Harvest Management of Canola

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Canola harvest requires appropriate timing and management of operations. Because canola is prone to shattering, harvest planning must begin well before the crop is ripe. The longer a ripe canola crop stands in the field, the greater the risk for shattering by wind and severe weather.

Shattering losses from severe weather can be devastating, ranging from 5 percent to 75 percent of total crop yield. As a result, some producers prepare their canola before harvest to reduce the risks of shattering. There are four harvest/preparation methods used in the southern Great Plains: direct cutting, desiccation, pushing, and swathing. Advantages and disadvantages of each method are discussed in this publication. Proper staging is critical for all four harvest/preparation methods.

Direct Cutting

Canola is ready to be harvested at seed moisture content between 8 percent and 10 percent. Delivery points will not accept canola grain above 10 percent moisture. When canola is ripe, it must be harvested in a timely manner. If canola ripens and is ready for direct cutting in the middle of wheat harvest, producers should stop wheat harvest and move to canola. Producers should do this because canola is more susceptible to shattering and it is a high-value crop.

Photo 1. *Direct cutting standing canola.*

Wheat harvesting equipment can be used when direct cutting canola (Photo 1). Canola is cut just below the seedpods, minimizing the amount of green material entering the combine. Direct cutting canola is slower than cutting wheat. The reel should be set as far back over the grain table as possible to reduce the effects of shattering by the header. The reel speed should match ground speed. From a distance, the reel appears to gently pull the combine through the field. The reel should be placed just far enough into the seedpods to lightly pull the crop onto the grain table.

Producers should begin with the settings for rapeseed or canola in the operator's manual. Adjustments should be made based on what is coming out the back of the combine. Because canola seed is small, it is a good idea to have a roll of duct tape, caulk, or axle grease handy to plug holes in combines and trucks. Check for grain losses ahead of the combine (shattering), behind the header (header loss), and behind the combine (tailings).

Begin with setting cylinder speed between 450 and 650 rpm, which is about one-half to two-thirds of the speed used when harvesting wheat. Set the concave clearances at ¾ inch in the front and ⅛ to ¼ inch in the rear. Canola seed threshes easily from the seedpods. Fan speed should be set between 400 and 600 rpm, but shaking the seed out of the chaff is better than blowing it out. Set the top sieve at ¼ to ⅜ inch and the bottom sieve at ⅛ to ¼ inch for proper separation.

Canola seed can be hard to see after it falls to the ground. Check for seed loss by placing a shoebox between seed rows in front of the combine and counting the seed in the box after the combine passes over it. About 130 to 150 seeds per square foot equals 1 bushel (50 lb) per acre yield loss. Producers with rotary combines should follow instructions in the owner's manual.

Direct cutting is a good method for producers with smaller acreages. Plant varieties with different maturities if direct cutting so all acres are not ready to be harvested at the same time. Direct cutting is the only method requiring one pass through the field, but it is the riskiest harvest method because the crop must remain standing in the field until it has ripened.

Canola is an indeterminate crop and will have some green seedpods on secondary branches at harvest. Do not wait for these remaining seedpods to dry down. Harvest must begin when the majority of the field is ripe and ready for harvest. Waiting until all seedpods are brown and dry will result in harvest delays and potential yield loss. Setting the combine properly allows green seedpods to be blown out the back of the combine. Stems remain green while the seedpods turn brown and brittle. Do not wait for stems to dry down before starting harvest. The decision to harvest should be based on seed color change and seed moisture content. When direct cutting, expect some yield losses at the ends of the header as the combine moves through the standing canola.

Advantages of direct cutting:

- Best opportunity to deliver No. 1 quality seed.
- Often results in the highest oil and seed yields.
- Uses same equipment as wheat harvest. If using a draper header, a cross auger may be advantageous. Any platform header can be used.
- Best for tall, thick canola stands with seedpods that are laced together.
- Able to harvest during hot, dry conditions and still maintain high-quality seed.

Disadvantages of direct cutting:

- The longer the crop stands ripe in the field, the greater the risk of seedpod shattering from wind and strong thunderstorms.
- No opportunity to accelerate dry-down.
- Green spots in the field will have to be harvested at a later date, increasing the chances for shattering losses.

Desiccating Canola

Canola can be desiccated before harvest to even out maturity differences within a field, to control weeds where stands are spotty, and to stop growth when canola is excessively lodged. Desiccation should take place when about 85 percent of the seed in pods on the main stem has turned color from dark green to reddish-brown, brown, or black.

Diquat bromide (Reglone) and Nufarm Diquat SPC 2L are labeled for canola desiccation at rates 1.5 to 2.0 pints per acre. For diquat to be effective, a large spray volume and medium water droplet size are needed. A minimum of 15 gallons per acre water carrier is recommended for ground applications, and at least 5 gallons per acre water carrier is needed for aerial applications. A nonionic surfactant is recommended at ½ to 4 pints per 100 gallons of water (0.06 to 0.5% v/v). Because of the dense, heavy nature of a maturing canola canopy, water volume is extremely important for effective coverage.

The diquat label recommends waiting 7 to 10 days after application to harvest canola. Diquat is a contact herbicide, which means it will only react with plant tissues it touches. Applications made in bright sunshine are activated immediately as the product reaches the plant surface. Applications made on cloudy days or in the evening may have more time to be active on the crop and may be more effective. Once the application is made, there will be no further ripening.

Harvesting desiccated canola requires the same equipment as direct cutting. Desiccating can be expensive and any canola that is run over will be lost; however, it is a useful tool when conditions are not favorable for swathing or pushing, and when a producer wants to get a standing crop harvested more quickly.

Photo 2. *Pushing canola.*

Pushing

Canola pushing, or forced lodging, is a relatively new concept to Kansas producers. A canola pusher is a convex shield that is mounted on the front of a tractor (Photo 2). The idea is to lean the plants over but not kink the stems, which allows the canola to continue grain fill. A crop that is closer to the ground is better protected from the wind and losses from shattering. Pushed canola plants lay about 1 to 2 feet from the soil surface and are held in place by other plants. This allows for airflow around the crop and ripening. For best operation, the pusher must be kept level through the field. Vertical sickles on the pusher ends and in front of the tires cut through the crop between passes and reduce the amount of canola run over by the tires. A standard platform header can be used to harvest pushed canola, but it must match the width of the pusher. Canola is harvested in the opposite direction it was pushed (Photo 3).

Photo 3. *Harvesting pushed canola.*

Advantages of pushing:

- Canola is pushed over, resting 1 to 2 feet above the soil surface, and protected from the wind.
- Pushing can be faster than swathing.
- Best for tall, dense crops that are intertwined.
- The crop fills grain completely and may result in higher test weight and yields than swathed canola.
- Pushing equipment is less expensive than swathing equipment.

Disadvantages of pushing:

- Canola must ripen fully before harvest, increasing the potential for shattering.
- Canola pushing does not accelerate ripening.
- Harvesting is slower because more material goes through the combine and harvesting takes place near ground level.
- Does not work well in thin, short canola.
- Does not work well when canola is already lodged.
- Pushed canola is cut low to the ground with the combine, leaving the least amount of standing stubble of all methods.

Photo 4. *Swathing canola with a roller.*

Swathing

Swathing is the most widely used canola harvest aid in the northern Great Plains and Canada and is gaining acceptance in Kansas and the southern Great Plains. A pull-type or self-propelled draper swather must be used to swath canola (Photo 4). Do not use a swather with a crimper to swath canola. A pickup

Photo 5. *Pickup header used to harvest swathed canola.*

header with a draper belt and rubber or synthetic fingers works best to harvest canola once the grain has dried to between 8 percent and 10 percent moisture (Photo 5).

Swathing can be an advantageous preparation step for harvesting canola. Swathing often allows canola harvest 7 to 10 days earlier than canola prepared by other methods. A properly swathed and rolled windrow is protected from strong winds. Fields with uneven maturity can be swathed, eliminating the need to harvest green spots later. In fields that are weedy and are swathed, weeds dry down before entering the combine, keeping seed moisture low. One of the biggest drawbacks to swathing is the need for additional equipment.

Producers should begin scouting canola fields for appropriate growth stage for swathing 10 days after the last flowers drop from the plants. Multiple checks should be made every 2 to 3 days until the canola is ready to swath because it ripens quickly under southern Great Plains environmental conditions. Seed color change is used to determine when canola is ready to swath. The optimum time is between 40 percent and 60 percent seed color change with 30 percent to 40 percent moisture content. Canola can be swathed at 30 percent and 70 percent

Photo 6. *Canola seeds showing color change.*

seed color change without sacrificing too much yield. However, swathing too early increases green seed count and reduces test weight; swathing too late may result in greater shattering losses.

To stage canola for swathing, select five to 10 spots in the field and open seedpods on the main raceme to check the seed color. As the plant matures, seeds ripen or turn from translucent, watery-green color to a firm, green color. As the seeds begin to lose moisture, the color will turn from dark green to reddish-brown, brown, or black. Seed on the bottom of the main raceme will turn first because it is the most mature, and seed color change will move up the raceme. Only seeds that have brown speckling or are completely brown or black should be counted as turned (Photo 6). At 50 percent seed color change, seeds in the lower one-third of the main raceme should be completely turned, the majority of the middle one-third should be turned, and the top one-third should be green and firm. Seeds on secondary branches also should be turning color or green and firm when rolled between the thumb and forefinger. When all spots have been checked, estimate the average seed color change for the field. Remember seed color change is the single most important method for staging the crop for swathing. Do not rely on overall field, stalk, or seedpod color.

Swath canola just below the seedpod layer so an adequate amount of residue remains to hold the windrow above ground level and increase airflow for ripening. The crop will harvest more easily if it is not bunched or twisted in the windrow. It is a good idea to follow the swather with a roller to gently pack the windrow into the standing stubble. The stubble anchors the windrow, protecting it from strong winds while still holding it off the ground for ripening. Producers usually swath canola parallel to the prevailing wind direction because strong crosswinds have the greatest risk of moving windrows.

Swathing can be done at any time of the day, but it works best during cooler periods rather than the heat of the day. Canola can be swathed in the morning, evening, night, or with a heavy dew or light mist. Hot and windy conditions accelerate seed dry down and may result in decreased test weight, oil content, and yield, and increased green seed count. Once the crop has been swathed, enzymes use the moisture remaining in the seed to clear chlorophyll and finish the ripening process. Swathed canola will be ready to harvest in 4 to 7 days under normal conditions in Kansas.

Advantages of swathing:

- Harvest 7 to 10 days earlier than other methods.
- Assists with managing different maturities in the field if staged correctly.
- Improves time management and allows for handling of larger acreages.
- A properly swathed and packed windrow can withstand higher wind gusts than standing canola.
- In fields with poor stands, weeds are cut off and will dry down before harvest, keeping seed moisture content low.

Disadvantages of swathing:

- Additional equipment investment.
- Potential for limited access to appropriate equipment in a producer's area.
- Yield and oil content may be slightly reduced because the crop is cut off before grain fill is completed.
- Stands that are lodged and tangled may be difficult to lay in an even windrow.
- Light, fluffy windrows can be picked up and blown by the wind.

Which method do I choose?

Kansas State University and Oklahoma State University examined the optimum swathing time versus direct cutting and the effects on test weight and grain yield (Godsey and Stamm, 2010). Results of the study are summarized in Table 1. Swathing had greater yield than direct cutting at Stillwater; however, the greater yields were likely a result of shattering caused by strong winds in the direct cutting treatment. In Hutchinson, direct cutting was greater than swathing for yield. This may be attributed to high temperatures following swathing. There was no difference between swathing and direct cutting in Manhattan. The only difference in test weights occurred in Hutchinson and was likely because of high temperatures following swathing. Harvest method did not affect test weights at Stillwater and Manhattan.

Results from this study indicate that swathing and direct cutting can be successful harvest options in the southern Great Plains. Results from Hutchinson indicate that timing of swathing is important and should be conducted during cooler periods of the day. Results from Stillwater indicate that swathing provides some protection over direct cutting when shattering losses are eminent.

The decision of which harvest method to use depends on the number of acres to harvest, the producer's tolerance to risk, the availability of equipment, and the costs involved. Because of the increasing interest in winter canola, custom harvesters are readily available to conduct swathing and harvesting operations. Inexperienced canola producers should consult with experienced producers, share equipment with neighbors, or take advantage of custom harvesters in the region.

Additional information

For more information about harvest methods, consult the *Great Plains Canola Production Handbook,* MF2734, or the Canola Council of Canada website (*www.canolacouncil.org*).

Visit the Great Plains Canola Association website (*http://greatplainscanola.org*) for information on canola custom swathers and harvesters in the region.

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References

Godsey, C. and M. Stamm. 2010. A comparison of direct combining and swathing winter canola prior to harvest. *In* Agronomy Abstracts. CD.

Table 1. *Mean canola test weights and yields for harvest management techniques, 2008–2009.*

	Stillwater		Hutchinson		Manhattan	
Harvest Method	**Test Weight**	**Yield**	**Test Weight**	**Yield**	**Test Weight**	**Yield**
	-lb/bu-	-lb/a-	-lb/bu-	-lb/a-	-lb/bu-	-lb/a-
Direct	48	1,166 b	48 a	1,520 a	46	2,037
Swath	48	2,156 a	44 b	1,172 b	46	2,012

Within a column, numbers followed by different lowercase letters are significantly different at $p \leq 0.05$. Stamm and Godsey, 2010.

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