

R – CEREAL ROOT DISEASE UPDATE

AUTHOR: Margaret Evans, SARDI

TAKE HOME MESSAGES

- Rhizoctonia has caused significant damage in cereal crops across South Australia in 2020.
- Soil analysis at the start of 2021 will be particularly important for crown rot and eyespot as it is difficult to predict the risk of yield loss due to these diseases based on paddock history.
- August-October are prime times for root inspection to make management decisions for 2020 and 2021.

Rhizoctonia continues to be a serious issue for 2020 cereal crops, with the dry conditions and low winter soil temperatures slowing root growth and favouring infection and development of this fungal root disease. Early sowing into warm soils generally allows primary roots to grow well with rhizoctonia symptoms only appearing once plants are established and soil temperatures have dropped. This year, a combination of low rainfall and early frost after the break have favoured development of the classic rhizoctonia “bare patches”. Now crops are also starting to show general unevenness due to rhizoctonia damaging the secondary root systems and reducing tiller number and growth.

Not all patches and uneven crop growth are caused by rhizoctonia. To check whether rhizoctonia is causing the problem, carefully dig up affected plants and roots. Wash soil out of the roots and float them in water on a white background (e.g. in a white ice-cream container). Rhizoctonia damage appears as honey-brown “spear tips” on roots or thick-and-thin roots characterised by honey-brown discolouration.

Management decisions to consider for affected crops in 2020 include whether or not to apply further inputs, cut for hay and the implications for forward-selling grain. It is also critical to consider long-term management strategies. Options include rotations away from cereals and grass pastures, ensuring summer weed control to remove the green bridge and also early seeding of priority paddocks.

Root lesion nematode (RLN) species *Pratylenchus neglectus* and *P. thornei* cause subtle symptoms on cereal roots and plants during winter (e.g. low vigour), but as temperatures warm up in spring these nematodes can multiply rapidly. In 2020, root damage due to RLN has been common. Severely affected roots are chocolate brown, lack root hairs and have limited fine branching. Plant resistance is the most effective management tool currently available. Resistance differs between the two species of nematode, so it is important to correctly identify which RLN is present in each paddock. This will allow correct selection of cereal types and broadleaf break crops which may also host RLN.

Crown rot affects all cereals, with symptoms including brown stem bases and white heads. This is most obvious in seasons with moisture stress during grain filling. Infection occurs when there is good moisture and contact of crown rot infested stubble with the new crop. Infection can occur at any time in the season, however the earlier plants are infected the higher the potential for significant yield losses. Dry conditions at the start of 2020 would not have favoured early infection, but yield losses may still occur if there is moisture stress during grain filling. Significant inoculum carryover into 2021 may also occur.

Crown rot management continues to be problematic, particularly where durum wheat is part of the rotation. In collaboration with the Hart Field-Site Group, Syngenta, Elders and the Southern Australian Durum Growers Association, we are exploring the potential of new bread wheat lines with improved resistance to crown rot, including a new seed treatment with activity against crown rot. Trials are being undertaken at Hart and Pinery to quantify the effectiveness of the seed treatments and also lines with improved resistance to crown rot in durum wheat, bread wheat and barley. We will also assess inoculum carryover after treatments. Results from these trials should allow us to determine the role of the seed treatment and of the lines with improved resistance for managing yield losses due to crown rot in current farming systems.

Eyespot affects all cereals and takes the name from eye-shaped lesions it causes. Good rainfall prior to canopy closure favours this disease, so the dry conditions experienced in early 2019 and 2020 mean eyespot infection and expression has been limited. Even though eyespot inoculum will have decreased in most paddocks for 2019 and 2020, eyespot could still be a problem in 2021. If considering fungicide application, there are now three fungicides registered for managing eyespot in wheat - Aviator®Xpro; Elatus® Ace and Soprano® 500.

PREDICTA® B soil analysis will be particularly useful for identifying the risk of yield loss due to crown rot and eyespot in commercial paddocks for 2021. As conditions across 2019 and 2020 breakdown plant infection and inoculum, it will become difficult to predict disease risk based on paddock history alone. When using resistance as a management tool for RLN, PREDICTA® B analysis will identify the species present, allowing for correct selection of crop types for the following season.

For more information:

Margaret Evans
Senior Researcher – Cereal pathology, SARDI
0427 604 168
marg.evans@sa.gov.au

Crown rot resistance and seed treatment trial plan

Buffer	Buffer	Buffer
Aurora trt	Edge 19 SA 1098 trt	Trojan trt
Aurora	Edge 19 SA 1098	Trojan
Edge 19 SA 0178	Bitalli trt	Aurora trt
Edge 19 SA 0178 trt	Bitalli	Aurora
Scepter trt	Aurora trt	Spartacus
Scepter	Aurora	Spartacus trt
Trojan	Edge 19 SA 0178	Edge 19 SA 1098 trt
Trojan trt	Edge 19 SA 0178 trt	Edge 19 SA 1098
Spartacus trt	Scepter trt	Bitalli trt
Spartacus	Scepter	Bitalli
Bitalli trt	Trojan	Edge 19 SA 0178
Bitalli	Trojan trt	Edge 19 SA 0178 trt
Edge 19 SA 1098 trt	Spartacus	Scepter trt
Edge 19 SA 1098	Spartacus trt	Scepter

Buffer Buffer Buffer
 *trt = treated with Syngenta seed treatment prior to sowing

Note – this site has been sown with crown rot inoculated grain added to all plots

Paired plots with and without seed treatment to assess effectiveness on cereals with a range of susceptibilities to crown rot

Aurora - very susceptible
 Scepter - susceptible
 Trojan - moderately susceptible
 Edge lines - bread wheat lines bred for improved resistance
 Bitalli - included to assess relative resistance and yield losses when compared with Aurora
 Spartacus - least likely to exhibit yield losses due to crown rot

N → **Seeding date:** May 25, 2020
Fertiliser: MAP
Fertiliser rate: 80 kg/ha