducted a multi-year, field experiment to assess the influence of herbicide-tolerant systems, herbicide rate and timing of application on yield and dockage. Their objective was to assess how these factors fit into an IWM approach.

Roundup Ready® (glyphosate-resistant), LibertyLink® (glufosinate-resistant), and Clearfield® (imidazolinone-resistant) canola was direct-seeded at three Alberta sites using recommended seeding rates. Herbicide rates were 50 and 100% of recommended label rates, while herbicide timing consisted of a single herbicide application as close as possible to either the two-, four- or six-leaf stage of canola.

Time of weed removal overriding factor

Yields were similar between herbicide-tolerant systems, but time of herbicide application had a significant impact on yield in all herbicide systems, and the trend was stronger for Roundup Ready® systems compared to Clearfield® and Liberty Link® systems. In all cases, seed yield was reduced when herbicide applications were delayed from the four-leaf stage to the six-leaf stage of canola. Generally, the highest yield was obtained when weeds were removed at the four-leaf stage of canola.

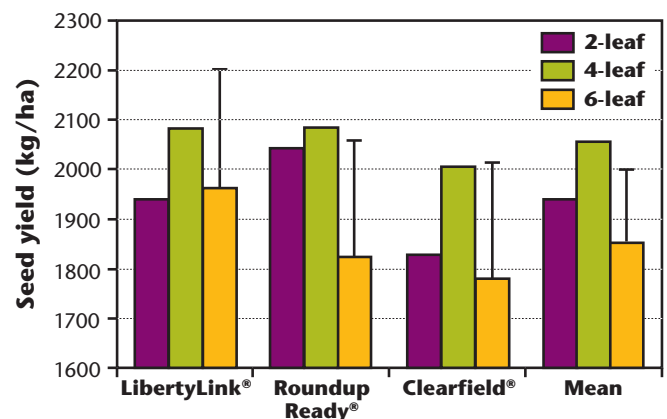
However, as shown by the yield results from the two-leaf stage, removing weeds too early with one herbicide application can leave the crop open to competition from later germinating weeds. Clearly, a balance must be struck between too early and too late.

Surprisingly, the 50% herbicide rate was often as effective as the full label rate. Evidently, the 50% rates reduced weed competition sufficiently to prevent significant yield loss.

However, dockage was greater after the 50% application rate in the Liberty Link® system than for almost any other treatment combination. A similar trend existed for weed biomass at three to six weeks after herbicide application. After analyzing the data, the researchers concluded that a reduction of herbicide rates leads to greater dockage risk for LibertyLink® systems than for Roundup Ready® or Clearfield® systems.

What it means to IWM

When applying these results to IWM, some of the treatments might favour IWM in crops after canola more than others. In terms of times of weed removal, moderation seemed to be the optimal practice. Yields were greatest and weed management challenges were often least when herbicides were applied at the four-leaf stage as opposed to the two- or six-leaf stage. Greater dockage and weed biomass variability after weed removal at the six-leaf stage or after 50% herbicide rates may limit IWM adoption in subsequent years. Although the three herbicide-resistant canola cultivar systems yielded similarly, weed management risks were usually less apparent for the Roundup Ready® system than for Liberty Link® or Clearfield® systems.



Mean seed yield responses for the interaction of herbicide-resistant canola cultivars and time of weed removal.

Source: Harker, K.N., Clayton, G.W., O'Donovan, J.T., Blackshaw, R.E., Stevenson, F.C. 2004. Herbicide timing and rate effects on weed management in three herbicide-resistant canola systems. *Weed Technol.*, Volume 18:1006-1012.



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