

# Is your canola at risk?

# CLUBROOT:

## A disease of canola and vegetables



Symptoms of clubroot include stunting, wilting, yellowing and premature ripening of canola plants (left), and the formation of galls on canola roots (right).

## Prevent Clubroot Spread in Saskatchewan!

- Plant canola no more than once every 4 years.
- Scout canola fields regularly and stay alert for suspicious stunting, wilting, yellowing and premature ripening.
- Check roots to confirm the presence of galls.
- Control cruciferous weeds and volunteer canola or mustard.
- Clean your equipment before moving it to another field: the disease is spread through movement of contaminated soil.



Saskatchewan  
Ministry of  
Agriculture

For more information, visit [www.clubroot.ca](http://www.clubroot.ca) or the Saskatchewan Agriculture website: [www.agriculture.gov.sk.ca](http://www.agriculture.gov.sk.ca).

If you have questions or suspect clubroot, call your local Regional Office or the Agriculture Knowledge Centre at 1-866-457-2377



# CLUBROOT OF CANOLA

## FACTSHEET

### CROPS

## Introduction

Clubroot is a soil-borne disease caused by a microbe, *Plasmodiophora brassicae*. Clubroot affects the roots of cruciferous field crops such as canola, mustard, camelina, oilseed radish, taramira and cruciferous vegetables such as arugula, broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, kale, kohlrabi, radish, rutabaga and turnip. Cruciferous weeds (such as stinkweed, shepherd's purse, wild mustard) can also serve as hosts.

## Symptoms

- Clubroot alters root hormone balance, increasing root cell division and growth, resulting in galls.
- Deformed roots are less able to absorb water and nutrients, leading to stunting, wilting, yellowing, premature ripening and seed shrivelling.
- The cause of suspicious above-ground symptoms can be confirmed by digging up plants to check roots for galls (see photo).
- Clubroot affects canola yield and quality to a similar degree as other diseases affecting water and nutrient uptake, and its impact depends on soil conditions and the growth stage of the crop when infection occurs.



**Clubroot galls on canola**

Photo: Canola Council of Canada



**Clubroot galls on canola**

Photo: Saskatchewan Agriculture

**Clubroot is of particular concern because the disease can cause devastating yield losses with limited control options. In areas where it has not yet occurred, clubroot is also of concern because the disease can spread through movement of soil contaminated with resting spores.**





## Spread of Clubroot

- Infected roots will eventually disintegrate, releasing resting spores into the soil that may then be transported by earth tag on agricultural or industrial field equipment, vehicles, tires, animals, and shoes, or transported by wind and water erosion, or through contaminated inputs such as manure.
- Resting spore numbers will decline over time when non-host crops are grown, but a small proportion can survive in soil for up to 20 years.
- Clubroot is primarily a soil-borne disease; it does not infect seed but it may be found in soil attached to seed or other plant parts.

		Level of Risk for Clubroot		
		Low		High
Importance of Risk Factor ↑ Very Important ↑ Important	↑	Good crop rotation with canola no more than once every 4 years.	Sometimes grow canola every 2 to 3 years.	Have grown canola 2 or more years in a row.
		Sanitation procedures are regularly followed.	Some sanitation procedures in place.	No sanitation procedures.
		You scout crops regularly for disease and have not seen clubroot symptoms.	You sometimes scout crops and investigate unusual symptoms.	You rarely scout crops or investigate unusual symptoms.
		Regardless of soil conditions, clubroot risk will be lowered with sanitation and good crop rotations.	Dry years may reduce disease High soil pH will not prevent clubroot.	Wet years may increase disease Low soil pH may increase clubroot.

**Clubroot is a declared pest in Saskatchewan under *The Pest Control Act*.**

## Best Practices for Prevention and Management (from The Clubroot Management Plan - [www.agriculture.gov.sk.ca](http://www.agriculture.gov.sk.ca))

- Plant susceptible crops, including resistant varieties, no more than once every four years. Crop rotation will restrict clubroot development by limiting the increase of clubroot resting spores and preventing the increase of clubroot inoculum. Clubroot resistant varieties may aid in reducing disease development and reducing the chances of clubroot establishing itself.
- Restrict movement of potentially contaminated soil on vehicles and equipment.
  - Cleaning steps may include removal of crop debris and soil and washing of equipment with a power washer using hot water or steam and misting with disinfectant (one to two per cent bleach), followed by an additional rinse with water.
- Scout crops regularly and carefully for plant diseases and signs of clubroot.
- Clubroot spores may survive livestock digestion. Avoid use of straw, hay, green feed, silage and manure from infested or suspect areas.
- The risk of spreading clubroot through contaminated seed or plant material is much lower than through transporting contaminated soil on field equipment and vehicles. However, avoid seed with earth tag from infested areas to prevent introduction to clean fields.

Scout canola fields regularly. Stay alert for suspicious stunting, wilting, yellowing and premature ripening. Check the roots for clubroot galls.



**Premature ripening of canola in Alberta**  
Photo: Saskatchewan Agriculture

### For more information:

- Visit the Saskatchewan Ministry of Agriculture website at [www.agriculture.gov.sk.ca](http://www.agriculture.gov.sk.ca); or
- Visit [www.clubroot.ca](http://www.clubroot.ca); or
- Contact the Agriculture Knowledge Centre at 1-866-457-2377 or e-mail [aginfo@gov.sk.ca](mailto:aginfo@gov.sk.ca); or
- Visit your local Regional Office.

Suspect samples can be submitted to:  
The Crop Protection Laboratory  
346 McDonald Street  
Regina, SK, S4N 6P6  
Phone: 1-306-787-8130  
(mail, courier or drop off samples in person)