**Mycotoxin Matters Podcast ep 4 V1**

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Female: Welcome to the Mycotoxin Matters Podcast from Alltech Mycotoxin Management. As mycotoxins present an ever-increasing threat to livestock production, join us as we discuss these impacts and potential solutions, sustainable farming, and our vision for a planet of plenty.

Nick: Hello and welcome to Mycotoxin Matters. I'm Nick Adams, Global Director for Alltech's Mycotoxin Management Program. I'm delighted to be joined today by Brian Springer to delve into more around the agronomic side of molds and mycotoxins. He is a certified crop advisor for over 20 years and has experience with dozens of crops including corn, soy, alfalfa, wheat, barley and many more. Brian, it's good to have you with us today.

Brian: Well, thank you, Nick. It's great to be here as well.

Nick: Brian, maybe let's kick off with maybe getting your perspective as an agronomist and your experience with this whole area around molds and mycotoxins. Where have you been over the last 5, 10, 15 years?

Brian: Well, in all honesty, it's been in that last 10 to 15 years at the most that it really started to be identified what the problem is. There are the mycotoxins from your feed perspective and what you guys are dealing with and then tracing it back into the crops, but it's really kind of a new and evolving component that everybody's looking into. There's still a lot to be learned about it, but in general, it's a little bit different than what we've dealt with with other pests because now we're talking about a byproduct from a pest instead of the pest itself.

Nick: When we think about those key pests, from your point of view, what are the key pests when we're thinking about molds?

Brian: When we're looking at molds, the ones that I get questioned about the most are probably going to be the fusarium because the vomitoxin, the mycotoxin or the DON that's coming across, it's a big issue in not only wheat, but also in our feed crops, in our corn and other things. That one tends to come up probably more so than anything. I think it stems back to a lot of our farming practices and things of that nature, kind of. We've kind of selected for that one and that's going to be probably the top one.

Nick: What are some of the things? When you mentioned selection for that mold, what are the key things? Is it the environment? Is it temperature? Is it actually things that we're doing from a practical standpoint on the farm?

Brian: Actually, I think it's a combination of several of those honestly because yes, as we're seeing differences in moisture, especially if you look at -- I'll point out to the US and we start looking into the upper Midwest going into the Great Lakes regions, more and more rain, more rain events, that is the correct weather. That's the right conditions to help fusarium grow on a crop. The weather plays into part of it because it's part of the disease triangle. You've got to have the correct weather, the host, which is the crop, and then the pest. So of course that plays into it wherever we go. Fusarium is going to be more moisture-driven. Some of the others are going to be from dry conditions.

The other part of it is from the farming practices, we're going to more and more no-till. Again, we need to do those things. It improves our soil. It improves the soil health and water-holding capacity. There are just so many other things that we need to do this in order to reduce that tillage. But by doing that, you're giving a bridge for that fusarium to come from a previous crop to your next crop. So if we don't start changing or extending our rotations, putting different crops and more of them in between our cereal grains, we're going to continue to have more problems.

So we need to look at rotations, we need to look at our tillage, and how we start to function with that residue. We better come up with -- and I think that's where we look at more of how the soil plays into this and what the biological compounds are or things that can help break down that residue because that's one of the big keys that farmers just struggle with trying to do. They're like, "We've got all this residue and we don't know what to do with it."

Nick: Which is interesting from all of the points that you've just made. We clearly know a lot more around and about molds as they are, but yet we don't seem to have found the magic combination yet within whether it's the breeding or the other, the tools at our disposal such that we can make these molds go away so to speak. Why is that?

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Brian: I think one of the reasons or one of the things that I see is when we start talking about the molds and mycotoxins as an agronomist, we are trained to go out, find the problem, identify it, and then figure out a way to kill it so we can come back next week and find something else. We're always in a reactive state. We're really not focusing on being proactive or preventative in what we're doing in a lot of cases. I think that kind of plays into this. You look at it and the main thing that a lot of agronomists, a lot of folks look at is, "What can I spray on my corn to get rid of fusarium mold?" thinking that that will then eliminate all the mycotoxins, and that is true. There are some fungicides that can work and they can help, but the problem is that if you use the wrong one like strobilurins, for instance, they're very good at killing northern corn leaf blight and some other rust diseases and things like that. But when you put those on a fusarium mold, yes, it will reduce the mold 40% to 50%, but the remaining population, that other 50% that's sitting out there on the leaf is now under so much stress that they can produce more mycotoxins than if you've never sprayed them at all.

We've got to start changing our perspective of it. Again, it's not that you can't spray. It's just we've got to do the right spray. As a comparison, if you look into wheat that goes into the food chain, the human food chain and everything like that, those same chemicals that we use on our corn on a regular basis are not labeled to use because they know this problem exists.

Nick: When you look at it then, how important is the soil in all of this if we need to take a step back and look at the bigger picture?

Brian: That's an area that I really think is going to be our key with this moving forward because again, like I was saying, the weather is important. The residue management is important. We don't need to start tilling and plowing and doing all these things again. We've learned that that's not necessarily what we need to do. But at the same time, if we can start to let the soil work for us -- and there are some really good ways that that happens -- it can really help to reduce some of these problems. As an example, what happens in the soil or on a plant, it doesn't really matter as you get two microbes that bump up against each other. If it's in the soil and you've got fusarium on the residue and it's bumping up against another competitor, they each exude metabolites in order to keep the other one at bay because they're fighting over food and for resources and things of that nature.

What we do, and this is one of the areas that Alltech has done very, very well with, is we can mimic some of those metabolites. We can grow the bug and we can kill it and we can take those extracts. But when we put them onto the soil, what happens is the good colony, the good microbes that we want, they can utilize those metabolites and their populations go up. They're building up and they're getting stronger and everything. But at the same time, things like fusarium cannot utilize those same metabolites. They don't have that food source. They don't grow as fast. Once you get that imbalance going, we trigger it. We're a catalyst. Once that happens, now all those good microbes continue to fight all season long against that fusarium. Now, you've got a season-long system that is helping you to not only break down the residue, get rid of it, help cycle it, and help your soil structure and water holding capacity. You've now got something that they're doing the battle for you. So again, it's not a pesticide, but it is getting all the pieces working for us in the same direction.

Nick: With something like that then, Brian, what's the timeline on something like that when you think about some of those other changing practices? The reduced till, maybe the reduced crop rotation, and therefore, we are building up potentially that mold proliferation in the dead matter in the field, et cetera. So when you think about the soil and helping the soil to fight back as it were, do you do it one year and it's done? Is it a continual thing? How does that work?

Brian: That's a very good question because yes, a lot of things that we look at from a soil building, soil health to build organic matter research, an agronomist will tell you it takes years and years and decades and even centuries to build all these things out. What we're really looking at is that year to year influence. So yes, it is something that you're going to continue to do each year. This goes back to the differences in the weather and everything that happens each year, so you're going to have different populations out there. You're going to have different things going on from year to year based off your crop rotation, your tillage and all your other things. So it's very good to look at it from that aspect.

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But what you do see when you start to build soil structure, improve your water holding capacity and everything like that then you do see year on year building. It is both sides of it when you start to look at it from the metabolites side. We have found over the years though that a lot of companies and a lot of places have talked about let's just put the live bug in the ground. Let's just inoculate the ground. What we found is that even though we put the perfect bug into the soil, it still doesn't survive year to year. They still have to reapply those. The other problem with it is they never know which year they really get a good response. One year, those colonies may take off and grow great. The next year, they just don't see the response. By dealing with the metabolites, we take all that out. So basically, what Alltech has done is you get the function of a pesticide as far as an immediate reaction, consistent reactions, but you don't get a lot of those inconsistencies from the live bug. So it gives us that biological activity in a much easier to use form, much more consistent this way.

Nick: Really interesting, Brian. Maybe we'll come back to that in a second as we look to some of the future concepts. Right here, right now, what about Aspergillus? On the animal feeding side, aflatoxin is such an important mycotoxin in terms of the fact that it is the regulated mycotoxin in so many countries around the world. What's your take on Aspergillus in the field?

Brian: Aspergillus would almost be the opposite of the fusarium. I mentioned that fusarium is that wet condition, increasing in rain, everything else. Aspergillus absolutely is going to thrive and it's going to be in those years where it's hot and it's dry. What we're seeing, again, this goes back to weather and some of the different things with climate change and some things along those lines, is that we're finding spots that are much drier than normal. Other spots are much wetter. So like I say, to me, those are the opposites of each other. One year, you'll have one. The next year, it may be the other one because no matter what we do, they are going to be in our soils. Those particular molds will hibernate, so to speak. They're going to carry over in there. And when the conditions are correct, they're going to come out and they're going to cause some problems.

Typically, again, looking at the US, we see the Southern US having Aspergillus as a routine problem year over year. Here in the last year or two, as we've seen increasing drought stress coming into even Western Iowa this last year, there was a lot of Aspergillus that showed up in some of those counties because of the weather alone. Now, the same thing goes. How do you interrupt that? How do you break that cycle? Again, I think the soil can play an extremely important role in that because again, it still has competitors. Even though Aspergillus is a very dangerous, very bad bug to have in our soils, it has natural competitors. We just have to trigger them to help them outgrow or outpopulate or outcompete I guess is probably the best way to say it, to outcompete whether it's Aspergillus, whether it's fusarium or whether it's any number of other soil-borne diseases that can be out there that can give us problems. Everything has a competitor. We just got to turn that competitor on and let them go do the job for us.

Nick: Fantastic. Brian, in that regard, when you think about the changes we see in the animal sector these days where as we move away from the antibiotic growth promoters and now a huge focus on the microbiome in the gut and really trying to get the gut health right, are we essentially saying the same thing about soil on the agronomic side of things?

Brian: Maybe not so much the soil, but absolutely on the plant. That's one of the areas we really haven't talked a whole lot. The plant itself, we actually have compounds that we've found and derived from yeast. So we actually grow yeast to break it down into its pieces and parts and then we can reformulate that. But when you put those compounds onto a plant -- so again, it doesn't matter. If it's anything with chlorophyll, it will turn on defensive triggers in that plant to where diseases cannot get in as easily, so it becomes part of this program. So not only can we be looking at the soil to help us to help knock things down and break up some of those cycles early on. In season, there are tools to where you can turn defensive mechanisms on with anything with chlorophyll.

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We've got a lot of research all the way through all the different crops, but it's a very strong reaction and it's very neat technology. Like I say, it's just really cutting-edge stuff that people know those defense mechanisms are there in the plants. They just don't really know how to trigger them.

Nick: Is that the future? Certainly, here in Europe at the moment, lots about the European Green Deal, the reduction in pesticide use, talking about a more organic farming in the future. Where is that going to take us with respect to some of the tools and technologies that you're talking about?

Brian: Absolutely true. That's, I think, where Alltech fits into this, where the crop science component fits in, is working from both sides of that equation. But when we start looking at the defensive triggers and how we help soils to get going with this, how we can turn certain processes on in the plant to improve growth, yield all kinds of different things, I definitely think that is the future and where we're going. It doesn't mean that we're going to get rid of pesticides. No, probably not in a lot of cases because there are just certain times that we need a little bit of help in all those things.

What I do see is that we definitely have a set of tools now that can start to go in there. It can work into either an organic situation, organic farming all the way through, so we fit into that category. We can work in the conventional side. If you've got pesticides that aren't working as well as they used to, they're getting resistance or doing some other things, there are newer technologies. Again, they're biological. They're coming from things that we grow and then break down and reformulate, but they can help to strengthen those or to keep these diseases and problems and things in check, and we've never really looked at it before. It's almost always in the past. It's been on one hand or the other. It's either you're organic or you're not. I think that's the stage we're at now, is the blending of those two ideas. That's what we truly need. It's because we need to start to blend that to keep our conventional farming practices and our yields and our incomes up where they are and help keep those growing.

Nick: I like that concept of almost like a hybrid approach, Brian, and using all of the technologies that we have available to us in their best place to get the best results. Brian, I really appreciate your time today. Are there any final thoughts you'd like to leave our listeners with today?

Brian: Like I say, I really appreciate the time and the questions about it. We do get these from the field, but I love being able to at least maybe put something out here that we can get to more people because a lot of these ideas, a lot of these things, people just don't get. The farms just don't get the access to it. They don't get access to it.

I think what we closed with there as far as this hybrid system, I think that's really one of the big keys. It's not an 'us versus them.' It's not a one system or another system. We've got to start looking for tools and opportunities on either side of that page to keep things moving forward. I think we're there. I think the industry is starting to accept it. Every major chemical manufacturer in the globe has been buying a biological company over the last seven to ten, twelve years. They know it's coming. They know that that's got to be part of the system. I think what really sets us apart is that Alltech's got the head start. We've been doing this for over 25 years. I think we absolutely got enough research and positioning to be that company that can really help make that bridge happen and bring these together.

Nick: Brian, fantastic. Many thanks for your time. Many thanks for joining us on Mycotoxin Matters. Where can people go if they have questions or they want to find any more information?

Brian: Yes, by all means, if anybody has more questions from the cropping side or from the mycotoxins, please come on over to alltechcropscience.com. We have a lot of information on there from the technologies, how they differ, how to use them, things of that nature. I'm more than happy to answer some questions as well. I know there's some contact information in there that they can reach out and we'll be glad to help answer your questions.

Nick: Many thanks, Brian.

Brian: Thank you.

Female: We hope you enjoyed listening today and we look forward to you joining us next time on the Mycotoxin Matters Podcast. For more information on the topics discussed, please visit knowmycotoxins.com. That's knowmycotoxins.com.

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