# GRDC PODCAST TRANSCRIPT

**Integrated management strategies for net form net blotch**

[00:00:05] **Intro** This is a GRDC podcast.

[00:00:12] **Camilla Plunkett** Hello, I'm Camilla Plunkett. Australian barley growers have found increasing problems of disease and fungicide resistance. Net form net blotch is an important foliar fungal disease of barley, and its impact on yield and decreased profitability has prompted a new GRDC co-investment - integrated management strategies for net form net blotch in low, medium, and high rainfall zones. This investment aims to develop and deliver cost-effective integrated disease management strategies across the northern and southern regions. Today, I'm at a trial site in the high rainfall zone of southern Victoria, near the town of Winchelsea. I'm here with Managing Director of Field Applied Research Australia, Nick Poole, to find out about the research, development and extension happening throughout Australian barley crops.

[00:01:14] **Nick Poole** This is a really exciting new investment from GRDC that covers both their northern and southern region. It's dedicated to developing integrated disease management strategies for the pathogen that causes net form of net blotch. It's being run across four states - SA, VIC, New South Wales, and Queensland, and it's being led by the Queensland Department of Ag and Fisheries. It also involves New South Wales DPI, AgVic, SARDI and ourselves, Field Applied Research Australia, here in the high rainfall zone. And I think that's the aspect of the project. It's trying to look at the control of this pathogen across different agroecological zones in those different regions. So, the low rainfall zone, what's the consequence of this disease in the low rainfall zone, medium and here in the high rainfall zone.

[00:02:17] **Camilla Plunkett** So why is this investment needed? What are the problems you are hoping to solve for barley growers?

[00:02:23] **Nick Poole** Well, the investment's needed I think, because what we found is that increasingly over this last five-year period, it's actually net blotch, both net form and spot form of net blotch, that has increasingly become the problem in our national acreage. And very often this follows trends in terms of some varieties becoming very popular and then the pathogen effectively tunes in to those particular varieties and over time their resistance to the disease is eroded. So the reason we're looking at net form of net blotch is to try and get some understanding of the epidemiology. How long does this stubble-borne disease persist in the stubble? What's the decline in inoculum over time? But also looking at the effect of the different levers that we can pull in an integrated disease management package. So, we're looking at aspects of stubble management and rotation we're looking at aspects of variety choice and, finally, the last line of defence, looking at fungicide management and effectively trying to say in those different agroecological zones, how we can put those integrated disease management levers or aspects together in one combined strategy.

[00:03:53] **Camilla Plunkett** Let's talk about net form of net blotch. How damaging is it? What are the potential yield losses and what conditions does it favour?

[00:04:03] **Nick Poole** Well net form of net blotch has, like I say, been increasing in its prevalence, particularly across southern Australia over this last five-year period and last year, admittedly in a pretty favourable season, i.e. it was a very wet season, plenty of development of the disease through the canopy, so it's a stubble-borne, wet weather disease and last year was very ideal for it. We're finding in the high rainfall zone that last year we were experiencing losses of 50 per cent, which is much higher than is typically quoted at the 20 to 30 per cent reduction in yield. And some of that comes back to sowing date, we know that we can probably take some of that pressure away by moving our barley sowings later into May from late April, but that gives you some idea of just how serious a problem net form of net blotch can be when the conditions are ideal for it.

[00:05:09] **Camilla Plunkett** How do growers identify net form net blotch? What do they look for?

[00:05:14] **Nick Poole** What you're looking for, earlier in the season, in the base of the crop, is very fine streaks, you might almost call them. Fine streaks that run with the veination of the leaf, and those fine streaks are usually dark brown in colour. And as the name suggests, you can actually in this case, net form is because when you look at those lines, sometimes they can run mainly longitudinally along the leaf, but also horizontally. So, you have the impression of a net actually on the leaf marked with these fine streaks. As the disease develops in the canopy, under ideal conditions, you can actually start to see a yellow chlorosis develop around those lesions. And it's easy with spot form of net blotch to actually misdiagnose it. But that yellow halo on perhaps the older leaves around the lesions is a real tell-tale sign that it's spot form of net blotch, as opposed to, say, a nutrient reaction, or even what we refer to as a hypersensitive reaction when the plant itself starts to actually produce very fine black specks across the leaf. So, spot form, probably easier to misdiagnose than net form of net blotch.

[00:06:40] **Camilla Plunkett** So do the net form and the spot form have any differences in the overall disease, and do they affect the plant differently?

[00:06:47] **Nick Poole** No. There is a key difference between net form and spot form in that net form of net blotch can actually get up on to the seed and the awns and then set up a seed-borne infection. Whereas with spot form of net blotch, it is far less prevalent to actually find any kind of transmission on the seed. So, in both cases, the stubble is a primary source of infection for the next year's crop but with net form of net blotch, we've got a disease that actually can be seed-borne as well as stubble-borne.

[00:07:28] **Camilla Plunkett** And what is the importance of not confusing the two?

[00:07:31] **Nick Poole** Well, I think one of the importance of not confusing the two diseases is that, generally speaking, net form of net blotch is more aggressive than spot form of net blotch, and so our yield losses typically are greater with net form of net blotch than they are with spot form. But I think it's also important to say that we typically find net form of net blotch in, perhaps, crop canopies that are very fertile, they've not got any nutritional deficiencies. In contrast, spot form tends to perhaps be more typical on soils that might be in the lower or medium rainfall zones where there may be some nutritional stresses and that accentuates the spot form. However, generally speaking, spot form of net blotch in those drier zones tends to be less problematic as the season goes on because it doesn't always get the conditions of weather to actually bring it up the crop canopy, like we do with, say, net form of net blotch in the high rainfall zone. So recognising that they're different is important in terms of how much yield loss, but also recognising those regions where spot form is more prevalent or net form. And of course, we know that our varieties for those two diseases can line up differently. And we've seen some great examples this morning where, for example, Rosalind is particularly susceptible to spot form of net blotch but here in the high rainfall zone, spot form is less prevalent than net form. And so Rosalind's genetics can still be engaged usefully to combat the disease in this zone, but would be less effective, perhaps in the low or medium rainfall zone where spot form of net blotch is more prevalent.

[00:09:37] **Camilla Plunkett** Can you give us an overview of the key integrated disease management strategies for net form net blotch in barley?

[00:09:44] **Nick Poole** Yeah. So, I think it's important when we think of an integrated disease management strategy, to think of it as almost a series of levers that the grower with his advisor can pull. The first is to consider your rotation because one of the highest risk scenarios for both net and spot is where you're growing barley continuously or barley on barley. So, review whether you need to be doing that as part of your rotation. If you are doing that, then perhaps think about how much inoculum came from last year's crop. Did the disease get out of hand? Is your stubble badly infected and therefore a source of infection for the following year? So, rotation, stubble management and if you have a very badly infected crop in the previous year you may need to strategically burn that stubble or even cultivate here in the high rainfall zone to try and reduce the inoculum pressure. After those initial considerations, or levers of rotation and stubble management, you can start to think about the variety that you're choosing and when you sow it. Because that aspect of genetic resistance, i.e. the resistance the variety naturally has to the disease, is a key component of that integrated disease management package.

[00:11:16] **Camilla Plunkett** Nick, getting back to the trial here today, what stage is it currently at and so far, are there any indications that it's working?

[00:11:26] **Nick Poole** So the trial that we've just been looking at this morning is just coming up to what we call awn peep or growth stage 49, so it's the end of the booting phase. We've just put our second fungicide applications on those treatments and so we're actually seeing that despite extremely high disease pressure, at this moment in time, the fungicides that we've put on it, so in the seed treatments, appear to be still working. But where we've used them on their own, you can now see that the infection's beginning to take off as those seed treatment effects have worn off. Where we've combined a seed treatment with a first fungicide at that growth stage 31, or first node stage, we're getting still reasonable control. With the very susceptible variety, Planet, we cannot say we've got a completely clean canopy, but it's certainly an awful lot better than our untreated canopies. And so this latter spray that we've put on it, awn tip, we're hoping will give us good protection of the main yield-bearing leaf, which is flag minus one, so the leaf just below the flag.

[00:12:53] **Camilla Plunkett** At the conclusion of this trial what information do you hope to provide to growers and how will this help barley growers in the long term?

[00:13:02] **Nick Poole** I think at the end of the project, Camilla, what we're hoping is that growers and their advisors will be better equipped with integrated packages. The way that all of these levers can be combined, we're looking to produce and develop packages across different zones of the southern and northern regions of GRDC to actually say, "this is how you are best to control this disease", and we hope that within the project, there will be new insights into particular aspects of how the disease persists in the stubble, the length of time it persists in the stubble, and how the environmental conditions affect that persistence. But with all strategies, clearly, it's no good doing the research unless we can get adoption out on farms. So, extension and communication, as we're doing right now, is a key part of this new project.

[00:14:06] **Camilla Plunkett** I understand that there are now reports of fungicide resistance to net blotch. So, if growers suspect that they are not controlling the disease, what help can they get?

[00:14:16] **Nick Poole** We know that more fungicide applications can actually speed up fungicide resistance. And so by trying to reduce the amount of disease pressure, the hope is that we can use that reduced disease pressure as a way of saying we don't need as much fungicide. So, one of the reasons that we are so interested in having a complete integrated disease management package, or IDM package, as we call it for short, is that if we can reduce the disease in the crop, then it should mean that we are less dependent on our last line of defence, which is the fungicides. If you are suspicious that you've got instances where you know that it was an application that was the problem, or that you know that the spraying that was done was very effective and you're getting very little control of either spot form or net form, I'd encourage you to contact your local pathologist at the state departments in those four states, and indeed ourselves here at FAR Australia, to let us know what's happening and we can start to organise for samples to be sent to Curtin University in the west for more detailed analysis of what's actually going wrong. Are we seeing new instances of fungicide resistance being recorded? And that's really important for us to understand in terms of the spread and the distribution of resistance, because, unlike herbicide resistance, this is a very social problem because fungal spores tend to blow around in a much more dynamic way than we're perhaps used to with herbicide resistance.

[00:16:13] **Camilla Plunkett** Nick, thank you so much for sharing your time and your knowledge with us today.

[00:16:18] **Nick Poole** Camilla, I just want to thank you and your crew for the chance to show you some of this important work and finally, really, to thank our principal investor, which is the GRDC, for actually backing work in this important disease, because, obviously, without that support, we could no longer provide the kind of insights that we're hoping that these trials and the data will provide long term. So, thank you.

[00:16:54] **Camilla Plunkett** That was Field Applied Research Australia's Managing Director, Nick Poole, discussing all things net form net blotch in barley for the new GRDC co-investment - integrated management strategies for net form net blotch in low, medium, and high rainfall zones. If you would like more information, head to the resources section of the GRDC website. This is a GRDC podcast. I'm Camilla Plunkett. Thanks for listening.