



PRODUCTION

Blackleg - A Disease of Canola

January 2009

Blackleg is a serious disease of canola that can result in significant yield loss in susceptible varieties. It is caused by the fungus *Leptosphaeria maculans*. A highly virulent strain of the blackleg fungus was first detected in Saskatchewan in 1975 and has since become widespread throughout the canola growing areas of the province.

Canola disease field surveys are conducted annually in the main canola production regions of Saskatchewan. Disease surveys from recent years indicate that blackleg is commonly found in 35 to 55 per cent of crops surveyed. Average disease incidence values (percentage of plants showing blackleg symptoms) are typically one per cent for basal stem cankers and three per cent for lesions occurring elsewhere on the stem. Lesions occurring elsewhere on the stem will have less impact on seed yield and quality than will basal stem cankers. The highest incidence values are often observed in crops that had received hail damage.

For additional information on the canola disease survey and other crop disease surveys, please visit the Canadian Phytopathological Society's website.

As is indicated in the disease surveys, it is not unusual to observe blackleg symptoms in canola crops, even when resistant varieties are being grown. However, to prevent blackleg from negatively impacting seed yield and quality, it is important to be familiar with blackleg symptoms, the disease cycle, and disease management practices.

Symptoms of Blackleg

Blackleg infections may occur on cotyledons, leaves, stems and pods. The plant is susceptible to blackleg infection from the seedling to pod-set stages. Lesions occurring on the leaves are dirty white and are round to irregularly shaped (Figure 1).



Figure 1. Canola seedling infected with blackleg.



Figure 2. Blackleg stem lesion on adult plant.

On stems, blackleg lesions can be quite variable, but are usually found at the base of the stem, or at points of leaf attachment. Stem lesions may be up to several inches in length, and are usually white or grey with a dark border (Figure 2). Stem lesions may also appear as a general blackening at the base. Severe infection usually results in a dry rot or canker at the base of the stem. The stem becomes girdled and, as plants ripen prematurely, the crop is more likely to lodge. Seed may be shrivelled and pods shatter easily at harvest, resulting in seed loss.

Blackleg lesions are usually dotted with numerous small, black pycnidia, which are the spore-bearing structures of the fungus. Pycnidia appear as tiny round specks, which may be seen more easily with the aid of a hand lens.

Blackleg Disease Cycle

The blackleg fungus can overwinter on infected canola residue and in infected seed (Figure 3). In the spring, the fungus produces fruiting bodies, called pseudothecia, on infected canola residue. Small microscopic spores, called ascospores, are released from the pseudothecia and become airborne, resulting in long distance dispersal of the disease to newly planted canola crops. Ascospore release can begin as early as May, causing leaf lesions from the seedling stage onward. The earlier the infection occurs, the greater the likelihood of basal stem canker development and more severe yield loss. Pseudothecia may continue to be produced on infected residue for two more years, or until the infected residue breaks down.

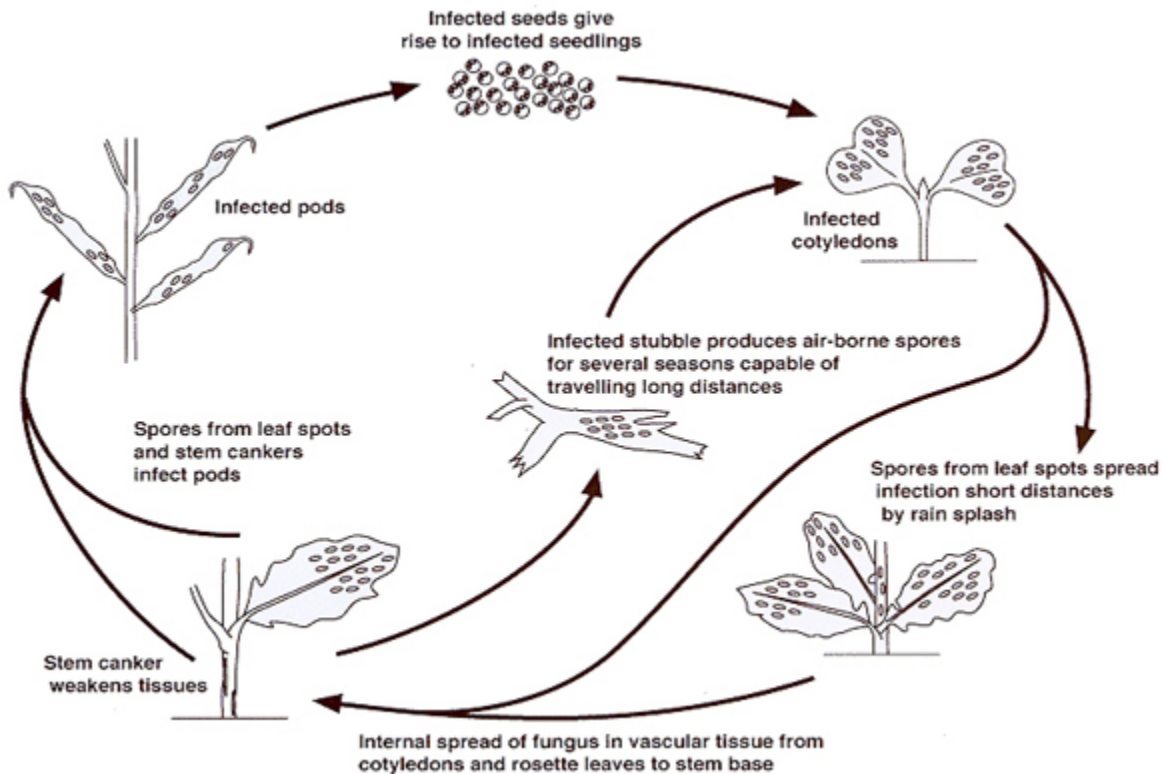


Figure 3. Blackleg Disease Cycle. Diagram courtesy of Department of Biology, University of Saskatchewan.

During the growing season, the blackleg fungus produces another type of fruiting body called a pycnidium (plural: pycnidia), which exudes conidia. These spores are spread short distances by rain splash and cause secondary infection within a crop. These secondary lesions are of less consequence to the crop and are commonly observed in fields that received injury from hail damage. (Figure 4)

Seedling infection may arise from infected seed or from airborne spores. Plants infected at this stage may be lost or stunted. Seed treatment will help prevent the spread of blackleg from infected seed to seedling, but will not protect the seedlings from infection by airborne spores. Once leaves are infected, the fungus can move systemically in the plant's vascular tissue to the stem base. Wounded stems may be infected directly.

Infection before the six-leaf stage is usually associated with serious yield loss. Stem lesions girdle the stem base, preventing the flow of water up the stem and often result in lodging of the crop. Infections initiated beyond the six-leaf stage cause less damage. Pod infection can result in infected seed, which serves as another source of inoculum for future infestation.



Figure 4. Hail damaged canola infected with blackleg. Source Saskatchewan Agriculture.

Control Measures

Identify the Disease

It is necessary to accurately identify the disease before implementing a costly fungicide application. There are other pathogenic and abiotic diseases that can be confused with blackleg. If uncertain, have the disease confirmed by submitting a sample to Saskatchewan Ministry of Agriculture, Crop Protection Laboratory.

Crop Rotation

Crop rotation allows for the decomposition of infected canola residue. Canola should not be seeded in canola stubble or adjacent to canola stubble that has had infected plants during the previous three years.

Weed Control

Wild mustard and volunteer canola can maintain the disease from year to year. Good weed control in the non-canola years will help break the disease cycle.

Seed Treatment

Plant seed that has been tested at an accredited laboratory and determined to be free of virulent strains of blackleg, and/or use a seed treatment. Seed treatments are also beneficial for other seed- and soil-borne diseases, as well as for flea beetle control. For more information on registered canola seed treatments, refer to Saskatchewan Ministry of Agriculture, Guide to Crop Protection.

Foliar Fungicide

A foliar fungicide may be warranted if blackleg symptoms are easily observed at the seedling and rosette stages or if a susceptible variety is being grown. Refer to product labels for information on timing and application of foliar fungicides.

Crop Residue

Burial of infected canola residue has long been recommended as a practice to speed up the decomposition of canola residue and reduce disease inoculum. However, recent research has found that zero tillage does not increase the risk of blackleg as long as a crop rotation with cereals and pulses is maintained. The use of straw choppers during combining effectively reduces straw size and spreads the straw over the soil surface, which will aid decomposition.

Resistance

A high level of resistance to blackleg is available in varieties of Argentine canola (*Brassica napus*), brown and oriental mustard (*B. juncea*) and yellow mustard (*Sinapis alba*). Almost all varieties of Polish canola (*B. rapa*) are susceptible or moderately susceptible to blackleg. For more information on specific canola variety disease ratings, see Saskatchewan Ministry of Agriculture, Varieties of Grain Crops.

Although all varieties of canola are resistant, or marginally resistant, to blackleg, new blackleg strains have been identified by researchers that potentially have evolved to breakdown this resistance over time.

Therefore, if you find a significant number of infected plants in your field it is important to notify the Agriculture Knowledge Centre at 1-866-457-2377.

For more information, contact:

Agriculture Knowledge Centre

Toll Free: 1-866-457-2377

E-mail: aginfo@gov.sk.ca

RELATED LINKS

- **Canola Production**
This publication provides essential information that can help establish and maintain a successful canola crop.
- **Guide to Crop Protection**
Guide to Crop Protection provides information on the use of herbicides, fungicides and insecticides for control of weeds, plant diseases and insects.
- **Varieties of Grain Crops**
Provides information on the relative yields for the different growing regions in the province and production information on the crops, including a list of seed distributors.
- **Canadian Phytopathological Society**
- **Canola Council of Canada web site**
- **Saskatchewan Canola Development Commission**
- **Crop Protection Laboratory Services**
- To provide diagnostic services in the areas of plant health, insects, weed control and herbicide resistance screening.