

Harvesting Oklahoma Winter Canola

Swathing vs. Direct Combining

Mark Boyles, Dr. Tom Peeper and Dr. Case Medlin
Plant and Soil Sciences Department
Oklahoma State University

Because of new winter tolerant varieties of canola, Oklahoma farmers now have the opportunity to grow a crop that produces high quality oil, forage for livestock and high quality 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 10% moisture with less than 2% 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 one load of canola at a moisture level above 10%. If you have a load of canola that has been cut and is above 10% moisture you will have to dry it down to 10%, or perhaps have it cleaned to get the crop ready to deliver to the elevator. Testing crop moisture before combining is a 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 combine harvest of canola is the most popular method in the Southern Great Plains and Europe. Direct combining or pick-up harvesting of swathed canola should not begin until moisture is at or below 10 percent. Harvesting above 10 percent moisture may result in getting turn away at the elevator or result in dockage due to green seeds and the chance of heating damage and storage problems. 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. Rain on canola almost ready to harvest will mature the crop quickly. This is opposed to wheat where rain slows maturity.

Swathing is generally not recommended for winter canola. But, swathing and combining with a pickup header might be practical when the fields have heavy weed infestations, thin stands or for growers with large acres that require a few weeks to get harvested or for growers who have draper type swathing equipment.

Initial combine settings should be in accordance with the operator's manual instructions for canola or rapeseed. Harvesting canola can be a slower process than harvesting wheat. Seed is dark brown to black in at maturity. Red seed at harvest indicates some sort of stress during the growing season. Before harvesting, check combines completely. Cover holes or cracks with plastic tape or a silicon rubber-sealing compound, especially in the table, feeder housing, elevator doors, and grain tank. Make sure your grain truck sideboards and floor are tight

Direct Combining

Direct combining is most successful when the crop matures evenly and crop density is uniform. An uneven crop stand can lead to less uniform ripening because a thin stand causes more

branching and pods on later branches that mature later. Direct combining also works well when the crop is relatively heavy, tall, partially lodged or with pods “laced” together. These conditions reduce the risk of shelling and pod drop due to high wind. For direct-harvested canola, the crop is ripe when the pods rattle when shaken. Winter canola varieties are less prone to shattering than spring varieties and are therefore better suited to direct combining. Seed oil content tends to be higher when a crop is direct harvested. Because it is a large, bulky crop, canola can be more difficult to feed into the combine than wheat, which can require slowing the combine some, but it is an easy crop to thresh. Canola should be cut just below the seed pods (top one third of the crop) to keep excess biomass from going through the combine and slowing harvest. Stems will still be partly green at harvest. A harvest speed of 2 to 3 mph is recommended to increase harvest efficiency, depending on the size of the combine. Some combine operator’s suggest raising the header auger slightly to help the canola stalks move to the feeder housing with less drag.

Advantages for Direct Combining

- Best opportunity to deliver No. 1 quality. Reduced green seed potential.
- Able to combine during hot (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 and “laced” together or lodged.
- Avoid risk of improperly laying (twisting or bunching) the crop on the ground by swathing.
- Decreased risk of diseases, or poor drying and maturing potentially found in swathed canola.
- Allows harvest of weedy fields without taking all weed seed into the combine.
- Thicker more productive crops will mature more evenly and are easier to direct combine.

Disadvantages for 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. Rain on a standing crop increases the potential for shatter losses as it promotes saprophytic organisms growing on the pods.
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General initial settings for Conventional Combines

- General rule is setting the combine up at $\frac{3}{4}$ of the settings of wheat. This includes ground speed of the combining operation.
- The reel should be set high and as far back over the table as possible.
- Reel speed should be the same as the ground speed.
- Cylinder speed should be slow. About $\frac{1}{2}$ to $\frac{2}{3}$ that for wheat. (450 - 650 rpm). Cracked seed indicates excessive speed

- Concave clearances - 3/4" in the front and 1/8 – 1/4" in the rear. Remember, canola is easy to thresh, and you don't want to grind up the stems any more than necessary. Grinding up the stems can increase seed moisture
- Fan speed is similar to wheat (400 -600 rpm). Shaking the seed out of the chaff is better than blowing it out.
- Top sieve / chaffer set at 1/4 to 3/8" for proper separation
- Lower cleaning sieve set at 1/8 to 1/4"

Rotary Combines

- Use preset settings from operators manual. Most crop settings can be set up 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 and wrapping around the reel.
- Remove row dividers, because dividing the row shatters pods where plants are pulled apart.
- 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 that right end of the header, (sometimes called the divider) so that seed that drops on the header end will all roll into the header, instead of 1/2 onto the ground. 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 (11-12%) and air drying the seed down to 10% or less. We do not have experience with drying canola under Oklahoma conditions. Extreme caution should be used if heated air is used for drying.
- Harvesting in the cooler part of the day can reduce shattering, because the pods pick up moisture and don't split as easy.
- 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.
- Sometimes, canola can be cut and thrashed 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. Loss of 1 bushel per acre is about 115 seeds per square foot. A small amount seed pods in the harvested product is acceptable compared to blowing out excessive 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 too much, it will flatten itself out and run over the side

Swathing

Swathing is generally needed for harvesting spring canola in cool areas where dry down can be slow. Swathing involves cutting the crop and placing it in rows directly on the cut stubble. The crop must be supported by the stubble, and not allowed to touch the ground. We have no experience with swathing canola in Oklahoma. The information presented below is taken from sources outside the state, and may or may not be correct for Oklahoma, but it is the best information we have at this time. We have not emphasized swathing in our research, because we have learned from our counterparts in Kansas that most farmers there harvest it standing. Also, we have learned that northern growers are trying to switch from swathing to direct combining.

Swathing could reduce the possibility of seed losses from wind and reduce losses from hail by 1/3. If swathing is the preferred method of harvest, then it is very important that the plant be at the proper stage of maturity when it is swathed. The best suggested time to swath for optimum canola seed yield and quality is when the weather forecast for the next 3 to 7 days is cloudy, cool with increased humidity and when average seed color change on the main stem is 40 to 60% and the seed contains 30 to 40 percent moisture. It is suggested to swath during the cool evening hours, at night, or early morning to allow the seed to dry down at a slower rate. The swath is placed on the stubble but not on the ground for approximately 7 to 14 days or until the seed moisture is 8 to 10 percent. The canola can then be harvested with a combine equipped with a pickup header. One concern we have with swathing is that information from northern areas cautions that “hot and dry” (86°F or higher) or windy weather after swathing may stop chlorophyll clearing due to low seed moisture”. That means green seed content will be high and grade will be low.

The draper belt style of windrower is superior to the auger style in reducing crop damage. Regardless of the swather used, the windrow must flow smoothly through the swather without bunching or twisting. Bunching and twisting leads to uneven drying and combining problems as well as development of disease organisms on the grain. It is recommended to swath the crop just under the bottom of the pods to reduce the amount of crop passing through the throat. This leaves a maximum amount of stubble on which to lay the windrow and ensure adequate air circulation through the swath. In general, the northern spring crops are only about 40 inches tall or less, whereas in Oklahoma, we have canola that is often 5 ft tall or even 7 feet tall. It is not clear how much of that should be cut by the swather, but stubble 3 to 4 feet tall could be very difficult to extract the crop from without excessive shattering. 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 (based on spring canola)

Start inspecting fields approximately 7 to 10 days after flowering ends. Walk out and sample 5 to 10 plants. Most of the seeds in the top pods will be firm, and roll, as opposed to break or crush, when pressed between the forefinger and thumb. Continue field sampling every two or three days. Using the seed color change chart take note on the percentage of the plants. Examine only pods on the main stem. Seeds in pods on the bottom third of the main stem mature first. Only seeds with small patches of color (spotting) should be counted as color change. 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 sampled, average the percent seed color change for that field. Continue inspections every 3 to 4 days to monitor color change. The key to curing the crop in a wind row is moisture. The enzyme responsible for

clearing the chlorophyll requires approximately 10-14 days. Seed color is more important than the overall field, straw or pod color when gauging the optimum time to swath.

Advantages of swathing canola are:

- Earlier harvest (eight to ten days) – increased potential for double cropping.
- More management flexibility with a large acreage since the timing of harvest is not as critical.
- Swathing can be done around the clock to assist with harvesting large acreages.
- May be the best approach for thin stands with uneven maturity within the field.
- Cutting weeds early allows a cleaner and drier sample and reduces the number of weed seeds that reach maturity.

Disadvantages of swathing canola

- Research has shown a yield reduction of 10% when plots were swathed at the optimum stage compared to direct combining.
- Don't swath canola if the weather forecast is for sunny, hot, dry and windy conditions. Swathing at hot temperatures (85°F or higher) will rapidly dry the crop resulting in shatter losses from swathing too late or excessive seed shrinkage from swathing too early. This is particularly important if soil moisture and stalk moisture are limited. Because the moisture in the cut stalk is what is needed to properly cure the seed.
- Additional equipment and a second pass over field increases costs.
- Once the crop is swathed the seed does not continue to fill. Canola swathed too early before accumulating its full complement of oil and protein will not accumulate any more after swathing resulting in reduced yield, oil, and protein and higher green seed.
- Swathing machinery may not be readily available.
- Stands of canola that are tall, thick or lodged and tangled make it very difficult to lay down an un-bunched smooth swath.
- Bunched, twisted or large windrows result in uneven drying and combining problems as well as the development of diseases.
- A major problem can be the amount of material in a heavy crop to be forced through the throat of the swather.
- Light or fluffy swaths can be lifted and blown by the wind, much like tumbleweeds.
- Weeds can mature and dry with the canola.

Enid, OK

Weeks From 1974-2004	Number of Weeks with at least one day Above 86 Degrees Farenheight in the Past 10 Years	Number of Weeks with at least one day Above 86 Degrees Farenheight in the Past 30 Years
	Degrees Farenheight in the Past 10 Years	Degrees Farenheight in the Past 30 Years
May 11-17	9	21
May 18-24	7	22
May 25-31	8	26
June 1-7	9	27

Chickasha, OK

	Number of Weeks with at least one day Above 86	Number of Weeks with at least one day Above 86
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May 11-17	9	24
May 18-24	9	23
May 25-31	9	27
June 1-7	10	28

Combining Swathed Canola

Canola is ready to combine when seed moisture has dropped under 10%. Under normal conditions this is about 5 to 14 days after swathing. Most seeds will hopefully be mature with little or no green color. A moisture meter is essential to ensure correct harvest timing. If green seed is present due to rapid dry down, and it is early in harvest, the swaths may be left longer to clear more green seed during subsequent wet weather. A small percentage of green seeds will reduce grade. Leaving the swaths to reduce green seed also runs the risk that prolonged wet weather will delay combining until late, resulting in yield and quality loss. Windrows are best picked up using a rubberized draper belt. The rubber belt type pick-up with rubber or synthetic fingers is preferred in canola as the gentle action helps to reduce shattering losses. The aluminum pick-up is more suited to bunched windrows. Direct cut headers require crop lifter attachments for the width of the windrow to lift the windrow into the header. The rest of the cutter bar may be covered to prevent or reduce the amount of green second-cut stubble entering the combine.

Canola Storage

- Canola storage may require closer monitoring than is needed for wheat.
- Transportation and storage equipment should be checked for leaks and taped or caulked.
- Seed moisture, temperature, and soundness of the container should all be considered.
- Seed moisture should be 8 to 10%, and if drying is necessary, the temperature of the air forced through the canola should not exceed 110°F. Relative humidity should be kept below 65%, and long term storage temperature should be 50°F or lower.
- Canola can continue to “breathe” for up to 6 to 8 weeks after harvest before becoming dormant. Monitor stored canola regularly and use aeration fans to avoid heating.
- Every reduction of 10°F below 77°F and 1% seed moisture below 9% will double the storage life of canola.
- Keep in mind that canola is nine times more dense than wheat, which can reduce air flow.
- Sealed round metal bins are reported to be best for storage.
- If canola is going to heat, it will probably heat in the center of the bin first. A good way to check for heating is to pull a load out of the bin and see if it is heating. If not, put it back in. If some heating is found, pull the seed out of the bottom of the bin, let it drop through air to cool, and put it back in on the top.

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 a special testing device which crushes 100 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 crushed from the seed, 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 green canola.