# GRDC PODCAST TRANSCRIPT

**AFREN podcast – mung bean powdery mildew**

[00:00:02] **Intro** This podcast is brought to you by the Australian Fungicide Resistance Extension Network.

[00:00:10] **Drew Radford** Hello and welcome to the Australian Fungicide Resistance Extension Network podcast. I'm Drew Radford. In this episode we're going to focus on the challenges of managing powdery mildew in mung bean crops. Recent research trials by the Centre for Crop Health at the University of Southern Queensland have further validated the powdery mildew MBM management app and shown there is often no economic benefit in spraying the crop. To tell us more about the app, the trials, and the implications for mung bean growers, I'm joined by Centre for Crop Health Director, Professor Levente Kiss. Levy, welcome back to the AFREN podcast.

[00:00:54] **Levente Kiss** Thank you for having me. It's a pleasure to talk to you, Drew.

[00:00:58] **Drew Radford** Levy, these decision-making apps are a fantastic use of technology. For those that don't know about it, can you please give us a quick description of the Mungbean MBM app?

[00:01:10] **Levente Kiss** Sure, it's a pleasure to talk about this app that is freely downloadable for both Android and iPhone devices. It was developed by the Department of Primary Industries and Regional Development, DPIRD, in Western Australia, with GRDC support, and it was released in 2019. It can be used to make management decisions based on potential crop losses due to powdery mildew, and to calculate the economic returns on fungicide applications. Basically, growers can just play with this app, can set a range of variables, including the cost, grain price in a particular season, the environmental conditions, temperature, values, to get the best case or the worst case, and the likely profitability of applying fungicides on a petal by petal basis if needed. So a number of scenarios can be tested before a decision is being made on spray or not to spray. In some cases, it will turn out that there is no need for a fungicide application because there's no economic return on that application.

[00:02:28] **Drew Radford** Which is a fantastic advantage for growers and a huge cost saving Levy. So what is unique about powdery mildew in mung beans?

[00:02:38] **Levente Kiss** This is a very common disease that almost always shows up in the paddocks, usually when temperatures drop a little bit after the really hot summer period. I think all growers are very familiar with powdery mildew and it is not regarded as a major yield limiting factor if it comes late in the season. Earlier research has shown that powdery mildew, if it shows up after flowering, it has no real impact on yield. It may still have an impact on harvest management because if there is a lot of powdery mildew at the end of the mung bean growing season and a desiccant is applied at the end of the season, then maybe the uptake of the desiccant is limited if most of the green tissues, leaf and stem tissues are heavily infected by powdery mildew. But usually, all research has shown that powdery mildew that shows up after flowering in mung bean paddocks basically doesn’t limit yield. Another important aspect of mung bean powdery mildew that has been revealed only recently during a collaboration of our team at the University of Southern Queensland and the Queensland Department of Agriculture and Fisheries. So Lisa Kelly, Senior Plant Pathologist who is doing her PhD at our research centre, much to our surprise, it has turned out that the disease is caused not by one, but two powdery mildew species, which are quite different. One of these two species is more adapted to higher temperatures, another one prefers lower temperatures. Based on the symptoms, it is impossible for us to tell them apart, but they are really different under the microscope and their DNA is also different. So this disease is caused by these two species. In contrast, barley powdery mildew, wheat powdery mildew is caused by a single species.

[00:04:39] **Drew Radford** I assume they can both cause yield losses, Levy?

[00:04:42] **Levente Kiss** Previous research funded by GRDC has shown that if powdery mildew comes early in the season, in a mung bean paddock, before flowering, and if the environmental conditions are favourable for the disease throughout the season, then powdery mildew itself can cause up to 40 per cent of yield loss, so this is a serious impact.

[00:05:05] **Drew Radford** It is a serious impact. So what then are growers' fungicide options?

[00:05:10] **Levente Kiss** There are only two fungicide options under permit to control powdery mildew in mung bean. One product is tebuconazole that contains the fungicide with the same name, tebuconazole, which belongs to group 3, the DMI fungicide group. And another option is Veritas Opti, which is a cocktail, a mixture of tebuconazole and azoxystrobin, which is a group 11 fungicide. And I have to add that all our field experiments have shown that 100 per cent of control is never achieved. Now industry practice is to apply an early preventative spray with insecticide even before powdery mildew has been detected in a paddock. And this spray is then followed by one or two more additional sprays with one of these two fungicides through the season. This is one of the industry practices. The recommendation of the app, and our recommendation as well, is to spray at first sign of the disease, and then two weeks later, if needed, if recommended by the app. the Powdery Mildew MBM app is a really good way to decide when it is needed to spray, when is it economical to have yield benefits.

[00:06:30] **Drew Radford** Levy, you mentioned earlier your field trials. Well, let's talk about those trials. What treatments did you test and what did you find?

[00:06:39] **Levente Kiss** So we set up validation trials in 2022 and 2023 to compare three industry practices. One was to spray with insecticide and fungicide, and then one or two more fungicide applications, no matter what the powdery mildew situation was in the paddocks. So, we compared these industry practices with the recommendations by the app. And we have also compared the efficacy of the two fungicide products, tebuconazole and Veritas Opti, in these validation trials that were set up in South East Queensland in three or four sites. And all these validation trials have shown that the preventative spray is not really needed. There was no yield response to a spray that was applied before powdery mildew showed up in these experiments. Now, unfortunately, in both 2022 and 2023, powdery mildew appeared at late flowering, the green pot stages, when we already know from previous experiments that it may not affect the yield anymore. However, we applied all these treatments just to compare the app’s recommendations, which was in some cases no spray at all, in some cases just one spray, so we compared the industry practices with the app recommendations. We found at the end of all these validation trials that every single treatment reduced infection rates compared to the control, except when tebuconazole was applied just once. That had no significant effect on the powdery mildew incidence and powdery mildew severity. Because powdery mildew showed up after flowering in all these validation trials, none of our fungicide treatments had a significant effect on yield. So, we were basically not able to capture the impact of powdery mildew treated or not treated with fungicides on yield. It is important to highlight that the app actually did not recommend any sprays for any of these replicates.

[00:08:58] **Drew Radford** That's a really important point to make, Levy. So for a grower, spraying would have just been an unnecessary cost, whereas the app would have saved them spending the money?

[00:09:09] **Levente Kiss** Absolutely. And it's not just the cost, but also the time. And it is really important to highlight that all our validation trials supported 100 per cent the app recommendations in all our validation trials.

[00:09:23] **Drew Radford** That's really important to know, Levy, which I guess brings me to my next question. Could not following the app, ie excessive spraying I guess, could that encourage fungicide resistance to develop?

[00:09:36] **Levente Kiss** Certainly. We have done some DNA work. We sequenced both powdery mildew species that cause mung bean powdery mildew to look for DNA markers for fungicide resistance to both tebuconazole, so group three fungicides, and azoxystrobin, group 11 fungicides and unfortunately we found those DNA markers of resistance to both mode of action groups in a number of samples collected in South East Queensland from 2020. So, resistance potential is there, but I have to highlight that the incidence of the DNA markers that indicate resistance is low at the present. We cannot talk about the frequency of these DNA markers because we haven't done enough work in this space. However, the mutations are here, are with us, and this is a clear red flag from a fungicide resistance development perspective.

[00:10:39] **Drew Radford** That’s an important red flag to point out then so in which case I'm guessing mung bean growers should be extra careful with their fungicide use. Is that the main takeaway from your project, Levy?

[00:10:55] **Levente Kiss** Yes, but there is more to it. Controlling powder mildew in mung bean is difficult because there are such limited fungicide options. We only have these two products under permit at the moment. And all mung bean varieties that are currently available are susceptible to powdery mildew to some degree. Planting early is the best non-chemical way to reduce disease pressure in mung bean, so planning early in the mung bean season, I mean, when the temperatures are still high and the powdery mildew appears in paddocks and becomes widespread when actually temperatures drop. If by that time, the mung bean crop is over flowering period, then most probably, always check with the app, but most probably the powdery mildew infection won't have an impact on the yield and no fungicide sprays will be needed. So it is also important to add that infection doesn't automatically mean yield losses, because if the disease shows up late in the season, then that won't be translated into a yield loss. I do recommend that growers download and use the Powdery Mildew MBM app to determine paddock by paddock and year by year and season by season if a fungicide application will deliver a benefit or if you could save actually money and protect the efficacy of those control options by not using them. All our experiments have shown that this app really works and makes good economic recommendations.

[00:12:34] **Drew Radford** So, in summary, Levy, the app can help save growers not only on the fungicide cost, but can also help them save time as well, plus protect their yields, and importantly, protect the efficacy of the fungicides that we currently do have for when they're really necessary.

[00:12:53] **Levente Kiss** And it's free, the app is free.

[00:12:56] **Drew Radford** That's a really good point to end on. So, if you're growing mung beans in the north, you should download the Powdery Mildew MBM app for your Apple or Android devices. For now though, Professor Levente Kiss, Director of the Centre for Crop Health at the University of Southern Queensland. This has been a really interesting chat about powdery mildew in mung beans and the powdery mildew MBM app. Thank you so much for your time and for joining us for this AFREN podcast today.

[00:13:26] **Levente Kiss** Thank you.

[00:13:30] **Drew Radford** If you want easy access to more fungicide resistance resources, visit the Australian Fungicide Resistance Extension Network website at afren.com.au. AFREN is a significant investment of the Grains Research and Development Corporation and has produced a Fungicide Resistance Management Guide, fact sheets, recorded webinars, videos and of course, this podcast series. You'll find them all at afren.com.au. I'm Drew Radford, thanks for joining me.