

# WORRIED ABOUT NEW CLUBROOT PATHOTYPES IN YOUR CANOLA ACRES? Q&A

**READ ON FOR KEY TAKEAWAYS FROM OUR WEBINAR AND ANSWERS TO COMMON QUESTIONS.**

## **Q: WHAT ARE SOME SYMPTOMS OF CLUBROOT TO LOOK FOR IN YOUR FIELDS?**

**A:** Above ground – stunting, wilting, chlorosis/yellowing, bare patches.

Below ground – galls on roots. Galling can range from small nodules on accessory roots to large galls encompassing the entire root.

## **Q: WHAT DOES THE SPREAD OF CLUBROOT LOOK LIKE?**

**A:** Clubroot was first discovered in Alberta in 2003. As of 2020, there were 379 new confirmed infestations, including the first confirmed cases in Grande Prairie, Wheatland and Smoky River, for a total of 3,670 infested fields in the province.

## **Q: HOW HAVE CLUBROOT PATHOTYPES CHANGED SINCE FIRST DISCOVERED?**

**A:** The U of A has been monitoring pathotype composition from the start of the clubroot outbreak. Prior to 2013, pathotype 3H was predominant (90%) and was controllable by clubroot resistant canola. Since 2013, there has been a proliferation of ‘new’ pathotypes that can overcome traditional clubroot resistant canola.

## **Q: WHAT ARE THE PREDOMINANT PATHOTYPES IDENTIFIED IN THE PRAIRIES?**

- 3A (resistance breaking\*), found in Alberta and Manitoba
- 3D (resistance breaking\*), found in Alberta
- 3H, found in all provinces

**A:** New pathotypes continue to be found but are mostly confined to specific regions, giving us hope to control them early, before they spread.

\*Resistance breaking is the ability to overcome traditional clubroot resistant canola hybrids.

## **Q: HOW DO PATHOTYPE SHIFTS HAPPEN?**

**A:** Continuous cropping of canola hybrids with a single resistance source allows proliferation of ‘new’ pathotypes, resulting in a pathotype shift.

## **Q: WHY IS PATHOTYPING IMPORTANT?**

- A:** Identifying pathotypes can help to:
- Focus canola breeding efforts in developing hybrids that are resistant to new and predominant pathotypes.
  - Tailor management plans to protect crops and contain pathotypes.
  - Map clubroot areas to locate high-risk zones and trends in pathotype spread and establishment.

## **Q: OF THE 13 PATHOTYPES THAT CAN OVERCOME FIRST GENERATION CLUBROOT RESISTANCE, IS THERE ANY RESEARCH ON THE EFFICACY OF CURRENT COMMERCIAL HYBRIDS AGAINST THESE NEW PATHOTYPES?**

**A:** Yes, U of A is working on screening some current commercial cultivars, including second generation cultivars against newer pathotypes. It is still in the preliminary stages, but data will hopefully be shared in the next year or two.

## **Q: WHY DOES SASKATCHEWAN ONLY HAVE TWO IDENTIFIED PATHOTYPES COMPARED TO MANY MORE IN ALBERTA AND MANITOBA?**

**A:** It is not completely known but it may have to do with a delay of when Saskatchewan began scouting compared to Alberta, creating a smaller sample size. It could also be due to the soil types, climate and other combinations of factors.

## PROACTIVE CLUBROOT MANAGEMENT TIPS

1. Grow clubroot resistant hybrids, even before you see symptoms. There are hybrids that protect against predominant and new clubroot pathotypes. Genetic stewardship is VERY important to prolong the efficacy of CR hybrids on the market. This means:
  - Rotating sources of resistance.
  - Not relying only on genetic resistance.
  - Using genetic resistance as part of an integrated management strategy.All Pioneer Protector® canola hybrids come with a list of exactly which pathotypes it is resistant to.
2. Practice a 1 in 3 rotation out of clubroot host crops. Two years out of canola leads to a significant decrease in viable resting spores.
3. Practice soil stewardship by:
  - Preventing soil movement through knocking soil off equipment/boots/tools, wearing disposable boot covers or working in infested fields last.
  - Bio-sanitation using a 1-2% bleach solution to disinfect boots/tools/equipment and using boot dips or disinfection mats.
  - Knowing who is coming and going from your fields.
4. Control host weeds such as flixweed, stinkweed, shepherd's purse, volunteer canola, and wild mustard, around and in your fields, to decrease the amount of resting spores in soil. Pioneer Protector® clubroot resistant hybrids are available in all major herbicide segments.
5. Scout early and often. Look in hot spots or high-risk areas, such as field entrances. Drones can be a helpful scouting tool. Look for:
  - Bare patches;
  - Wilting;
  - Chlorosis;
  - Stunting;
  - And pull plants to look for galls.
6. Patch management. If you find small patches of infestation, you can manage them by:
  - Grassing to a non-host species;
  - Bait cropping;
  - Using soil amendments such as lime, biochar, soil fumigants\*\* and fungicides.

\*\*Soil fumigants will damage the crop where applied.

## Q: WHAT PH DOES SOIL NEED TO BE AT TO REDUCE FAVOURABLE CONDITIONS FOR CLUBROOT PATHOGENS?

**A:** Recent research from U of A has shown that a pH of 7.2-7.6 is the optimal range. Most soils tested in Alberta are in the 5 range (which are low pH soils), so it does require quite a significant change in pH (to a high pH range), which is a limiting factor of using lime in that large quantities are necessary. There are some ongoing improvements in lime production/formulation which will hopefully increase user-friendliness in the future.

## Q: ARE THERE ANY FUNGICIDES THAT ARE SHOWING PROMISE FOR CLUBROOT CONTROL? IS IT AN IN-FURROW APPLICATION OR SEED TREATMENT?

**A:** There are quite a few that have been tested so far with the main one being Ranman® as a seed drench option. It showed very good results in heavily infested fields, but it had less effect in low to moderate infestations.

## Q: IN TERMS OF LIMING AND FUNGICIDE, WHICH HAS SHOWN MORE PROMISE?

**A:** It depends on the situation. Fungicide has shown better results for heavy infestations but had no significance with low to moderate infestations, whereas liming was effective in all ranges of clubroot development.

## Q: DO PATHOTYPES DIFFER IN VIRULENCE?

**A:** There hasn't been much research on this, however, because 3A and 3D are so prolific and dominant, we suspect they are more virulent (ie. more able to infect canola and spread quicker).

## Q: IF YOU'RE GROWING A NON-HOST CROP SUCH AS WHEAT BETWEEN CANOLA, HOW MUCH SHOULD YOU BE FOCUSING ON CONTROLLING HOST WEEDS?

**A:** It's great to control host weeds proactively, especially in places such as field entrances, as they may be the "spark" to a clubroot infestation. If they can be controlled to low levels, you are reducing the potential for clubroot to enter your fields and spread. U of A is doing further research on this subject.

## Q: SHOULD GROWERS BE ROTATING CLUBROOT GENETICS?

**A:** Right now, only 45% of acres in Western Canada are growing any form of clubroot resistant hybrid so getting CR1 down first is a good choice to proactively prevent clubroot from occurring in places where susceptible varieties are being grown. It can be helpful to rotate to CR2 in places where CR1 has been grown a number of times or in areas that are experiencing a virulence shift.

## Q: WHAT PERCENTAGE OF CANOLA ACRES IN WESTERN CANADA ARE CURRENTLY BEING AFFECTED BY CLUBROOT?

**A:** Based on survey results, it's about 10% of canola cultivated acres in Alberta that have confirmed symptomatic cases. In Saskatchewan, it's about 1% and 1.5% in Manitoba of either confirmed clubroot symptoms or positive soil test results. However, surveys are limited, and results are likely an underestimate, so it's important to start prevention early by planting clubroot resistant canola hybrids on your farm.

## CORTEVA CLUBROOT UPDATE

**PIONEER HAS BEEN DEVELOPING CLUBROOT RESISTANT HYBRIDS FOR OVER 16 YEARS. THE GOAL OF THE CORTEVA AGRISCIENCE CANOLA BREEDING PROGRAM IS TO OFFER A 100% CLUBROOT RESISTANT CANOLA LINE-UP SO THAT IT BECOMES A STANDARD IN HYBRID DEVELOPMENT.**

### **Q: HOW ARE CLUBROOT RESISTANT CANOLA HYBRIDS DEVELOPED?**

**A:** It starts with identifying clubroot resistant sources and gearing testing towards predominant and new virulent pathotypes. The genetics are introduced into elite germplasm. Hybrids are then characterized against multiple clubroot pathotypes in the greenhouse and in the field to find the strongest contenders.

We characterize our material against pathotypes 3A, 3H and 3D as well as the original diversity of pathotypes found between 2003-2009 (2F, 5I, 6M, 8N). We are also increasing testing on some of our new clubroot genetic packages using a suite of clubroot pathotypes that are virulent on clubroot resistant canola such as 5X, 8P, 2B and 8E.

### **Q: HOW IS PIONEER PROMOTING STEWARDSHIP OF CLUBROOT GENETICS?**

**A:** With the new pathotype shifts being seen, we are progressing towards a rotational gene-stack strategy which will allow growers to rotate different Pioneer Protector® canola hybrids with different stacked sources of resistance. Stacked resistance is more durable and gene rotation helps prevent build-up of any one specific pathotype. Used in an integrated strategy, along with good crop rotation, we have the best chance of prolonging effectiveness of clubroot resistant genetics.

**TO LEARN MORE ABOUT PROACTIVE MANAGEMENT STRATEGIES AND PIONEER PROTECTOR® CLUBROOT HYBRIDS FOR YOUR FARM, CONTACT YOUR PIONEER SALES REPRESENTATIVE OR VISIT [PIONEER.COM/CLUBROOT](https://www.pioneer.com/clubroot)**



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