canola council

Canola Disease Scouting & Risk Assessment Card

Effective and economical management of diseases like sclerotinia stem rot in canola often requires decisive action prior to symptom development, making accurate assessments of potential disease risk in each field very important. The goal of this card is to help improve the accuracy of these risk assessments through better understanding of risk factors and improved identification of spore producing structures and late season infections. Better risk assessment will help ensure that fungicides are applied only when the likelihood of a positive economic return is high. Accurate identification and records of diseases present, including the percent infection and severity of symptoms, will help growers better prioritize their disease management based on the prevalence in their fields.

1 Sclerotinia Disease Cycle

What are sclerotia? Sclerotia are hard black fungal resting bodies up to 2 cm (0.8") long. They can remain dormant in soil for up to 5 years or more.

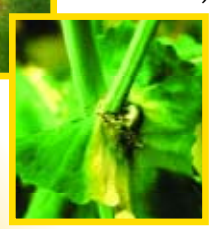
Sclerotia overwinter in soil and on canola residue. Sclerotia germinate to produce apothecia during subsequent growing seasons (see section 3). Ascospores are released from apothecia and dispersed by the wind.

Infection leads to premature ripening and stems become bleached, brittle and will easily shred to reveal sclerotia forming in stem cavities.

Lesions progress up and down stems

Early infection appears as a soft grayish white rot, and affected leaves wilt. Infection penetrates into stems.

These moist conditions allow infections to begin.



Infected petals collect in high moisture areas (e.g. on leaves or in leaf axils).

Spores land on petals then germinate and feed on them as they decay. Dying petals drop into the canopy.

Early flowering is the best time for risk assessment. Fungicides must be applied between early and full bloom, prior to petal drop.

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2 Assessing the Risk for Sclerotinia Stem Rot in Canola

Sclerotinia incidence can vary greatly among fields and years, making scheduled spraying of fungicides unprofitable. However, when sclerotinia risk is high, preventative fungicide applications can effectively lower disease severity and improve yield. Assessment of disease risk within each field is essential to improve the odds that fungicides are only applied when it is economical to do so.

This checklist developed in Sweden can be useful in helping to assess disease risk in fields. Growers should fill out the checklist for each field shortly after first flower (when 75% of the canola plants have at least 3 open flowers). The greater the risk score for a field the higher the probability of a positive economic return. Results in Sweden have suggested that fields scoring 40 or higher will likely benefit from a fungicide, but this may vary a bit depending on fungicide cost and commodity price. Using this checklist effectively requires scouting for apothecia, usually in nearby cereal crops following canola or other host crops (e.g. beans, sunflowers) in the rotation. The same moist soil conditions conducive to apothecia production can also favour the development of many other types of mushrooms or fruiting bodies. Accurate identification of apothecia is critical to effectively determine the risk of stem rot (see sections 3 and 4).

What are apothecia? Apothecia are small fruiting structures that look like tiny mushrooms germinating from sclerotia. They are slightly cupped (similar to the top of a golf tee) with a diameter of between 5 and 15 mm (0.2" to 0.6"), with a stalk no more than 50 mm (2") long that is mostly below ground. The apothecia release many spores, called ascospores, which are the infectious agents of the fungus (see Section 1). Emergence of large numbers of apothecia at or just prior to the early bloom stage will increase potential for petal infection.

Petal testing (developed by the University of Saskatchewan and available from Discovery Seed Labs at time of publication) throughout the flowering period can also provide additional information regarding the proportion of petals that are actually infested with spores of sclerotinia, which can be correlated with risk of sclerotinia development. However, the test is a snap shot of infection when the petals were collected and subsequent disease development in the crop is strongly influenced by weather conditions, particularly precipitation and relative humidity.

Something else that may affect the risk profile of a field is the genetics that have been chosen. Research has shown that there is a correlation between lodging and sclerotinia levels, and susceptibility to lodging can be related to genetics. As well, the introduction of varieties with some tolerance to sclerotinia into the marketplace offers an additional management tool that may reduce the risk in fields where they are grown.

Sclerotinia Stem Rot Checklist

(For each risk factor, circle the risk points that apply to your field).

RISK FACTOR	POSSIBLE ANSWERS	RISK POINTS
NUMBER OF YEARS SINCE LAST CANOLA CROP	More than six years	0
	Three to six years	5
	One to two years	10
DISEASE INCIDENCE IN LAST HOST CROP	None	0
	Low (1 to 10%)	5
	Moderate (11 to 30%)	10
	High (31 to 100%)	15
CROP DENSITY	Low	0
	Normal	5
	High	10
RAIN IN THE LAST TWO WEEKS	Less than 10 mm (0.4")	0
	10 to 30 mm (0.4 to 1.2")	5
	More than 30 mm (1.2")	10
WEATHER FORECAST	High pressure	0
	Variable	10
	Low pressure	15
REGIONAL RISK FOR APOTHECIA DEVELOPMENT	None found	0
	Low numbers	10
	High numbers	15

TOTAL RISK POINTS FOR ALL RISK FACTORS =

❸ Examples of Apothecia of the Sclerotinia Fungus

Only apothecia produced from sclerotia of the stem rot fungus *(Sclerotinia sclerotiorum)* produce the ascospores that can infect the canola petals, increasing sclerotinia risk and the potential need for fungicide application.

Typical apothecia of *Sclerotinia sclerotiorum*

The cups or top parts of apothecia seldom protrude much above the soil surface.

Apothecia of sclerotinia stem rot will always germinate from sclerotia. If mushrooms are growing from canola residue, check for sclerotia inside infected plant tissue or gently dig apothecia from the soil to try to find the sclerotia.

Apothecia do not always appear perfectly round, particularly if they are growing close together or against crop debris. Apothecia tend to be honey-coloured, ranging from light tan to dark brown depending on their age.

❹ Examples of Other Fungal Fruiting Bodies *That **Are Not** Apothecia of the Sclerotinia Fungus*

The spores produced from these fungi do not contribute to increased sclerotinia risk.

Other fungal structures or mushrooms are often produced by saprophytic fungi, meaning that they survive on decaying crop residue. The tiny mushrooms on this wheat stalk (picture at left) are only 1 to 2 mm in diameter, while apothecia are typically 5 to 15 mm across.

Mushrooms of bird's nest fungus are often abundant in wet conditions, but differ considerably from apothecia *(circled here)*.

Above the soil surface the stalks of apothecia tend to be short, so mushrooms with stalks that extend above the soil surface (e.g. 25 mm or more) are unlikely to be apothecia of sclerotinia.

Mushrooms with rounded tops or bright colours are not likely apothecia of the sclerotinia fungus.

❺ Late Season Scouting *Other Diseases That Cause Premature Ripening*

Late season field scouting enables growers to record the percentage of canola plants infected and the severity of disease symptoms. This data can then be used to assess the success of past management decisions as well as potential future benefits of various IPM techniques (e.g. varietal resistance, crop rotation), provided the diseases are accurately identified. These are some diseases other than sclerotinia that can cause premature ripening.

Blackleg lesions can occur on leaves, but it is the basal stem cankers that can girdle the stems. This can lead to premature ripening and plant death, followed by bleaching of the plant in the sun. Look for small black pycnidia (slightly raised spots) embedded in the lesions to confirm the problem is blackleg. Rising levels of blackleg in fields over time may indicate the need for selection of varieties with greater genetic resistance and/or lengthened crop rotations.

Fusarium wilt is another fungal disease that can cause premature wilting and death of plants. The fungus attacks the vascular tissue of stems causing yellow or reddish-brown streaking followed by chlorosis and necrosis, resulting in premature dessication and poor seed set. This often occurs on only one half of affected stems, or on individual branches.

Alternaria black spot causes small black lesions on canola pods, stems and leaves. It does not typically cause premature plant death. However, it can cause desiccation of pods, predisposing them to shattering. As a result, crops with significant alternaria are not good candidates for delayed swathing or straight cutting.

Clubroot is a disease characterized by the creation of galls on the canola roots that severely hinder the ability of plants to take up moisture and nutrients, causing wilting and premature plant death. Bleaching of stems and deterioration of the galls then follows (picture at right). For more information regarding prevention and management of clubroot check out the website at www.clubroot.ca.

Photos and assistance supplied by - Dr. Kelly Turkington and Dr. Randy Kutcher, Agriculture and Agri-Food Canada; Murray Hartman, Alberta Agriculture and Rural Development; Canola Council of Canada Agronomists; David Kaminski, Manitoba Agriculture, Food and Rural Initiatives; Penny Pearse, Saskatchewan Ministry of Agriculture.

For more information on managing diseases in canola, contact the Canola Council of Canada:
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Contact our agronomy specialists at: http://www.canolacouncil.org/grow_canola_find_us.aspx

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