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UNDERSTANDING BLACKLEG RESISTANCE

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SaskCanola Saskatchewan Canola Development Commission

Manitoba Canola Growers

BLACKLEG RESISTANCE AND CLASSIFICATION

Blackleg resistant canola varieties have been a key tool to help manage this disease since their introduction in the early 1990s. However, blackleg pathogens continue to evolve and, in some areas, are overcoming the effectiveness of current blackleg resistance genes.

New resistance genes and two-part labels will help growers identify which resistance groups may be best suited for the current pathogen population in each of their fields - improving the ability to manage blackleg and increasing the longevity of blackleg resistance.

Blackleg resistance is a valuable resource that must be used judiciously in an integrated management approach, which includes practicing a diverse crop rotation with at least two years between canola crops, effectively managing weeds, and proper scouting/identification of canola diseases.

WHAT SHOULD YOU DO?

For proper management, an integrated management approach **MUST** be incorporated.

To prevent or manage canola fields severely infected by blackleg (resulting in yield loss), the following management practices should be strongly considered:

- Practice a diverse crop rotation with at least two years between canola crops
- Scout for the disease across fields
- Grow canola varieties with a Resistant (R) or Moderately Resistant (MR) field rating
- Use a different resistance group or source to target the blackleg races within the field
- Consider an early season fungicide application
- Manage Brassica weeds and volunteer canola, which can host the pathogen

WHAT TO LOOK FOR?


Pseudothecia on canola residue (fall/spring)


Leaf lesions with pycnidia (visible in crop)


Blackened stem tissue (clip prior to harvest)


Stem cankering (visible in crop)

BLACKLEG RESISTANCE CLASSIFICATION

FIELD RESISTANCE RATING

Individual canola breeding companies substantiate their blackleg resistance claims to the Canadian Food Inspection Agency through standard testing procedures outlined by the Western Canada Canola/ Rapeseed Recommending Committee guidelines to obtain blackleg resistance field ratings.

Varieties are compared to the susceptible check variety (Westar) for blackleg infection and are assigned ratings as follows:

FIELD RESISTANCE RATING	% DISEASE SEVERITY OF WESTAR
R (Resistant)	0-29.9
MR (Moderately Resistant)	30-49.9
MS (Moderately Susceptible)	50-69.9
S (Susceptible)	70-100

MAJOR GENE RESISTANCE IDENTIFICATION

Major gene resistance labels are also being introduced for more detailed blackleg resistance identification. These labels are voluntary for seed developers to apply to their varieties. Major gene resistance has been categorized into alphabetized groups based on their interactions with the pathogen and other major genes. Ten resistance groups have been created to provide growers with additional information when deciding on their next variety to use while managing severe blackleg fields.

RESISTANCE GROUP	MAJOR RESISTANCE GENE*
A	Rlm1 or LepR3
B	Rlm2
C	Rlm3
D	LepR1
E_1	Rlm4
E_2	Rlm7
F	Rlm9
G	RlmS
H	LepR2
X	unknown

* Major resistance gene groups are subject to change.

EXAMPLE OF A BLACKLEG RESISTANCE TWO-PART LABEL

FORMS OF BLACKLEG RESISTANCE WITHIN VARIETIES

There are two main forms of blackleg resistance found within Canadian canola varieties:

- **Major Gene Resistance:** the major resistance gene, in the plant, needs to match with specific genes in the race of *Leptosphaeria maculans* for the defense response in the plant to be induced. It is a less stable form of resistance if there are many races, but it allows for complete blackleg control when matched with a specific *L. maculans* race.
- **Minor Gene (Quantitative) Resistance:** the resistance genes in the plant help to reduce the severity of infection of all *L. maculans* races within the field by slowing the pathogen as it moves into or down the plant stem. It is a stable form of resistance but does not provide complete blackleg control.

Due to the complexity of minor gene resistance there is no simple way to measure it (at this time), but its performance is captured within the field resistance rating. Major genes are readily identified within a variety and can be communicated using the major gene resistance label.

BE SURE TO DIFFERENTIATE BETWEEN THESE PLANT DISEASES:

Sclerotinia Stem Rot

Verticillium Stripe

Grey Stem

Blackleg

For more information on blackleg, such as prevention strategies and scouting, please go to **blackleg.ca**

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To contact your local Canola Council of Canada agronomy specialist, visit **canolacouncil.org** or call **1-866-834-4378**.

2018

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