

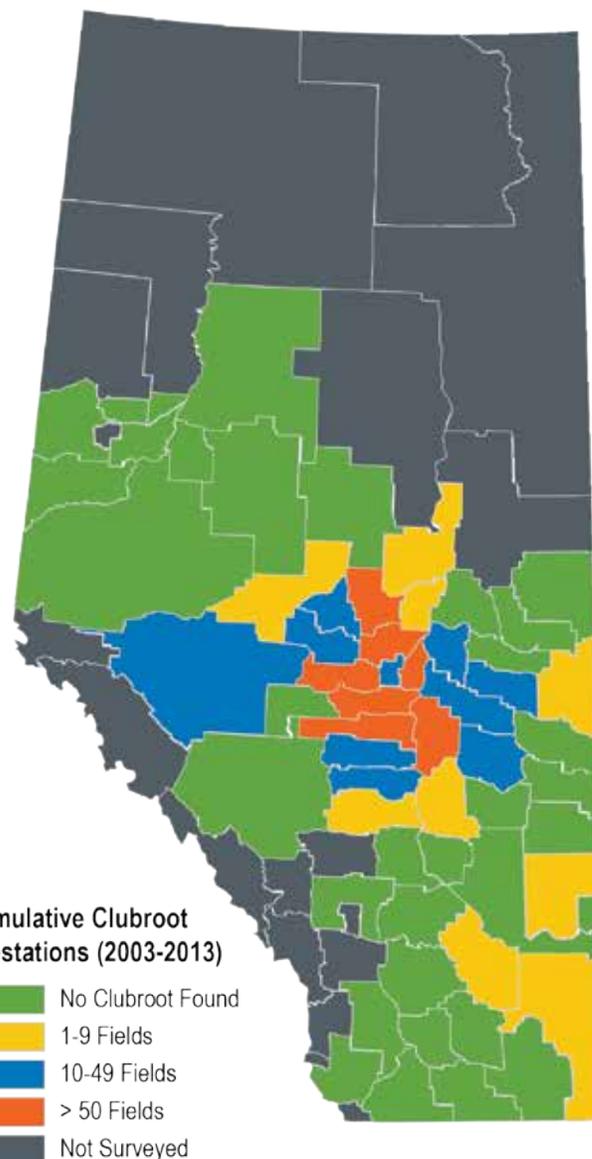
## Clubroot Disease of Canola – Western Canada Update

### Clubroot Infection and Spread

- Clubroot is a soil-borne disease of cruciferous crops and weeds and is caused by *Plasmodiophora brassicae*, a protist pathogen that induces gall formation on infected roots of susceptible plants.
- Infections occur when exudates from roots of host plants trigger germination of resting spores in the soil, producing zoospores. They swim in soil water to root hairs that they infect to start the formation of the root galls.
- The disease is favoured by warm soil (20-24° C), high soil moisture and low soil pH (< 6.5) but can still develop outside these optimum conditions.
- Clubroot is mainly spread through movement of soil containing the long-lived resting spores that are released into the soil when the galls decay.
- To estimate yield loss due to clubroot, take the percentage of infected plants in a field and divide by two (recognizing that losses > 50% can occur from extreme infestations). For example, if 50% of the plants are infected, a 25% yield loss would be estimated.

### Clubroot in Western Canada

- Clubroot was first reported in western Canada in canola fields in the Edmonton area in 2003. Since 2003, additional canola fields in Alberta have been identified with clubroot every year.
- In 2013, 459 fields were surveyed in Alberta for clubroot. 418 new cases of clubroot were found, bringing the total number of fields in Alberta with confirmed clubroot to 1,483 (>235,000 acres) (Strelkov et al., 2013).
- In 2008, one canola field was identified in Saskatchewan with spore concentrations sufficient to produce clubroot symptoms in plants.
- Recently, confirmation of clubroot symptoms were found in two Manitoba canola fields and one Saskatchewan commercial canola field. What this means is that growers in all three Prairie Provinces need to be vigilant with their scouting program and have in place a management strategy for this disease.
- Effectively managing any plant disease requires an understanding of how it survives within fields and the conditions that allow the population to increase and spread.



**The occurrence of clubroot on canola in Alberta in 2013 (Adapted from Strelkov et al., 2013)**

Source: Canola Council of Canada

## What Can You Do To Protect Your Crop From Clubroot?

### Early Identification

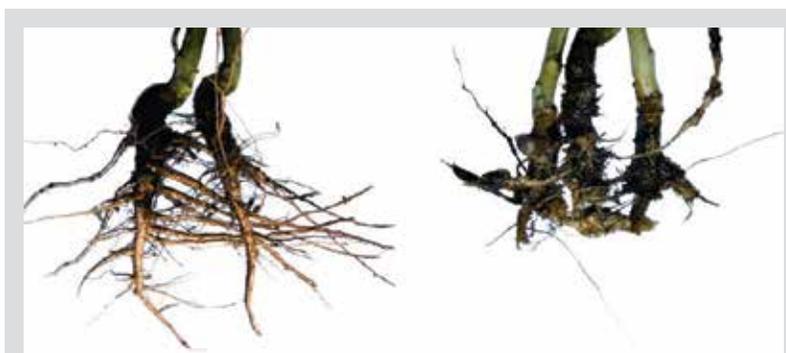
- Scout canola fields regularly from late rosette through podding, being sure to examine the roots of plants.
- High risk areas for clubroot include field entrances and low lying areas, but it could show up anywhere.

### Clean Your Equipment

- Cleaning equipment helps avoid the movement of soil from infested to non-infested fields.
- If you do not have clubroot on your farm, the greatest risk of infestation comes from equipment that was previously used for tillage or excavation off-farm.
- If you have found clubroot in some of your fields, sanitation when leaving those fields is critical to reduce spread throughout the rest of the farm.

### Grow Clubroot-Resistant Canola Hybrids

- Pioneer Protector® Clubroot resistance, as found in Pioneer® hybrid 45H29 (RR), provides multi-race resistance and a high level of resistance to the most prevalent race in Alberta (Race 3) as well as races 2, 5, 6 and 8.
- This effectively reduces incidence and severity of gall formation in affected fields, protecting yield and reducing the number of resting spores re-introduced into the soil.



The roots and stalk of clubroot resistant hybrid (left) are healthy and unaffected compared to the clubroot susceptible hybrid which exhibits the characteristic galls (right).

Photo Courtesy: Michael Raine, Western Producer, 2009

### Rotate to Non-Host Crops

- Tight canola rotations do not cause clubroot but can increase the rate of spore build-up once the disease is present in a field.
- They can also increase selection pressure for breakdown of resistance deployed in infested fields.
- Good weed management of alternate hosts is essential to maximize reduction in viable spore numbers between canola crops.

### Plan Your Strategy

- Clubroot can be managed effectively, but once it is present, it moves with soil regardless of the crop being grown.
- Manage infested patches separately to limit growth of host plants and equipment traffic, and develop a suitable rotation to maintain the effectiveness of available genetic resistance.

Strelkov et al., 2013. The Occurrence of Clubroot on Canola in Alberta in 2013. Internet: [www.2020seedlabs.ca](http://www.2020seedlabs.ca) Accessed: December 6, 2013

<sup>1</sup> Pioneer® brand products are provided subject to the terms and conditions of purchase which are part of the labeling and purchase documents.

<sup>2</sup> Product responses are variable and subject to a variety of environmental, disease and pest pressures. Individual results may vary.

<sup>3</sup> RR - Contains the Roundup Ready® gene. Roundup Ready® is a registered trademark used under license from Monsanto Company.

