Economic impact of sclerotinia stem rot

Sclerotinia is a true hidden yield robber. One of the greatest problems with the disease is that once you see symptoms in your field, it’s too late to apply any control measures.

Derwyn Hammond agrees the economic impact of sclerotinia can certainly be detrimental to growers. He notes the rule of thumb is that on average you get half the yield out of infected plants, which means for every one per cent incidence (one per cent of plants affected), the yield loss for a field will be about half a percent. “But it all depends on how early the infection comes in – earlier incidence allows more time for the disease to spread throughout plants and kill them prematurely. Typically leading to higher losses,” he says.

According to Kristin Hacault, Pioneer agronomy research manager, in 2010, sclerotinia caused Western Canadian canola growers hundreds of millions of dollars in lost revenue. “In 2010 sclerotinia cost western Canadian growers an estimated $600 million in lost revenue,” says Hacault. By planting a Pioneer brand hybrid with the Pioneer Protector sclerotinia resistance trait you reduce disease incidence levels by over 50 per cent, thereby reducing yield loss. In addition you get the benefits of season long protection against sclerotinia.

Yield Loss (%) = 0.5 x Disease Incidence (%)

What you need to know!

Sclerotinia stem rot, also known as white mould, is one of the most devastating diseases in canola production. With much of the prairies having above average to excessive moisture the past two years, sclerotinia is one disease that requires attention.

Sclerotinia is usually most severe in the higher moisture areas of the prairies. But with the right combination of adequate moisture and susceptible host, heavy infections can develop almost anywhere. Disease severity and the resulting effect on yield will vary according to temperature, rainfall (environment), and especially the stage of crop growth at the time of infection.

According to Derwyn Hammond, resource manager with the Canola Council of Canada at Brandon, Manitoba, environmental conditions are drivers of the disease in terms of severity. “So it really varies, depending on geography. For instance, southern Alberta and southern Saskatchewan, which tend to see moisture deficits more frequently, have traditionally had less of an issue, but here in Manitoba it’s much more common.”

The 2010 Provincial Disease Surveys (Manitoba, Saskatchewan, Alberta) found that 92 per cent of canola crops across the prairies were affected by sclerotinia, with an average incidence of 21 per cent.

2010 Provincial Disease Surveys

- Saskatchewan: 91 per cent of canola crops surveyed had sclerotinia, with an average disease incidence of 20 per cent
- Manitoba: 88 per cent of canola crops surveyed had sclerotinia, with an average disease incidence of 31 per cent
- Alberta: 64 per cent of canola crops surveyed had sclerotinia, with an average disease incidence of 15 per cent

(Note: Incidence is defined as the number of plants out of 100 that show visible signs of sclerotinia infection in a field. For example, 20 plants infected out of 100 equates to 20 per cent incidence.)

Sclerotinia disease cycle

One of the greatest challenges facing growers is the difficulty in diagnosing the threat of sclerotinia before it appears. With wide distribution, multiple hosts, long term survival and billions of spores, getting a jump on the disease is crucial.

Sclerotinia can survive in the soil for five years or more as irregular shaped fungal bodies called sclerotia. These sclerotia germinate in the summer and produce apothecia which are mushroom shaped structures that produce and release ascospores. These spores travel by wind, land on canola petals which are the food necessary for the spores to germinate, grow and infect the canola plant. The infection spreads from the petal to the canola plant at the leaf axil. The infected branch may then die or ripen prematurely and shatter before the healthy crop is mature. There can also be plant to plant infection following lodging as infected plants contact healthy plants thereby spreading the disease.

Disease cycle detail:
1. Sclerotia are overwintering fungal bodies that can survive for many years in the soil
2. Sclerotia germinate to produce apothecia under prolonged moist soil conditions
3. Apothecia release airborne ascospores
4. Ascospores infect petals or other connecting tissue
5. A fallen petal is used as a nutrient source for the fungus and enables it to colonize on healthy leaves or stems
6. Sclerotinia lesions are initially accompanied by a white mould growth and will show premature ripening above the point of infection
7. Advanced lesions become bleached and shredded; sclerotia develop within the infected tissue and eventually drop to the soil or are harvested with the seed
8. Sclerotia bodies from previous infections can survive in the soil for many years. This is the source of the disease
9. Sclerotia bodies grow inside the infected canola stems
10. Sclerotia bodies from previous infections can survive in the soil for many years. This is the source of the disease
11. Sclerotia bodies are adapted to the soil during dormant operations. This aids in the survival of the disease inoculum for future establishments
12. Sclerotia bodies germinate to form apothecia during structures
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What you need to know!

With sclerotinia on the radar for the last couple of seasons due to an increase in moisture conditions and widespread incidences, it’s too late to apply any control measures.

Yield Loss (%) = 0.5 x Disease Incidence (%)

What you need to know!

Sclerotinia stem rot.
Field scouting and agronomic practices are still vitally important in assessing and preventing sclerotinia infection. However, despite disease forecasting checklists which aid in fungicide spray decisions, control of sclerotinia continues to challenge canola producers prairie-wide.

In the past four years Pioneer Hi-Bred has introduced four sclerotinia resistant canola hybrids – Pioneer® brand 45S51, 45S52, 46S53 as well as VR9557GS. In 2010 On-Farm Sclerotinia Trials, 13 locations, Pioneer Agronomy Sciences.

Pioneer large scale on-farm sclerotinia field trials indicate a greater than 50 per cent overall reduction in sclerotinia infection with a resistant hybrid vs. susceptible hybrid.

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Pioneer Hi-Bred offers top performing Pioneer Protector® canola hybrids. The Pioneer Protector hybrids provide growers with leading seed genetics and insurance against one of canola’s worst diseases.