



Field testing of impact mills for weed control shows potential

CATEGORY [weeds](#) | *January 17, 2024*

Few significant differences were found in weed densities and the weed seedbank between a combine with a physical impact mill and a regular combine without the impact mill. This may have been because of the short time frame of the 3-year experiment, the high initial densities of the weeds, the targeted weed species having dormancy, or longer term seedbanks

Harvest weed seed control methods, such as using an impact mill like the Harrington Seed Destructor, have had successes in Australia as a form of alternative weed management. Stationary impact mill testing at Agriculture and Agri-Food Canada demonstrated a high weed seed mortality when run through the mill. The objective of this study was to evaluate the efficacy of a physical impact mill in reducing weed densities in producer fields in central Alberta.

Twenty producer fields within a 50 km radius of AAFC Lacombe, AB were selected for evaluation of the original tow-behind Harrington Seed Destructor (HSD) impact mill. These fields had dense weed patches of numerous species ranging in size from 1.85 ac (0.75 ha) to 18.5 ac (7.5 ha) with an average patch size of 5.2 ac (2.1 ha).

With the HSD, chaff is directed through the mill while the straw is spread as normal. The two treatments used in this study were chaff going through the HSD, or a harvest with the physical impact mill by-passed (“regular” harvest). There were three replicates per patch.

The treatments were implemented through the 2017 to 2019 harvests, and were applied at the same location to help determine if there were any cumulative effects of the HSD compared to a regular harvest.

Weed population density assessments in 2017, 2018, 2019, and 2020. Weed assessments were first conducted prior to the start of the study to determine which species were present and at what densities. Weed densities were assessed each spring prior to in-crop herbicide application. In total, there were 20 dominant weed species present including grassy weeds like green foxtail and wild oat, and broadleaf weeds like wild buckwheat, lamb’s quarters, and stinkweed, and perennial weeds like dandelion and toadflax. However analysis focussed on the top 5 dominant weeds in each patch.

In 2020, 20 soil cores of 4 inch (10 cm) diameter and 2 inch (5 cm) depth were taken across each plot to help measure the weed seedbank. These soil cores were washed and sieved to remove large particles, mixed with potting soil, and placed in a growth chamber. Trays were assessed weekly for 3 weeks for emerged weeds, and run through three cycles of 6 weeks of minus 18C followed by 3 weeks in a growth chamber.

Mixed results with HSD

Across the 20 fields, there were few significant differences between the HSD treatment and the regular treatment after three years. Significant differences occurred at 5 out of 20 fields, but some fields had an increase in weed species and some had a decline.

In field 2, wild oat populations were increased in the HSD treatment, while hemp-nettle populations were reduced in the HSD treatment. In field 8, false cleavers and hemp-nettle populations were reduced in the HSD treatment, while sow thistle species populations were higher in the HSD treatment. In field 15, wild buckwheat and chickweed populations were lower in HSD treatments. In field 16 wild oat was lower in the HSD treatment, and in field 17 false cleavers was lower in the HSD treatments.

Overall, no conclusive evidence of the efficacy of physical impact mills over the short 3-year period of time in western Canada was found. The researchers say that measurable reductions in weed densities may have been limited by the short timeframe of the experiment, the high initial densities of the weeds, or the targeted weed species having dormancy or longer term seedbanks.

At the time of writing, about 20 to 30 mill units were being used in western Canada. Anecdotally, some of these producers are initially seeing reductions in weed patch size and distribution, prior to seeing changes in weed densities in those patches – they are seeing that the physical impact mill prevents the spread of seeds and the expansion of the weed patches.

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