

On-Farm Canola Strip Trials

Introduction

Canola production has changed greatly over the past few years with the development of improved canola hybrids and varieties and herbicide-tolerant canola to assist with weed management. Growers have increasingly more choices of hybrids, varieties and technologies to address their production needs. But in order to make the best product selections, growers need reliable, research-based information that compares competing products in valid field trials.

Current Product Comparisons

Currently, most of the yield data comparing different canola products and traits come from small, replicated yield plots. These plots provide useful information on a narrow range of conditions within the sampling area. Differences in soil type, soil moisture, soil compaction, field preparation, and a host of other field and/or environmental factors are narrowed down to provide the most uniform conditions for the yield tests. However, these conditions may not completely represent the climate, soils and other variables specific to your production environment.

On-Farm Strip Trials

A better way to evaluate new canola hybrids/varieties or new herbicide-tolerant canola technologies under your growing conditions is with field strip trials on your farm. These larger, field-sized trials add precision to the testing process as well as more closely representing your growing environment and production methods. Results from your own farm trial, when averaged with those of other farm trials like yours, can be a very effective tool in identifying the best canola products for your operation.

Multiple Environments Needed

Including results beyond your own farm is important to sample environments somewhat different from yours that still represent conditions your farm could experience some seasons. Selecting products based on multiple-location performance helps ensure their adaptability to a wide range of growing conditions, including next year's as well as this year's environment. Proven wide-area adaptation is usually much more indicative of future product performance than is topping a single plot, even if that plot is on your own farm. One hybrid or variety will seldom win every plot, but those that finish near the top in multiple plots that represent your environment should be given strong consideration in your selection process.



On-farm side-by-side strip trials are an excellent way to evaluate new canola products.

Planning for Canola Strip Trials

On-farm testing of new canola hybrids/varieties or evaluation of canola production systems requires planning prior to plot establishment. Initially, determine what treatments are going to be evaluated and where the treatments will be established in a field. All hybrids/varieties evaluated should differ by no more than 5 days relative maturity, and only 6 to 8 products should be evaluated at a single time. Planting a higher number may result in those products being compared more than 8 strips away from each other, which has shown to introduce greater risk of field variability.

Evaluation of canola production systems should be limited to 2 to 3 management practices, for both ease of establishment and reliability of results. If there are too many treatments or practices compared in one set of strip trials, differences in soil type or other soil properties can start to impact the results.

Establishing the Canola Strip Trial

One key to on-farm strip trial success, especially with larger plots, is to have uniform soil conditions across the test area while holding constant all of the other production variables. However, the trial can be established in fields having some degree of variability in soil type and topography as long as the variability is perpendicular to the strips, allowing each variety or treatment to be exposed to the same field variation. Your local Pioneer agronomist can assist with determining the best site on your farm to locate the plot.

When setting up a canola strip trial, be sure to consider the grower’s planting and harvesting equipment that may impact specifications of the test strips. Because the strips will be swathed at harvest, they need to be at least as wide as the producer’s windrower. It is also preferred to establish the canola test strips in straight rows, rather than contour or curved rows.

When testing different canola hybrids/varieties, all of the agronomic management practices (e.g., tillage, fertility, seeding rate and herbicide program) need to remain constant across the test area. When evaluating different tillage practices, such as direct seeding vs. conventional tillage, the seeding rate, canola variety, herbicide program, etc. need to remain the same.

The evaluation of two or more herbicide-tolerant canola production systems (Roundup Ready¹, Clearfield² or LibertyLink³) in the same plot would require additional buffer area between the test strips to prevent any potential herbicide drift concerns.

Strip Size

The individual canola test strips should be at least 1000 feet in length and one drill pass wide. The strips need to be at least as wide as the swather. Improved test results can usually be obtained with larger strips.

Plot Layout

On-farm trials can consist of a single set of each of the canola products or treatments across the field area, or replications of the set. Replication increases the level of confidence in the test results. A sample plot layout to evaluate three canola hybrids using two replications is shown in Figure 1.

Figure 1. Potential strip trial design for a field experiment evaluating three canola hybrids with two replications.

Rep 1 - Canola Hybrid A
Rep 1 - Canola Hybrid B
Rep 1 - Canola Hybrid C
Rep 2 - Canola Hybrid B
Rep 2 - Canola Hybrid C
Rep 2 - Canola Hybrid A

The use of a “check plot” or “tester” every two or three strips to estimate variability across plots has NOT been found to be an effective way of increasing precision in plot data.

Other Plot Requirements

Plant all hybrids/varieties on the same day using the same planting equipment. Finally, make sure the field trial area is marked and the various products or other treatments arranged in the test area are properly identified. When possible, it is also best to use the same insecticide seed treatment (IST) on all products tested, to fully evaluate genetic differences.

Evaluations During the Growing Season

No matter if you are evaluating different canola products or different canola production systems, differences among treatments during the growing season will appear. Differences in emergence, growth and development, flowering date, plant height, disease and insect susceptibility, standability, and maturity are a few of the possible differences that may be observed. Many of these differences apparent during growth of the crop may impact final yield. As you observe differences between the canola treatments, take notes on your observations to share with your Pioneer agronomist or sales rep. These differences will assist you in identifying the canola variety or production system best suited for your farm.



Harvesting swathed canola plot in Manitoba.

Harvesting the Strip Test

When it is time to harvest or swath the canola test strips, mark off the ends of the plot area in order to maintain a uniform plot length for each plot. When swathing or direct combining, always take a full header width even if this means coming back later to clean up the left-over small strips between the hybrids. This removes variations associated with trying to run the header along the edge of the previously harvested strip. Harvest all strips on the same day using only accurate weighing devices such as a weigh wagon or truck scale.

Combine Yield Monitors

Combine yield monitors are now commonplace and represent a new means of comparing canola yields. Although yield monitor accuracy continues to improve, careful calibration and operation is necessary to obtain reliable data for canola. For split fields and large side-by-side plots, yield monitors do an acceptable job of estimating yields. However, for most smaller strip trials with multiple hybrids/varieties, the yield monitor’s margin of error is not small enough to accurately separate products. For this reason, a minimum plot weight of 1500 pounds is recommended to help ensure accuracy when using a yield monitor to compare canola yields. For Pioneer

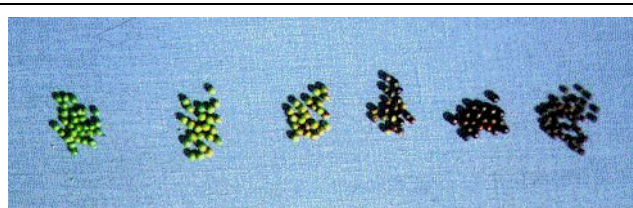
Product Advancement Trial (PAT) plots, yield monitors may not be used.

Swathing Plots

If the canola plots are being swathed, use the swathing procedure and timings standard for the grower. Time of swathing can have a major influence on final yield and seed quality if the canola hybrids/varieties in the comparison are not all within 4 to 5 days relative maturity of each other. If there are large differences in maturity, swathing too early makes for more green seed in the later maturing products. Swathing too late will result in increased shattering with the early maturing products.

Timely swathing of the test plot area is another reason to establish the test plot on a uniform area within the field. If the field site is not uniform, there will be uneven maturity across the plot site. Hilltops are often riper than low areas in a field.

An Alberta Government website “Canola Harvest Management”^a describes the proper procedures for harvesting canola using swathing. It states that the optimum stage to swath canola is when 30 to 60% of the seeds have changed color on the plant’s main stem. Seed color changes occur when the canola seed reach 30 to 35% moisture. There can be large variations in seed color on a single plant since the seeds at the base of the plant may turn color while seeds at the top of the plant may be mature, but still green. The authors indicated that changes in seed color are more important than the overall field, straw, or pod color. Combining the swath should occur when the canola seed is at 10 percent moisture or less. Harvesting above 10% moisture can result in increased dockage due to green seeds and increase spoilage during storage. Green seeds will not cure once they are harvested and will increase storage concerns.



Demonstration of seed color changes with maturity progression in canola (courtesy of North Dakota State University).

Pioneer Assistance

During harvest the Pioneer sales rep or agronomist will assist in calculating the canola yield from the plot weight indicated by the weigh wagon, the average moisture for the treatment strip, and the measured plot area. Plot area should be measured with either a measuring tape or wheel rather than relying on the area calculated by the combine monitor.

Once a plot has been harvested and weighed, Pioneer reps explain the yield results and have farm operators sign the plot harvest forms, which include co-operator name, address,

planting date, harvest date, plot size, previous crop, rep name, type of tillage and other pertinent comments. The grower-cooperator keeps a copy of the forms, and the agronomist submits his copies to Pioneer information managers, who enter the data for analysis.

Tips for Harvesting a Valid Strip Test

- Treatment or variety strip size should be large enough to provide an adequate amount of seed for weighing while not getting too large as to increase field variability across plots. The plots should be at 1 to 2 drill passes wide x 1000 feet long.
- Walk the plots before harvest to check for stand differences or other problems that may influence yield.
- Harvest in one direction, especially if the plot traverses a slope or if there is a strong wind blowing in the same direction as the rows.
- Take care to guard against any bias or unfair advantage of one treatment over another.
- The plot area should be as uniform as possible for soil type, slope, and previous and current management practices.
- If using a calibrated weigh wagon, place it in a level convenient location and leave it in one place for all the data collection.
- Dump grain directly from the combine into the stationary weigh wagon. Do NOT use a grain cart.
- Discard erroneous data. Having no data is better than using questionable or misleading data for making decisions.

References:

^a Canola Harvest Management , Alberta Government [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/crop1299](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/crop1299)

¹Roundup Ready is a registered trademark of Monsanto.

²Clearfield is a registered trademark of BASF.

³LibertyLink is a registered trademark of Bayer.

For more information contact your local supplier of Pioneer canola seed or your local Pioneer field sales agronomist.