

Winter Canola Production in Ontario

2005 Update:

During the past 3 growing seasons, most growers have had positive experiences growing winter canola. Like all crops, top yields and best returns require timely management and scouting.

- Yields have varied between 1 - 1.5 t/acre.
- Winter survival of the variety Kronos (hybrid) has been much better than the old variety Artic, with improved vigour, and excellent tolerance to blackleg. The most important factors in winter survival were field selection, planting date. Winter canola does best on well-drained loam soils. Survival was an issue in 2005 on heavier soil types and with late planting.
- Seeding rates have sometimes been higher than required for optimum stands and survival. Recommended seeding rate is 3.5 – 4 lbs/acre depending on soil type. Calibration of seeding equipment is critical. Slow speed sprockets and seed bulking agents can be used with conventional drills to fine tune seeding rates.
- Some tillage of cereal residue prior to seeding is recommended to reduce the risk of slugs. Slugs have been a problem when canola was no –tilled without any tillage.
- Attention at cereal harvest to reduce large clumps of straw, and spreading of chaff is important in seeding canola. Tillage coulters and disc openers must cut cleanly through residue to ensure good seed placement and seed – soil contact.
- Volunteer cereal control in the fall is critical to reduce competition. In some cases cereal control may also be required in the spring. Contamination of delivered canola with cereal grain can result in downgrading/refusal of a load.
- Nitrogen rates need to be higher than spring canola, 120 – 150 lbs/ac is recommended
- Cabbage Seedpod weevil control is a must. In some cases two applications of insecticide may be required.
- Sclerotinia (white mold) control is important.
- In 2005 sulphur deficiency was evident on sandy soils, shallow soils, and with high nitrogen rates in 2005. Dry weather was also a important factor in limiting the ability of the crop to access sulphur. Use ammonium sulphate in these situations as the nitrogen source to also supply sufficient sulphur. Elemental (rock) sulphur does not supply sufficient sulphur in the year of application to correct deficiencies.
- Canola is an attractive food source for deer and wild turkeys. Canola can withstand some grazing in the winter & very early spring, because the growing point is close to the ground in the crown. However, when growth resumes in the spring, constant grazing of wildlife has been a problem in a few cases.

Benefits of Winter Canola :

- Winter canola can help to spread the workload for both seeding and harvest.
- Provide a living ground cover over winter
- Offer land available during the summer for manure application.
- Allow for timely planting of winter wheat.
- Marketing of the crop, targeting old crop prices for canola because of the early harvest date.

Winter Survival

Winter survival is and always has been the unknown in winter canola production. The crop is planted in the fall and then reassessed in the spring to see if it has the potential to produce a viable crop. If 30% of the plants survive the winter and are evenly spaced throughout the field, the stand has the potential to produce an economical crop. As a general guide to assessing winter survival an adequate stand is 2 to 5 healthy plants/ ft.². The remaining plants will branch profusely and fill in the spaces. Many of the management practices are designed to get the crop off to a good start so that the plants will be large enough to withstand the winter and spring conditions. The plant must rely on a strong root system to initiate and sustain spring growth. Winter canola is slightly less winter hardy than winter wheat.

Winter canola can withstand low temperatures during the winter. Winterkill occurs mainly in the spring when root reserves are low and heaving causes further damage to the roots. Winds can also desiccate the new leaves putting further stress on root reserves. Ideal conditions are a snow cover that disappears quickly, followed by consistent growing conditions. Costs should be kept to a minimum in the fall until you know you have a crop. Nitrogen, one of the largest input costs is applied in the spring when you decide to keep the crop

Site & Rotation Considerations

Winter canola grows best on loam or sandy loam soils. Avoid planting winter canola in poorly drained soils and heavy clay soils since root heaving may occur. Canola is less tolerant to imperfect drainage than winter wheat. Sporadic problems in the past did occur with winter canola roots entering tile drains in Huron County and areas close to Lake Huron, but not elsewhere. The reasons for this are unclear. Winter canola is susceptible to sclerotinia stem rot (white mold). For this reason, it should not be grown in rotations of less than four years following soybeans, edible beans, canola, or tame mustard. Production of canola and tame mustard on the same farm should be avoided. Winter canola normally follows winter wheat in the rotation or a spring cereal crop. The early harvest of winter canola allows for timely winter wheat planting. Canola is sensitive to a number of herbicides, so it is important to observe herbicide crop rotation restrictions. This information can be found in publication 75, Guide to Weed Control and by referring to the manufacture's label. You will want to promote good healthy fall growth of the canola plant but growth should stop before the plant is ready to bolt or begin flowering. Winter canola can be controlled in a spring-seeded crop with tillage but may remain a volunteer in a no-till situation. Rotations should include effective methods of volunteer control. Winter canola should not be located in areas (i.e. within 5 km) where rutabagas are grown because both crops are hosts for turnip mosaic virus. Serious crop losses have occurred in rutabagas from this disease

Variety

There are two registered varieties of winter canola *Kronos* and *Baldur*. Only *Kronos* is currently available and is distributed by C&M Seeds. Both varieties are hybrids developed in Europe. The Ontario Oil and Protein Seed Crop Committee provided the information needed for the licensing and importation of the hybrid variety *Kronos* through the Variety Performance Trials (Table 1). *Kronos* displays improved early season vigour, improved winter survival, and improved blackleg tolerance compared to

older open-pollinated types previously grown. Only import and plant seed carrying a phytosanitary certificate requiring the canola seed to be free of blackleg. In the past import of seed carrying blackleg, caused serious crop losses. Blackleg is a serious disease of canola that can be seed or soil borne.

Name	Yield (kg/ha)	Yield (kg/ac)	Percent Yield Over Check
Arctic (check)	2253	912	
Baldur (hybrid)	2674	1082	119
Kronos (hybrid)	2938	1189	130

Note: Arctic is no longer available and was the standard variety (open pollinated) previously grown.

Seedbed Preparation

Winter canola, like spring canola, responds to excellent seed to soil contact. You want to provide a level, firm, slightly lumpy seedbed with moisture within 2.5 cm (1”) of the surface. Canola is very susceptible to soil crusting. A lumpy soil will not crust as badly after heavy rains as a pulverized soil. The lumps will help to protect the tiny seedlings. If the soil is too dry, wait for moisture. Also don’t plant when the soil is wet, especially on heavier soils. Limit tillage to the minimum required to prepare an adequate seedbed. Management of residue begins with harvest of the cereal crop. Use chaff spreader on the combine, and minimize straw piles. Tillage should ensure good distribution of residue, for achieving good seed to soil contact.

Planting Date

You want a large healthy plant going into the winter that has not bolted. Plants overwinter as rosettes and bolt early the next spring. In southwestern Ontario (Essex and Kent) counties August 25th to September 10 is the ideal. In all other areas aim for August 15 to September 1. Winter canola has a taproot much like alfalfa. The plant has to grow, photosynthesize and accumulate enough sugar reserves in the root to allow it to overwinter. Planting too early, particularly with good growing conditions, can cause stem elongation before winter, which decreases survival. Ideally, plants will have 6 to 8 leaves and a taproot the size of a pencil before a killing frost occurs.

Planting Depth

Plant just deep enough so there will still be enough moisture for germination. A depth of ½-¾ inch (1 –2 cm) is ideal. Packing before planting helps firm the ground to control planting depth and reduce soil moisture loss; packing afterwards will help emergence by bringing moisture up to the surface. If you have packer wheels on the drill, set them firmly and leave the soil between the rows loose to discourage weed germination.

Planting Equipment

Stand establishment has been the most consistent when some tillage is involved. No-till is a very attractive option for planting winter canola but it is more difficult to make it work. Even a minimum of tillage such as the tillage from residue coulters on the drill

appears to help. Slugs can be a significant problem in no-till stands. No registered controls for slugs are available. When no-tilling into cereal residue, the straw must be removed, and chaff spread evenly. Coulters should cut residue cleanly and be set shallow to keep the seed opener from placing seed too deep.

Broadcasting the seed can be effective if the ground is properly prepared, packed before and after broadcasting and the moisture is adequate. Seed can be planted directly through a grain drill or through the small seed box. Metering the seed at the proper rate will be the most important part of the package and will determine what you can use.

Seeding Rate

Seeding rates of 3.5 -4 lbs.(1.4 –1.8 kg) per acre are adequate for a good stand. Accuracy of delivering this rate is difficult but cost effective given the price of seed. Higher seeding rates can result in smaller, spindly plants that are less able to survive the winter. The variety Kronos contains approximately 113,400 seeds per pound, which is equal to 453,600 seeds/ acre at 4 lb seeding rate. Based on final plant stand of 80% of seeding rate can result in a stand of 7.5 - 8 plants/square foot. Seed can be “bulked up” by mixing it with MAP (monoammonium phosphate), corn cob grits, or elemental sulphur . Other fertilizer types should not be used, because they have a much higher salt index increasing the risk of fertilizer injury. . These products must have a flow rate similar to the canola seed to be effective.

Fertilizer

The fall fertility program is very similar to winter wheat. Use a soil test to determine your rate. In general, 50 units of phosphate and 40 units of potash are used at seeding. Nitrogen and potash materials should not be placed in direct contact with the seeds but should be broadcast or applied in a band at least 2 inches away from the seed. There is some research to indicate that up to 30 units of nitrogen can be used in the fall to stimulate growth. This is especially effective on late plantings, very sandy soils, if cool weather results in slow growth, or if cereal residue will tie up available soil N. Attention must be paid to the type of fertilizer used and to its placement so that the seedlings do not experience fertilizer burn. The rate of nitrogen fertilizer placed with the seed must not exceed 11 kg/ha (10 lb/ha). Place only superphosphate or monoammonium phosphate with the seed. The rate for spring application of nitrogen is based on the expected yield and on the price ratio between canola and nitrogen fertilizer (Table 2). Canola is a large user of sulphur, but Ontario research results have not shown a consistent response to this nutrient.

Table 2. Spring Nitrogen Requirements for Winter Canola

Price Ratio ¹ (\$/kg N:\$/kg canola)	Expected Yield ² t/ha		
	2	3	4
3.3	125	170	195
2.5 ³	160	195	210
2.0	180	210	220

¹ To use this table, the price of canola must be known or estimated. Canola at \$350/t and nitrogen at \$0.65/kg results in a price ratio of 1.9 (0.65 ÷ 0.35). At these prices and an expected yield of 3.0 t/ha, you should use 210 kg/ha of nitrogen.

² 1 t/ha = 893 lb/ac

³ The highlighted area represents the most appropriate ratio at time of printing.

Sulphur.

Canola utilizes more sulphur than other crops, and on occasion sulphur deficiency has occurred. Sulphur is highly mobile in the soil, so deficiencies occur most often on sandy soils, low organic matter soils (< 2%) , shallow soils and where soil conditions may limit root growth (e.g. compacted areas). In these situations, the most economical method of supplying sufficient sulphur (20 – 30 lbs/ac) is by using ammonium sulphate as the nitrogen source. Very dry weather conditions in 2005 were also associated with more instances of visible sulphur deficiency.

Herbicides

Annual weeds will not be a problem with the August planting. Once established, canola is a good competitor with most weeds. Fields must be free of twitch grass. Volunteer cereals need to be controlled in the fall to reduce competition and keep harvested canola free of cereal grain. Volunteer cereals attract aphids, which can transmit turnip mosaic virus to canola. Canola is extremely sensitive to drift from most broadleaf herbicides such as 2,4-D, MCPA, dicamba, glyphosate, and certain sulfonylurea herbicides (e.g. Pursuit). Precautions must be taken to ensure proper sprayer tank cleanout and avoiding the drift of these herbicides to canola fields.

Insect & Disease Management

Further information on insects and diseases affecting canola can be found in OMAFRA publication Agronomy guide or OMAFRA or Canola Council Council website links listed at the end of this guide. Refer to OMAFRA publication 'Field Crop Protection Guide' for product control recommendations and the product label for specific information. Canola updates and information are also available on the Ontario Canola Growers website.

Insect Problems

Fleabeetle is not as severe a problem in winter canola as in spring canola. Seed treatments give adequate control. Fields should be monitored but damage will generally be insignificant where a seed applied insecticide is used.

Cabbage Seedpod Weevil (CSW) is a much more serious concern. The population has increased dramatically since 2001. Yield losses can be significant if not controlled. Winter canola and early planted spring canola are at the greatest risk of damage from CSW. In the spring, adults emerge from their overwintering sites (shelterbelts, leaf litter, fencerows and ditch banks) when air temperatures reach 18⁰ C. These newly emerged adults move into winter canola and areas containing other host plants such as wild mustard. After feeding briefly and mating, the female then lays her eggs, typically one per pod, directly into the seedpod itself. The larvae hatch within approximately one week and cause the most damage as they feed on the seeds. Seeds are consumed, pods are susceptible to shatter and diseases can enter more easily through the damaged seeds and pods. Once mature, the larvae mine out of the pod, drop to the ground and pupate in the soil. Adults emerge from the soil 10 days later to feed on cruciferous plants until it is time to enter their overwintering sites

How do you scout for them?

Adult weevils can be seen feeding on the upper flower bud clusters. Pods, flower petals, and buds may also have small visible holes. Punctures become more noticeable with time as the tissue around the hole deteriorates or becomes infected with other pathogens. Pods may also appear bent or distorted from the larva developing within.

Scouting should be focused on monitoring the adult population before they lay their eggs inside the pod. Insecticides can not penetrate the pods to control the feeding larvae. A sweep net is best used for sampling to determine population numbers. Begin sweeping when the crop enters the bud stage through until after flowering. Take 10 sweeps in 10 locations of the field and determine the average number of adult weevils per sweep.

What are the thresholds?

No thresholds have been established for Ontario yet however, in other jurisdictions with similar yield potential as Ontario, thresholds are 2-4 adults/sweep. Spraying should be timed to when the crop is in the 10 to 20% bloom stage (2-4 days after flowering starts) to control adult weevils before they can lay eggs.

Control

Timing of control is when weevils reach threshold numbers which generally is at early flower (10 – 30% bloom), since the weevils are attracted to the yellow flowers. Matador is the only product currently registered for CSW. The insecticide will not control the larvae within the pod and must be applied before egg laying. Experience the last several years has been that control last 7 – 10 days. Re-application may be required if threshold numbers are reached again. See product label for further details and restrictions. Continue to monitor both your winter and spring canola to ensure that this pest does not affect your yield this year.

Diseases

Sclerotinia or White Mold can severely infect winter canola, as the crop grows very thick and dense. In moist conditions, an infection can cause economic damage. The disease starts from either overwintering fungus bodies (sclerotia) in the soil or by wind blown spores from nearby infected fields. Soil moisture near the surface for several days before or at flowering, initiates spore production. Initial infection occurs from spores that spread upwards in the crop canopy to infect fallen flower petals that land on stems. These flower petals serve as a food source for the disease. A few days of showers, heavy dew or dampness in the crop canopy during bloom set the stage for an outbreak. Fields with a heavy crop canopy or sheltered from drying winds will be at greater risk. Treatment with a fungicide may be advisable when conditions favour white mould, but the fungicide must be applied before symptoms appear. The most effective fungicides for control are Ronilan and Lance (new in 2004). Both are BASF products, and each has its advantages (Table 1)

Appearance: Initial infections begin with a soft watery rot on leaves and stem, followed by a white fungal growth. Eventually the plant wilt and dies, and stems appear bleach coloured. The disease also affects soybeans, edible beans, and sunflowers. Rotation of at least 4 years with non-host crops can help to reduce the severity. In areas where the disease is widespread, crop rotation is not enough to control it.

Table 1.

	Ronilan DF	Lance WAG
Mode of Action	§ Contact § Through coverage of plant parts <i>important</i> § Some 'kickback' to control infections 36 hours prior	§ 'locally systemic' - quickly moves into and through the leaf to protect both leaf surfaces § Thorough coverage of plant parts important § No kickback. Must be applied prior to infection.
Timing of Application	1 spray – 20 to 50 % bloom 2 sprays – 20 to 30% bloom (1 st application) - 50% bloom (2 nd application, 7-14 days later)	1 spray – 20 to 50% bloom 2 nd application (as needed) – 7-14 days later, 50% bloom
Suggested Retail Costs *	Low rate: \$20/acre High Rate: \$27/acre	One rate: \$22.50 * * discounts may apply

Turnip mosaic virus (TuMV)

Turnip mosaic virus can be a problem in canola, especially in areas where rutabagas are grown. The disease is transmitted to canola in the fall by several species of aphids that migrate from other host crops. The disease causes leaf mottling (yellow or light green areas surrounded by normal green colour) and wrinkling or puckering of the leaf tissue between the veins. Spring growth is slow. Severely infected plants are stunted, twisted and generally light green or yellow in colour. Pods are distorted and a significant proportion of the seeds are poorly filled. The disease appears to be more severe in areas where other cruciferous crops are grown and in fields where pressure from weeds and volunteer cereals is high. Volunteer crops of winter canola often have high levels of TuMV infections.

Harvest

Almost all the winter canola grown is direct harvested. The crop is quite shatter resistant and easier to handle with a direct cut head rather than swathing. Manuals will detail how to set up the combines for best seed harvest. Be sure that your machine is capable of handling the volume of this crop. Canola may drop quickly in moisture in the field once it nears harvest moisture. A drop of 1% an hour is not uncommon

Storage and Marketing

Traditionally canola moves directly to market from the combine. There is one canola crushing facility in Ontario, ADM at Windsor. Marketing to ADM is arranged through designated elevators. Seed moisture must be 10% or less for delivery. Marketing may also be possible on the open market. One such possible market is P & H Inc., Owen Sound. . .

Crop Insurance

Winterkill coverage is available in most counties for winter canola through Agricorp. There is a reseeding benefit. Winter canola will be grouped with spring canola for yield averages. Production insurance will also be available for counties outside of the winterkill coverage zones.

Publications

Insect & Pest Management

OMAFRA Publication

- Agronomy Guide

- Field Crop Protection Guide

Internet Web Sites

OMAFRA : <http://www.gov.on.ca/OMAFRA/english/index.html>

OMAFRA Crop Pest: - published weekly during the growing season

- <http://www.gov.on.ca/OMAFRA/english/crops/field/news/index.html>

Canola Council of Canada: <http://www.canola-council.org/>

Ontario Canola Growers: <http://www.ontariocanolagrowers.ca>

Contacts

Brian Hall
Canola & Edible Beans Specialist
OMAFRA
581 Huron St.
Stratford, Ont. N5A 5T8
Phone: 519-271-0083
Fax: 273-5278
Email : brian.hall@omaf.gov.on.ca

Ontario Canola Growers
Box 463
206 Toronto St S.
Markdale, Ont
N0C 1H0
Phone: 519 986-3469
Email: info@ontariocanolagrowers.ca

C& M Seeds
RR 3 Palmerston, N0G 2P0
Telephone: 519 – 343-2126
Toll Free 888 – 733-9432
Internet: www.redwheat.com