

Harvest Weed Seed Control in Barley

Harvest weed seed (HWS) hammer mills are a relatively new technology in Western Canada that can be used as part of an integrated weed management program. Barley is generally harvested early compared to other crops and may offer an advantage in controlling weeds that retain seeds at the time of harvest. This harvest weed seed control (HWSC) protocol will evaluate the potential of after-market hammer mills to reduce weed seeds entering the seed bank and weed patch management.

Objective:

Evaluating the performance of harvest weed seed hammer mills in barley to improve weed management options for producers.

Project Overview:

Cooperators will conduct a replicated field-scale trial in a barley field of their choice, using their own equipment and otherwise normal practices. An agronomist/trial manager will provide support throughout the season, including setting up the trial and collecting data. Statistical analysis of the data will be conducted following harvest, and a report with your results including economic analysis will be provided. Data from all on-farm trials will also be pooled to examine the results across different management, soil, and weather conditions. Results from all trials will be publicly available, however individual farm data will be kept anonymous, apart from the location of the trial (nearest town or R.M.). Collaborators will be invited to join a network of producers who are conducting on-farm research through field tours and a year-end result meeting and banquet. This program is only available to registered barley producers in Saskatchewan.

Trial Design:

There are two treatment options for the HWSC protocol.

1. Two-treatment option (preferred):

- a. Untreated Check: normal combine operation, bypassing the HWS hammer mill
- b. HWSC: Harvest weed seed control implemented

A sample field layout is shown below:

Rep	1		2		3		4	
Plot	1	2	3	4	5	6	7	8
Trt	1	2	2	1	1	2	1	2
Treatment Desc.	Standard	Seed Terminator	Seed Terminator	Standard	Standard	Seed Terminator	Standard	Seed Terminator

2. Split-plot option:

- a. Untreated check: normal combine operation, bypassing the HWS hammer mill
- b. Harvest weed seed control (HWSC) implemented
- c. Reduced herbicide treatment*

* Reduced herbicide treatment: One to two sprayer passes perpendicular to the direction of the main plots is managed separately from the rest of the field/main plots. This treatment may eliminate a fall or spring burn-off in the test area. While this is one treatment, it doubles the data collection requirements for this project, compared to the simple two-treatment option.

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Plot	1	2	3	4	5	6	7	8
Trt	1	2	2	1	1	2	1	2
Treatment Desc.	Standard	Seed Terminator	Seed Terminator	Standard	Standard	Seed Terminator	Standard	Seed Terminator

Fall Burn Off

No Fall Burn Off

Data Collection:

Agronomists will complete the following in-season data collection. A data collection spreadsheet will be provided and must be used to submit data.

1. Fall weed patch assessment (ideal): a survey of the target field for the project will be taken to assess weed population species, approximate density throughout the field and/or target trial area. Aerial/drone photography and/or GPS of weed patches by species would be beneficial.
2. Spring soil samples will be collected at each trial site prior to seeding and fertilizer application to assess residual soil nutrient levels (regardless of whether soil sampling was previously completed). Trial site managers will collect a minimum of 12 soil cores throughout the trial area, separated by 0-6" and 6-24" depths. A single composite sample for each depth will be submitted directly to AgVise Laboratories for Test F2. Shipping and Purolator information will be provided.
3. Spring weed density: a survey of the target field for the project will be taken to assess weed population species, approximate density throughout the field and/or target trial area. Aerial/drone photography and/or GPS of weed patches by species would be beneficial.
4. In a continuing spring, for an active project, the spring survey will be supplemented with species survey and density prior to spring burn-off. A minimum of 6, up to 8 counts will be conducted in each treatment.
5. Height will be assessed on each treatment strip separately at the soft dough to late dough stage. A minimum of 20 plants will be measured over 4 different locations in each treatment strip.
6. Lodging will be assessed on each treatment strip separately at the soft dough to late dough stage. A visual rating should be representative of the plot. Where differences occur throughout the plot, take separate ratings.
7. The trial should be visited regularly to collect notes, observations, and photos describing any other visual treatment differences in lodging, weed pressure, maturity, and disease pressure. NDVI imagery at key growth stage(s) would also be an asset.
8. Yield will be determined separately for each treatment strip using a weigh wagon or calibrated grain cart scale. Cooperators will communicate with agronomists regarding the harvest date. Digital yield maps would also be an asset.
9. Grain samples (approximately 1 kg) will be collected separately for each treatment strip for quality analysis.
10. The following management and agronomic data will be recorded precisely:

- a. Variety and seed quality information
 - b. Equipment type, seeding depth, seeding speed, row width
 - c. Applied fertilizer rates, products/blends, placement, timing
 - d. Crop protection: seed treatment, pesticide applications
 - e. Previous crop and residue accumulation
 - f. Soil moisture conditions at seeding time
 - g. General notes on weed, insect, disease infestations, and notable weather events
11. Daily precipitation will be recorded using a weather station should ideally be positioned at or within 0.5 miles of the trial site. A rain gauge will be provided to provide site-specific precipitation data. The rain gauge should be observed weekly. Daily average temperature will be recorded from a weather station within 25 km of the trial site. Precipitation and temperature should be recorded from May 1 to August 31, regardless of seeding and harvest dates.

For more information or to participate in the program contact:

Mitchell Japp
Research & Extension Manager, SaskBarley
Cell: 1-306-535-4536
mjapp@saskbarley.com

Kayla Slind
Lead Research Associate, WARC
Office: 1-306-247-2001
Cell: 1-306-843-7984
kayla.slind@warc.ca