# GRDC VIDEO or PODCAST TRANSCRIPT

**Managing Rhizoctonia in low and medium rainfall zones**

**00:00:05:01 - 00:00:07:14**

**Intro:** This is a GRDC podcast.

**00:00:12:22 - 00:01:04:03**

**Shannon Beattie:** Rhizoctonia is a soil borne disease that causes a huge impact for farmers in Australia, particularly in the low and medium rainfall zones, with yield loss in the vicinity of $150 million for wheat and barley annually. Hi, I'm Shannon Beattie. With GRDC investment, the Department of Primary Industries and Regional Development in Western Australia is developing disease risk and management strategies that are practical and economical for growers to reduce the impact of rhizoctonia in the southern and western cereal growing regions. The project is supported by CSIRO, the University of Adelaide and Crop Disease Solutions, and on this episode, I'm joined by Dr Daniel Hüberli from DPIRD to learn about the integrated and cost-effective approach of cultural, chemical and biological management strategies that the research team is working to create.

**00:01:04:17 - 00:01:28:04**

**Daniel Hüberli:** So rhizoctonia is a soil borne fungal disease. A lot of growers probably don't know they have anything like that until they see it as a patch, which is manifested usually in cereals like barley and wheat. And it does cause a big issue on the roots, it attacks the roots and basically prunes them off, and you end up with often stunted plants in the paddock.

**00:01:28:06 - 00:01:36:02**

**Shannon Beattie:** Can you give us a bit of an idea of how rhizoctonia actually takes effect in the paddock, I guess its lifecycle, so to speak?

**00:01:36:04 - 00:02:05:13**

**Daniel Hüberli:** Yeah. So, the whole thing really starts over summers in plant material, mainly roots and stubble. And then as the season starts with a rainfall, it starts to grow from those tissue and basically then starts to grow into the new crops that are being planted and happily munches away on the roots. Primarily, again, it's on the serial roots where it does a lot of that damage. So that is its favourite hosts, it really likes to feed on those roots.

**00:02:05:15 - 00:02:14:18**

**Shannon Beattie:** You mentioned it has an economic and a yield impact. Do you have any statistics about just how bad that impact is for our Australian farmers?

**00:02:15:04 - 00:02:44:17**

**Daniel Hüberli:** Across Australia in wheat and barley, the annual yield loss is $150 million, that's a huge cost. For Western Australia it's $53 million. But if you're looking at the paddock scale, where there's stunted plants in the patches, those will be 100% yield loss. So that can have a huge impact. And that depends on the season often, you know, so it's not always going to be that $150 million. But in those seasons that are really dry you do get a huge yield loss impact.

**00:02:44:19 - 00:03:00:00**

**Shannon Beattie:** This project is looking at the impact of rhizoctonia in the low and medium rainfall zones in particular. Why is that? Is it because there are particular rainfall zones or particular soil types that rhizoctonia has more of an impact in?

**00:03:00:11 - 00:03:34:18**

**Daniel Hüberli:** The answer is yes, but rhizo is found everywhere, but where it has the impact are in specific areas in the low to medium rainfall zone, especially regions that have seasons, more consistent seasons that have low rainfall. And that's where it will be pronounced. But also soil types, non-wetting soils that can be a big issue. So basically, anywhere where the plant has difficulty accessing water through season or the soil type may be problematic. That will have a big impact in those areas.

**00:03:34:20 - 00:03:40:28**

**Shannon Beattie:** Talk to me about the aims of this project. What are you actually trying to figure out and trying to learn to help our growers?

**00:03:41:00 - 00:04:12:21**

**Daniel Hüberli:** So, what we're doing in this project is developing new management strategies for the low to medium rainfall zone growers, and also providing that information to them in a communication package so that they have the confidence to implement those changes. Some of that is through demonstration trials where they can see some of the things we've been trying. And also that's often a platform for us to say our research work and what we're doing and what we're finding.

**00:04:12:27 - 00:04:20:28**

**Shannon Beattie:** I believe you're also looking into the economics and the epidemiology of the disease. Can you talk to me about that aspect of the project?

**00:04:21:12 - 00:05:25:26**

**Daniel Hüberli:** It was actually two components. So, the economics is around really understanding the disease impact and providing data around that. So, providing where disease is more pronounced and getting the data and then putting that through an economic model. But also, from that we're also going to be providing a basic grower decision support tool to help the growers basically implement some of the management strategies that we've got in the decision support tool and give them a dollar and cents bottom line, basically so they can implement something. The epidemiology component is basically looking at a number of components. And one of them are the seasonal triggers for driving the increased disease expression. And then also looking at environmental factors that influence the disease expression. So, we're looking at climate and we're also looking at soil biology within the paddocks. And then layering that over the top of the disease which we're measuring in the soil but also on the plant material as well.

**00:05:25:28 - 00:05:33:27**

**Shannon Beattie:** Have we learned anything there that we can already provide to growers in terms of those seasonal factors that seem to increase disease severity?

**00:05:34:02 - 00:06:27:20**

**Daniel Hüberli:** So, we're two years into this project. We're still stitching all the data together. And at the moment we don't have all that information. But we do know from previous work that we've done, season obviously has a huge impact in particularly survival of the pathogen. So, a dry summer early start with a dryness as well, the pathogen is quite happy to survive. In other seasons where you get summer rainfall or early rain. The pathogen doesn't survive as well in a moist soil, because when other microbes start to increase in numbers and activity, it's not able to compete against them. So, in that case, often you get less disease. But dry periods it survives, and it will germinate and impact the crop that's planted as soon as the season starts, and they are often the worst.

**00:06:27:22 - 00:06:42:22**

**Shannon Beattie:** So, it definitely sounds like keeping an eye out for it in a dry season is particularly important. Let's move on to some of the management strategies and the management side of things. What are growers currently doing to control or suppress rhizoctonia in their paddocks?

**00:06:42:25 - 00:07:32:24**

**Daniel Hüberli:** So currently most growers probably would be using rotation as part of the strategy. So basically, cereals are the worst in terms of increasing the disease, and also the worst in terms of impact and the yield loss. Often growers would grow a canola and that will help reduce the inoculum level and you will see an improvement in the following cereal crop. But that's short term. Other things that might be done are things like fungicide seed treatments and in-furrow fungicides, which they can apply using registered products, there's quite a few available. But then also playing the game in the sense with the season. So, trying to sow early to avoid the plant growing into a stress at the end, and then more yield loss through that.

**00:07:32:28 - 00:07:45:15**

**Shannon Beattie:** As part of this project, you're looking at some different management options in terms of both field research, but then also some farmer demonstration trials. Can you talk to me about the different management options that you are looking at.

**00:07:45:20 - 00:10:22:27**

**Daniel Hüberli:** So, in the research trials we've got probably two main areas that we're looking at. One of them is looking at new chemicals, so that includes new fungicides and also looking at biologicals. Primarily in that space, we've got bacteria and they've been shown in glasshouse and lab trials to reduce the rhizoctonia, and so that's an interesting lead. So, we've got trials here in WA but also in South Australia as well. The other component that we're looking at is soil amelioration and amendments. So, for that we've got things like deep ripping, mouldboard plough, spading that we're using as the amelioration. So heavy duty stuff and not things that would be done necessarily every year. But understanding how that can be used in the farming system and what impact it will have on rhizoctonia. In terms of amendments, we're trying a few different things, like using compost and mixing that in, and basically what we're trying to do there is increase the microbial activity. And as I said earlier, the rhizoctonia is not a good competitor, so if you can drive up the microbes, potentially we can get an edge on the pathogen and get the plant growing in a healthy way and not get as much impact from the disease. In terms of the demonstration trials, I guess looking over the fence and seeing what the growers are using and implementing, and there are quite a few that are doing amelioration type work. And one of them was in Narembeen and he was using a grizzly plough, and he showed us the paddock the year after. And you couldn't see any rhizo or very minimal rhizo. So, whereas previously when I saw the aerial footage, it was like a holey cheese, it was full of patches, it was insane, and it was striking. So, we talked to them, and we identified another paddock, and he ran strips through with the grizzly. And so, we compared the treated and the untreated and got data in terms of disease, but we'll also be providing an economic analysis on that as well for that grower. There are other things that we're doing too, in terms of we've got the Reefinator with another grower. So that data we're still putting together. And then with another two grower groups, we've got long coleoptile wheats, which the idea behind that is if we can sow deeper. Rhizoctonia, its battle ground is sort of that 0 to 10cm, so if we can get below the ten, potentially we can get roots that establish and not get infected, and that gives them a head start.

**00:10:23:03 - 00:10:36:14**

**Shannon Beattie:** What's the logic behind the amelioration methods, the grizzly or the Reefinator, spading. Why do you think it is that those methods seem to decrease the prevalence of rhizoctonia in a paddock?

**00:10:36:16 - 00:11:46:04**

**Daniel Hüberli:** It allows the plants to get water and nutrients in a more efficient way, whereas if you don't do the amelioration treatment, it's often compacted and it's struggling to get access to those things to grow ahead of the pathogen. But it also has an impact on the pathogen as well, and that is probably impacting the harmful network that grows at the start of the season. So, if you're breaking that up, it then means that the plant has a head start because it can grow its roots in front of the pathogen that's now been destroyed. So, the pathogen doesn't necessarily disappear, it's still there. But it gives the plant, I think, a head start, and that is one of the things. With mouldboard plough maybe it's a little bit of a different situation because there effectively you're burying the soil. So effectively you end up with the pathogen further down. And as I said earlier, the main impact is really the zero to 10, and I think that gives that plant that edge. So, it's a number of different effects, and there's more out there that we still need to understand what are the benefits and what is actually happening. So there's a lot of work still we need to do in that space.

**00:11:46:09 - 00:11:51:25**

**Shannon Beattie:** When is this project wrapping up and when canal growers expect to see some real results coming through from it?

**00:11:51:28 - 00:12:05:23**

**Daniel Hüberli:** So, the project is ending in 2024 the trial period, but basically we'll be wrapping everything up and putting it all together in July 2025. So, there'll be information from the project coming out in that time.

**00:12:05:25 - 00:12:08:13**

**Shannon Beattie:** Daniel, thank you very much for joining me on the podcast today.

**00:12:08:16 - 00:12:09:09**

**Daniel Hüberli:** It's a pleasure.

**00:12:16:02 - 00:12:38:05**

**Shannon Beattie:** That was Dr Daniel Hüberli from DPIRD talking about managing rhizoctonia in the low and medium rainfall zones of the southern and western regions. More information on this topic can also be found in the description box of this podcast, or online at GRDC.com.au. I'm Shannon Beattie and this has been a GRDC podcast. Thanks for listening.