



Harvesting Options for Winter Canola

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Because of new winter tolerant varieties of canola, Oklahoma farmers now have the opportunity to grow a crop that produces high quality oil and protein meal. A key aspect of getting a high quality consumer oil or livestock meal is to harvest the seed when it is at or below a 10 percent moisture level or lower with less than 2 percent green seed and then store it in a manner that preserves its quality. Yield and quality losses caused by untimely harvesting, inappropriate harvesting techniques, improper handling, improper storage, or a combination of these practices all reduce crop value. Timely harvest and proper storage will help maximize yield, quality and economic returns.

Do not expect your local buyer to take a load of canola at a moisture level of more than 10 percent. If you have a load of canola that has been combined and is more than 10 percent moisture, you will probably have to dry it down to 10 percent, or perhaps have it cleaned to remove green material to get the crop ready to deliver to the elevator. Testing crop moisture before combining is the first step in harvesting a quality product. On a typical day, canola seed moisture will be highest in the morning and lowest in the middle of the afternoon. Canola is an indeterminate crop and may have a small amount of immature seeds at harvest.

Direct combining and swathing are the most popular harvest methods in the Southern Great Plains. Direct combining or pick-up harvesting of swathed canola should not begin until moisture is at or below 10 percent. For checking moisture before harvest, the outside edges of the field generally mature first and can be checked to see how soon harvest can start. Swathing and combining is a good method for managing equipment and time during harvest, compared to direct combining that must be done when the canola crop is ready.

Whether to swath, push or direct combine is a management decision because all three methods can be used successfully. Swathing is generally recommended for winter canola if harvest cannot be completed in a timely manner (three to seven days). Direct combining requires no additional equipment for wheat growers. Harvesting canola is a slower process than harvesting wheat. Ripe canola should be harvested immediately as pre-harvest shattering will happen if severe thunderstorms hail, or very high winds occur.

Whether to swath or direct harvest is a management decision because both can be done successfully. Swathing is generally recommended for winter canola if harvest cannot be completed in a timely manner. Direct combining requires no additional

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equipment for wheat growers. Harvesting canola is a slower process than harvesting wheat. Ripe canola should be harvested immediately as pre-harvest shattering happens frequently. Holes in the combine, trucks or trailer should be plugged with tape or caulk to ensure seed is not lost.

Direct Combining

Direct combining is often satisfactory in the Southern Great Plains because dry-down is accelerated by high air temperatures at ripening (Figure 1). Ideally, canola should be harvested when the average seed moisture is 8 percent to 10 percent. Do not bother with allowing smaller immature pods and seeds to mature. If the combine is set correctly, these will be blown out the back. Waiting for smaller, greener seed pods to mature will result in the larger, higher yielding seed pods to potentially shatter and reduce yield. Harvesting at slightly higher moisture content (10 percent to 13 percent) and then drying the canola down with forced air in a bin may help reduce the losses from pod shatter. Check the grain tank to ensure there is little to no green seed.

Ripe standing winter canola is easy to thrash. Therefore, after first setting the combine, try opening the concaves more, as this reduces grinding of stalks. This will allow more material through, and by not grinding the green stalks, the moisture content of the canola seed will be lower. Keep an eye on what is coming out the back. Do not be concerned if you see a few green pods in the bin. Harvest canola immediately below the seedpods to avoid excess trash and green stems moving through the combine and slowing harvest. Canola seed is very difficult to see once it falls onto the ground. It is better to place a small box on the ground



Figure 1.

ahead of the combine and then look at what is inside after the combine passes over it. Check around the combine for places where the seed may be falling out and fill those cracks with duct tape, caulking or grease.

Advantages to direct combining

- Good opportunity to deliver No. 1 quality because of reduced green seed potential.
- Able to combine during hot (greater than 85 F) dry weather conditions and maintain quality.
- Generally results in the best yield, protein and oil content.
- One-pass harvest with either the grower's combine or by custom cutters.
- No swathing equipment or pickup attachments for combines required.
- Best method for stands of canola that are tall, heavy, "laced" together, or lodged.
- Decreased risk of diseases from poor drying and maturing that can occur when canola is lying in a windrow.
- Thicker, more productive crops will mature more evenly and are easier to direct combine.

Disadvantages to direct combining

- Must harvest when crop is ready. Do not wait several days until wheat harvest is finished.
- Bad weather or wet fields at maturity could delay harvest allowing shattering to begin.
- Shattering due to hail, high wind, or severe storms may be worse if the crop is standing.
- The longer the mature crop stands in the field, the greater potential for shatter losses.
- Uneven maturity throughout the field.

General settings for conventional combines

- In general, the ground speed of the combining operation is slower than for wheat.
- The reel should be set high and as far back over the grain table as possible.
- Reel speed should be the same as the ground speed.
- Cylinder speed should be slow (450 rpm to 650 rpm), about one half to two-thirds that for wheat. Cracked seed indicates excessive cylinder speed.
- Concave clearances – Although combine operator's manuals generally recommend 3/4-inch in the front and 1/8-inch to 1/4-inch in the rear, wider concave settings often work better. Canola is very easy to thresh, and the combine operator should continue to open the concaves until whole dry pods are not being threshed. This is often nearly wide open. Grinding the stems because the concaves are too close can increase seed moisture. Increase concave clearance until just the seed is threshed from pods.
- Fan speed is similar to wheat (400 to 600 rpm). Shaking the seed out of the chaff is better than trying to blow the chaff out.
- Top sieve/chaffer set at 1/4 to 3/8 inch for proper separation.
- Lower cleaning sieve set at 1/8 to 1/4 inch.
- For rotary combines, use settings from the operator's manual. Most settings can be adjusted from the cab.

Some tips on reducing shatter losses from direct combining:

- Make sure your sickle is sharp and hold-downs properly adjusted to get a quick clean cut.
- Make sure the reel speed matches the ground speed. Reel speed control is essential.
- Run the reel as high and as far back as possible over the grain table.

- Install reel bat shields to prevent branched stalks from catching on reel bat ends.
- Remove row dividers, because dividing the row shatters pods.
- Shattering is unavoidable where the inside end of the header divides the crop. On combines with wide header ends, consider modifying the rounded or peaked top of the right end of the header (sometimes called the divider). Using a wider header and slowing down some is better than driving faster with a narrow header.
- If you have on-farm drying capability, you might consider harvesting the crop at higher seed moisture levels (11 percent to 12 percent) and air drying the seed down to 10 percent or less.
- Shattering at harvest can be reduced by harvesting at night when the pods are damp from dew. This is most beneficial during periods of very hot dry weather. But check the seed moisture often when harvesting at night
- Canola can be cut and threshed when it is too damp to harvest wheat. This happens when the seed is dry but there is some dampness on the pods left from dew.
- **GET OFF AND LOOK** behind the combine for leaks, grain being blown out, un-threshed pods and stems being ground up too much. Approximately 115 seeds per square foot on the ground equals a 1 bushel per acre loss. A small amount of seed pods in the harvested product is acceptable compared to blowing seed out the back of the combine.
- Cover the load when hauling it to town. The small seed will blow off and cost you much more than a tarp. Don't try to round up the load, it will flatten itself out and run over the side.

Swathing (Use a draper type header)

Swathing reduces the possibility of seed losses from wind, rain and hail. Swathing involves cutting and placing the crop in windrows directly on the cut stubble for approximately five days to ten days or until the seed moisture falls to 8 percent to 10 percent. At this time, the canola can be harvested with a pickup header (Figures 2 through 5). Swathing during hot (85 F), dry, and windy weather will stop natural chlorophyll clearing due to low seed moisture. Try to swath during the cool evening hours, at night, or early morning to allow the seed to dry at a slower rate. The draper, belt-style of swather is superior to the auger style in reducing crop damage. Do not swath with an auger-type swather.

Regardless of the swather type used, the windrow must flow smoothly through the swather without bunching or twisting. Bunching and twisting leads to uneven drying and combining problems. Canola should be swathed a few inches below the pods to reduce the amount of crop material passing through the throat. This leaves a maximum amount of stubble on which to lay the windrow and ensure adequate air circulation. Swathing too early will result in green seed, lower oil content, and higher seed moisture. Swathing too late will result in excessive shattering.

Field staging for optimum time of swathing

Start inspecting fields approximately seven days to ten days after flowering ends. Walk out and sample five plants to ten plants, examining pods on the main stem only. Seeds in pods on the bottom third of the main stem typically mature first. Take note of the seed color change percentage on the main stem. Only seeds with small patches of color (spotting) should be counted as color change. Most of the seeds in the top third should be firm and roll, as opposed to break or crush, when pressed between the forefinger and thumb. After assessing the main stem, look at the seed from the pods on the side branches to ensure that they are firm with no translucency, especially with low plant populations. Once you have sampled the seeds, estimate the average percent



Figure 2.



Figure 3.



Figure 4.



Figure 5.

seed color change for that field. Continue inspections every two days to three days to monitor color change. The key to curing the crop in a windrow is moisture. The enzyme responsible for clearing the chlorophyll requires up to 14 days to change the seed to a mature color. Seed color is more important than the overall field, stalk, or pod color when gauging the optimum time to swath. The best time to swath for optimum canola seed yield and quality is when average seed color change on the main stem is 40 percent to 60 percent and the seed contains 30 percent to 40 percent moisture. However, canola can be swathed at 30 percent to 40 percent seed color change without sacrificing significant yield or quality. This widens the “swathing window” for growers.

Advantages of swathing canola:

- Harvest eight days to ten days earlier than direct combining.
- With earlier harvest comes an increased potential for double cropping.
- More management flexibility with large acreages.
- Swathing can be done around the clock to assist with harvesting large acreages.
- A properly swathed, tight windrows will withstand heavy rain storms and high winds without shattering.
- Uneven field maturity makes swathing a desirable option because of time management concerns with direct harvesting the canola.

Disadvantages of swathing canola

- Research has shown a 0 percent to 10 percent yield reduction when plots were swathed at the optimum stage compared with direct combining.
- Do not swath canola if the weather forecast is for extremely hot, dry, and windy conditions. Swathing at temperatures of 85 F or greater will rapidly dry the crop and may result in excessive seed shrinkage.
- Additional equipment and a second pass over the field are required.
- Once the crop is swathed, the seed does not continue to fill.
- Stands of canola that are tall or lodged make it difficult to lay down an un-bunched, smooth windrow.
- The amount of material in a heavy crop to be forced through the throat of the swather may be a problem.
- Light or fluffy windrows can be lifted and blown by the wind. Swath rollers that lightly push the windrow down into the standing stalks reduce the risk of blowing (Figure 3).

Combining swathed canola

Canola is ready to combine when seed moisture has dropped to 10 percent. Under normal conditions, this is about 5 days to 14 days after swathing. Most seeds will be mature with little or no green color. If green seed is present due to rapid dry down and it is early in the harvest window, the windrows may be left

longer to clear more green seed, since only a small percentage of green seeds will reduce the grade. However, by leaving the windrows to reduce green seed, you also run the risk that prolonged wet weather will delay combining and result in yield and quality losses.

Windrows are best picked up using a rubberized draper belt. These belt types have rubber or synthetic fingers and are preferred when harvesting canola as the gentle action helps reduce shattering losses. The aluminum pick-up is more suited for bunched windrows. Since the canola is not on the ground, direct cut headers maybe used to harvest swathed canola. Crop lifter attachments that are the width of the windrow will lift it into the header in most cases. The rest of the cutter bar may be covered to prevent or reduce the amount of second-cut stubble entering the combine.

Pushing

Pushing is a relatively new procedure for canola harvesting that has been suggested as a faster and less expensive alternative to swathing. A “pusher” is mounted on the three-point hitch of a bidirectional tractor or a tractor with a three point hitch and it is driven through the canola at a relatively high speed to force uniform lodging (Figure 6). Mounting a pusher on front loader brackets has not been successful because the unit is too wide and heavy. By pushing the canola over, it is less susceptible to wind and shatter losses because the pod layer is more dense.

Although experience with pushing is limited, it may work better in some crop situations than in others. Pushers work best in fields with high production potential and few or no terraces. Pushing works better in taller, even crops. Shorter, thin crops simply stand back up, minus a few pods, after the pusher has gone through the field. The optimum speed (5 mph to 10 mph) for pushing may vary depending on crop size, density and field terrain. The goal is to push the stalks over, but not break them off or rip them out of the ground. Hydraulic driven vertical sickles are located at both ends of the pusher and directly in front of the tractor tire tracks. These are designed to ensure a clean cut between passes and reduce the amount of canola crushed by tires. Pods cut off by these sickles are lost.

After the crop naturally matures, it is direct combined (Figure 7). The combine must travel in the opposite direction of the pusher. The combine header must operate much closer to the ground than for standing canola. Harvesting is slower (2 mph to 3 mph) because more stalk material enters the combine. The canola feeds into the header platform with little assistance from the reel.

Desiccants

Generally, desiccants are expensive and generally not necessary in the Great Plains because of high temperatures during dry-down. Desiccants are advantageous where plants are excessively lodged, weed infestations are heavy, maturity is not uniform, and the crop is not going to be swathed. Before using a desiccant check local and state pesticide labels.

Green seed

With canola, green seed does not mean that the outside of the seed looks green. It means that the inside of the seed coat is still green. The amount of green seed is determined by using



Figure 6.

a special testing device which crushes 100 seeds to 500 seeds onto a white tape. Any seed that has green on the inside of the seed coat leaves a small green stain on the tape, and is then considered a green seed. Green seed is objectionable because the green color is soluble in the oil and causes the oil to be off color. Such oil must be filtered before it can be sold as cooking oil. The cost of filtering reduces the value of the canola.

Canola Storage

Successful canola storage requires cool, dry conditions. Therefore, storing canola in Oklahoma requires aeration. Potential risks of improper storage include heating, high seed moisture, spontaneous combustion, insect infestation, clumping due to molding, and free fatty acid development. Ripe canola varies in moisture and oil content. When placed in storage, moisture content and seed temperature determine the amount of drying and cooling necessary to prevent spoilage. Canola undergoes a period of extended respiration or “sweat,” producing heat and moisture for six to eight weeks after harvest. Aeration and intensive monitoring are required to prevent quality loss.

For additional canola storage information refer to Fact Sheet BAE-1110, “Storing Oklahoma Winter Canola.”



Figure 7.

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