



Fall harrowing for volunteer canola control

CATEGORY [weeds](#) | October 16, 2024

Fall harrowing shortly after harvest increased volunteer canola seedling emergence in the fall, resulting in over-winter kill and reduced volunteer canola persistence.

Volunteer canola is an on-going problem for farmers on the Prairies. This is partially because of significant harvest seed losses during combining, and also because of secondary seed dormancy that allows canola seed to persist in the seedbank for several years.

A field trial was conducted to evaluate soil disturbance timing, tillage implement type and relay-seeding a winter cereal on the impact on fall emergence of volunteer canola seedlings and volunteer canola persistence. The research was initiated at three sites near Carman, Howden and Melita, MB in 2013, and two sites near Carman and Pilot Mound, MB in 2015. The results are as applicable today as they were when the research was conducted.

In both years, an InVigor Liberty Link (glufosinate-resistant) canola variety was seeded in the spring, and after harvest seed losses were supplemented with 700 seeds/ft² (7000 seeds/m²) of freshly harvested F2 generation DEKALB 73-45 RR (glyphosate-resistant) hybrid canola broadcast over the treatment areas.

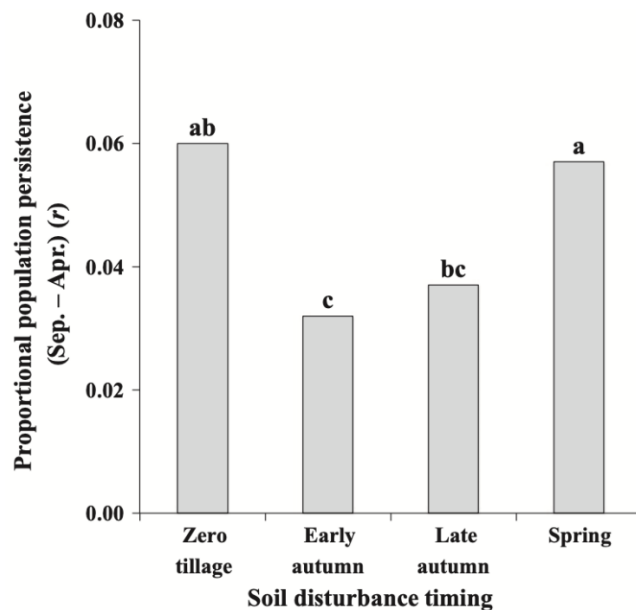
Three tillage treatment timings were compared at (i) early fall (September, shortly after canola harvest and supplemental seed broadcasting/immediately after), (ii) late fall (October, one month after harvest) or (iii) early spring (May, prior to spring seeding). Tillage included a soil disturbance using either a spring-tooth tine harrow set at 0.4 inch (1 cm) depth or a tandem disc at 4 ¾ inch (12 cm) depth with two passes in opposite directions. A zero-tillage control treatment was also included.

The relay cropping treatments compared the winter wheat variety Falcon seeded into undisturbed, zero-tillage soil or into tine harrow disturbed soil.

Early fall tillage lowered canola population persistence

Early fall soil disturbance was the most effective at reducing over-winter persistence of volunteer canola compared to the other soil disturbance timings, and was one-half that compared to no-till or spring soil disturbance only. Late fall tillage was intermediate in volunteer canola persistence, but tended to be more similar to early fall than zero tillage or spring soil disturbance.

Overall population (plants + seedbank) persistence of the volunteer canola from September to April as affected by timing of post-harvest soil disturbance.



Source: Geddes and Gulden (2017)

Overall, soil disturbance in early fall resulted in approximately double the fall seedling emergence (newly germinated seedlings mainly from harvest seed losses) at 38% compared with late fall at 23%, and zero tillage at 20%. Complete winterkill of fall germinated seedlings occurred at all sites except at Carman 2015 where over-winter survival was less than 2%. This led to decreased population persistence because volunteer canola seedlings that emerged in the fall did not over winter and persist to the spring, thereby depleting the soil seedbank.

Spring soil disturbance resulted in a large spring seedling emergence with an average of 11% of viable seed compared to 3% at other timings. This stimulation of volunteer canola emergence in the spring with tillage indicates that spring germinating volunteer canola can contribute to early season weed competition for moisture and nutrients.

There was no significant differences between harrowing and discing in terms of volunteer canola seedling recruitment or persistence. This suggests that even a light disturbance from harrowing can promote volunteer seed-soil contact in the fall and deplete the population prior to the following growing season.

Seeding winter wheat had minimal effect on population persistence, seed mortality or spring seedling recruitment.

The research found that fall soil disturbance shortly after harvest can be used as a management tool to decrease volunteer canola seedbank persistence. Tine harrowing can be viewed as an effective, low disturbance tool, and may fit under minimum- or zero-tillage systems.

This research was supported by Manitoba Pulse and Soybean Growers, Monsanto Canada and Agri-Food Research and Development Initiative, as well as a Natural Sciences and Engineering Research Council of Canada Industrial Postgraduate Scholarship and University of Manitoba Graduate Fellowship to CMG.

Geddes CM & Gulden RH (2017). Early autumn soil disturbance decreases persistence of volunteer summer- annual oilseed rape (*Brassica napus*). *Weed Research* 57, 182–192