

Keeping Clubroot Under Control

Clubroot has been ravaging fields in Western Canada for almost two decades now. The soil-borne disease causes galls to form on the roots of canola plants, eventually killing them prematurely. It's well documented that short canola rotations in intensive clubroot zones are a serious factor in aggravating the disease and creating conditions for it to thrive, allowing new pathotypes to emerge.

The University of Alberta has identified over 43 clubroot pathotypes in Western Canada. Pathotype 3A is the most common in the region, followed closely by 3H and 3D. Clubroot is spread easily through soil movement. Root galls release spores back into the soil where they remain dormant until susceptible plants are grown again. So, if you can't prevent it, what can you do?

Clubroot-resistant hybrids

One of the best ways you can manage clubroot is by growing a clubroot-resistant canola hybrid. The canola industry is moving forward on standardized testing and labelling protocol for hybrids with resistance to clubroot pathotypes. This will provide growers with better information when making hybrid selections. Newer pathotypes such as 3A, 3D, and 8E are

overcoming the first-generation resistance genes, which is why next-generation clubroot resistant hybrids may provide you with a better defence.

BrettYoung's Clubroot DefendR: Broad Resistance with a Multi-Genic Approach

Along with the identification of new pathotypes, plant breeders have been identifying and incorporating new sources of resistance into their latest canola hybrids. This includes the stacking of multiple sources of clubroot resistance in hybrids like BY 7102LL, BY 6216TF, and BY 6217TF. These hybrids have resistance to the older pathotypes that were first identified on the Prairies (2F, 3H, 5I, 6M, and 8N), plus several recently discovered pathotypes.

BrettYoung, through our primary canola genetics supplier, DL Seeds, continues to screen clubroot-resistant hybrids against the most common and newly emerging clubroot pathotypes. DL Seeds' research on clubroot genes is never-ending, and they're constantly working to create hybrids with resistance to the newest clubroot pathotypes.

Keep spores **low**



Crop rotation: Maintain a minimum 2-year break between canola (1-in-3 rotation).



Scout: Examine roots in every canola field during late summer/fall. Pay special attention to high-traffic and high-moisture areas. Soil testing may help identify spores before physical symptoms appear.



Grow CR: Early infestations can be missed for years while susceptible hosts multiply spores to catastrophic levels. Clubroot resistance (CR) should be grown on all canola acres as part of an integrated management strategy.



Control brassica weeds in all crops: Host weeds (like volunteer canola, stinkweed, flixweed, shepherd's purse and mustards) should be controlled early to minimize gall formation and resting spore release.



Patch management to keep spores low and local:

If you find clubroot, manage the patches separately from the rest of the field to reduce spore concentration and prevent spores from spreading.



Keep spores **local**



Biosecurity: Commit to a biosecurity plan to prevent the introduction and spread of spores on contaminated inputs and equipment. Communicate sanitation expectations with all relevant parties before field entry.



Reduce tillage: Minimize soil (and spore) movement within and between fields.

Visit **clubroot.ca** to learn more.

Glen Hawkins, Senior Agronomist and Pulse Research Manager for DL Seeds, said together, we have a “solid next-generation resistance package” in most of our hybrids.

“At the end of the day, we’re not stopping there,” he said. “We’re always developing new genetics and new potential forms of resistance to bolster what we already have.”

Hawkins described the clubroot situation as status quo right now, with Alberta continuing to be a hotspot for the disease but noting that Manitoba is beginning to catch up. He said our first generation and next-generation clubroot-resistant products are doing what they’re supposed to, with both having multi-pathotype specificity.

“The gene we insert,” he stated, “will have full or partial resistance to a number of different pathotypes.”

Clubroot Management Practices

The Canola Council of Canada (CCC) has a list of recommendations to manage the spread of clubroot spores by focusing on keeping them low and local.

Growers in Manitoba, Saskatchewan, and other areas not impacted by clubroot pathotype 3A can prevent the accumulation of spores for as long as possible by using resistant hybrids. Choose BrettYoung’s Clubroot DefendR hybrids for areas where incidence of resistance breakdown is suspected.

1 Strelkov, S.E., Hwang, S.F., Manolii, V.P., Cao, T., Fredua-Agyeman, R., Harding, M.W., Peng, G., Gossen, B.D., McDonald, M.R., and Feindel, D. 2018. Virulence and pathotype classification of *Plasmodiophora brassicae* populations collected from clubroot resistant canola (*Brassica napus*) in Canada. *Canadian Journal of Plant Pathology*. 40:284–298, DOI: 10.1080/07060661.2018.1459851
2 Askarian, H., Akhavan, A., Manolii, V.P., Cao, T., Hwang, S.F., Strelkov, S.E. 2020. Virulence spectrum of single-spore and field isolates of *Plasmodiophora brassicae* able to overcome resistance in Canola (*Brassica napus*). *Plant Disease*, 105:43–52, DOI: 10.1094/PDIS-03-20-0471-RE
3 Hollman, K.B., Hwang, S.F., Manolii, V.P., Strelkov S.E. 2021. Pathotypes of *Plasmodiophora brassicae* collected from clubroot resistant canola (*Brassica napus* L.) cultivars in western Canada in 2017–2018. *Canadian Journal of Plant Pathology*. DOI: 10.1080/07060661.2020.1851893

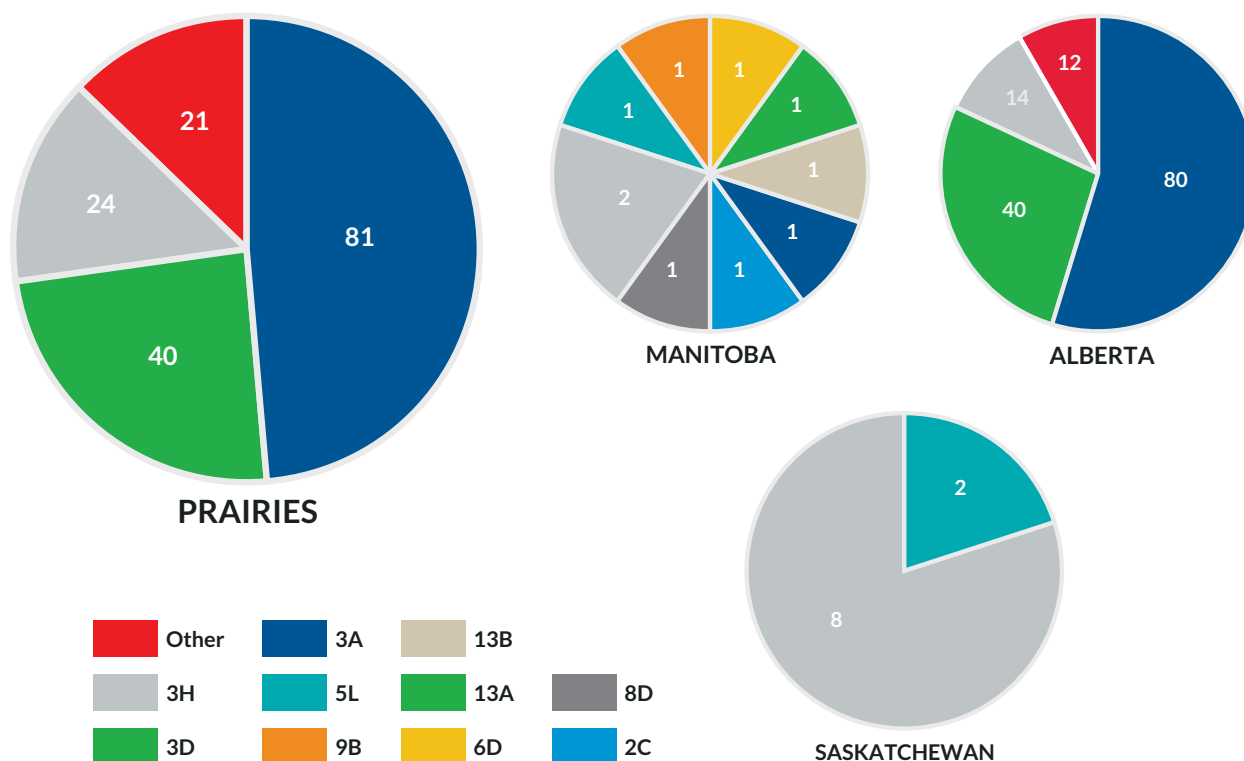


Fig. 1 Prevalence of *Plasmodiophora brassicae* pathotypes across the Canadian Prairies and in the provinces of Alberta, Manitoba, and Saskatchewan. Based on collections made from canola crops in 2017 and 2018. One hundred and sixty-six *P. brassicae* field isolates were tested, including 146 from Alberta, and 10 from each of Manitoba and Saskatchewan. Pathotype classifications are according to the Canadian Clubroot Differential set.