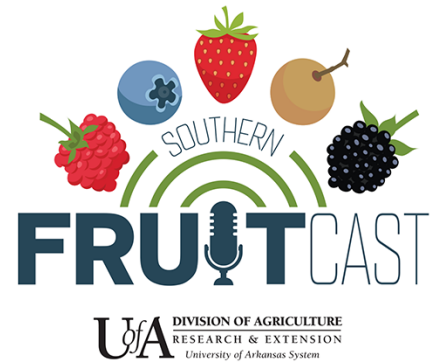


The Southern Fruitcast

Episode 11: Fungicide Resistance Testing

with Dr. Emran Ali



[Intro] Thanks for tuning in to the Southern Fruitcast. This podcast aims to cover the people, technology, and latest developments at small fruit production in the Southeast. We are brought to you by the Southern Region Small Fruit Consortium and the University of Arkansas System Division of Agriculture.

[Cato] I'm Dr. Aaron Cato, extension specialist for Commercial Fruit and Vegetable IPM. at the University of Arkansas.

[McWhirt] And I'm Dr. Amanda McWhirt, extension production specialist for fruits and vegetables, also at the University of Arkansas. Welcome back to the Southern Fruitcast. Today we have with us Dr. Emran Ali. He's a plant pathologist at the Department of Plant Pathology in the University of Georgia. He received his masters and Ph.D. degrees in molecular plant pathology at Ehime University in Japan. And then following a brief postdoctoral stint at the same institution, he completed additional postdoctoral trainings at Ohio State University and at Washington State University. He's currently the director of the Plant Molecular Diagnostic Lab at the University of Georgia. And today he came on to talk with us about what that lab can offer, specifically with fungicide resistance, testing, support that they offer in strawberries. Emran, thanks so much for joining us today.

[Ali] Thank you very much for having me on your podcast.

[Cato] Sounds good. All right, Emran, so let's get started on questions. I think it would be an excellent idea if we were to start off giving some more information about fungicide resistance. Could you please explain what fungicide resistance is and how it develops in pesticides and why we care so much about it?

[Ali] Thank you, Aaron. That's a really very good question. Fungicides are important tools for managing diseases in modern crop production. Unfortunately, one of the risk for using fungicide is the fungi sometimes develop resistance to them, which leading to lost disease control and unnecessary expenses by applying products that no longer work. Fungicides resistance mainly occur gradually or sometimes suddenly. In general, fungicide with a single side mode of action are a higher risk for resistance development.

If a single mode of action fungicide - people use or used alone for a long time, it's more likely to develop resistance against fungicide. In an orchard, resistance sometimes may occur naturally, even [if you] never applied a fungicide before, but all the time the resistant population grow. That scenario actually teach us that again and again, the same product, same fungicide will make the products no longer active against the starting pathogen. Thank you.

[Cato] Yeah. Thanks, Emran, I think that was an excellent answer.

[McWhirt] So when we talk about resistance to different fungicide classes, can you talk a little bit about how we understand if resistance to one specific product or active ingredient will also mean resistance to another product or active ingredient?

[Ali] Yeah, I think that's also a very important question. Thank you for asking me this question. Yes, fungicide are generally classified according to their mode of action or numeric we call FRAC Code. Then that's the reason for doing these is to facilitate the resistance management. Fungal pathogen that are resistant to one active ingredient or fungicide, often resistant to different active ingredient within the same FRAC code that has similar types of mode of action. This we normally would refer to as cross resistance. So I can give you one real world example. When you find resistance develops for a certain isolate in your field, to azoxystrobin, like strobilurin fungicide. All other strobilurin fungicide like pyraclostrobin or Trifloxystrobin... It is likely you will have no activity against these isolate as well.

[Cato] Thanks, Emran. And so now let's move more specifically about fungicide uses within strawberries. I think everyone that's listening currently knows that strawberries are a very high risk of significant yield loss due to the many diseases that affect the flowers and fruit of strawberries. So could you talk a little bit more about which diseases or the pathogens that cause them better that are exhibiting resistance in the Southeast? That may be problematic for growers?

[Ali] Yes, I think that's something that we all need to be very aware about that was related to a strawberry production system. The fungal diseases are considered as the major threat for the strawberry production in the southeast. Even (indecipherable) losses from the fungal diseases can exceed almost 50% when environmental conditions favor for the disease development. So anthracnose fruit rot caused by *Colletotrichum* and the botrytis or gray mold that caused by botrytis pathogen are the most significant diseases for the strawberry production in the Southeast. Interestingly, this is not only South. These two are the major problem worldwide for the citrus production. Some

other diseases like you can see like fungal leaf spot or bacterial leaf spot, leaf blight, powdery mildew are also seen in the strawberry production field in the southeast.

[Cato] And so just to kind of bring it home for the people that are listening – what can growers or extension agents do to prevent fungicide resistance from occurring on their farms, especially when we talk about anthracnose or gray mold.

[Ali] Yeah, I think that is also a very good question in terms of management issue. In general to prevent the fungicide resistant issue grower need to focus using multi-site fungicide instead a single mode of action fungicide or rotating as many different FRAC groups into their fungicide program as possible. We know there is not a lot of option in outside out, but as most as we can to rotate this single mode of action fungicide would be very great help for managing this issue. Also, we can do tank mixture with different mode of action fungicides we can put together and apply. That will also help to reduce the fungicide resistance issue. That would be also another way we can do the good culture practices that help us to manage this issue, like we can maintain the proper sanitation, weed control, scheduled irrigation and row spacing, etc. I think might help to make the disease pressure low in your field as well as the disease fungicide resistant issue will be down.

[Cato] Yeah. I think those are very important aspects of disease management. You know, when we talk about a single site mode of action, these kind of all kind of work in concert, like they're different sites of modes of action. Right? If you're –

[Ali] That's true.

[Cato] Yeah. So if you're select, you're not going to select as easily if you're integrating all these cultural practices alongside your fungicides.

[Ali] That's correct. Yeah.

[Cato] And so, let's move more specifically on what you do. Right. So at the plant molecular diagnostic lab at Georgia, you all work to identify whether growers are dealing with fungicide resistance on their farms. And can you talk more about why classifying resistance at that farm level is important for growers?

[Ali] I think that's a very interesting question because if they maintain the classifying resistance at the farm level, it will be very important tool. Ah, like to avoid the further spreading of fungicide resistance. Let's see. If you buy a plant materials or plants from a nursery with many times the pathogen also move along with the plant or materials. Whatever you buy from an certain nursery. If this pathogen have fungicide resistant

issue in this previous nursery or orchard, then there will be a similar fungicide resistant issue in the new farm too. That's why the clean on materials are critical for reducing disease pressure, as well as minimizing the fungicide resistant problem. In actually, in other crop system, I saw frequently people are making sure like buying their materials or plant materials, they make sure their product, whatever they're passing are disease free or pathogen free in that way, actually, we can maintain less fungicide resistant issue in our production system.

[Cato] Yeah, I think those are all very important aspects of it. And I wanted to bring it back to something you said earlier. You talked about, you know, using a fungicide that won't work and how that's a waste of money. Right. And so if someone was to send you samples and determine, say, maybe Elevate may not work on my farm, and then that grower could potentially just avoid using Elevate and use other modes of action FRAC fungicides. And that way they save money by not wasting an application. Right. Or and in the in the meantime, if they wasted that application, then the potential for that disease to build up or the pathogens to build up and get worse in their field.

[Ali] That's absolutely correct.

[McWhirt] All right, Emran, we just have one more question for you. So currently, the Southern Region Small Fruit Consortium, which is one of our sponsors on the podcast, is also provided support for growers to send in samples to your lab for free of charge until the funds have been exhausted to do some of this testing. So could you talk a little bit more about what growers will need to do to get you all a sample to determine if they have resistance in Botrytis or Anthracnose?

[Ali] Now, thank you so much. So as a practical question, I think this is a very important question in terms of the service we are providing. That's nicely explained. Our program allows for a single location in the Southeast that can provide fungicide resistant testing support for the multiple strawberry pathogens against multiple fungicides. The ultimate goal for our program is to provide support to the growers and grower advisor. Then they can able to establish a management protocol for their production system. This program actually very crucial to guide growers in their use of effective fungicide to reduce losses caused by fungicide resistance. The Southern Region Small Fruit Consortium, this year we have received funding to provide service free of charge to a small food producer in the member states. But we have funding limitations. The service we are providing until the funds run out, this will be completely first-come, first-served services. So a certain number of test we can do we are expecting all like a related to state would send us a sample we can do free up testing service, but as soon as the fund

run out, the producer will need to pay for the extra service. For sampling the MPL, accepts samples from preferably flowers, but we also accept samples from leaves, fruits. Even you can send us the cotton swab. We just taking the spore from Botrytis and send us that that those cotton swabs. You can easily buy those cotton swabs actually from the Walmart. You don't need to be concerned about auto-plating all of those things. You just simply buy those cartons from the Walmart and put in the block and send us for testing. For the Anthracnose rot sample we only accept fruits with disease symptoms. Please send us 15 to 20 freshly collected symptomatic samples. After collection of the sample, so what you need to do, you just place each sample and individual sealed plastic bag. Make sure, like that, the specimen or the sample you are collecting it are representing for the entire field, not just only some a specific area. So that that way we can make sure the result we are providing you, it will be very representative results for your orchard and during when you submit the sample, please make sure you are submitting the submission form with the all information we need. Especially we need your information, your email address, your phone number or spraying history. What you were sprayed last year or this year, the host species and a sampling location. So all this information will be very valuable for us to making up a very nice data that can be helpful for future fungicide resistant program management, very helpful tools, and be sure to send us sample by overnight delivery. We saw in last two years, sometimes people send sample in normal delivery that causes the sample degradation. So the result will be very different if the sample quality got degraded. So the more details about our sample submission and shipping address can be found on our website. You can visit the Plant Molecular Diagnostic Lab, University of Georgia. So all the information and the submission form is there, but is still if you need more information or if you have any troubles to get those form, please don't hesitate. Just email or call us. We'll be happy to provide you more information if needed.

[Cato] Yeah, thanks, Emran. So I have a quick question. I did a little bit of sampling last year and sent some in and so when you say 15 to 20 samples per field, you mean take 15 to 20 fruit or, you know, especially with anthracnose, individual fruit from different parts of the field and then put those within individual sealed plastic bags and then ship those together, right, and that would be one field? Right?

[Ali] That's true. Yes, you are right. So we need to collect 15 to 20. But in a different, different spot and different setback. You're right. That's correct.

[Cato] Okay. And I think I may have sent him one of the samples last year that was too degraded for you to look at. But it was it wasn't my fault. By the time I got the fruit from a grower, they were pretty they were pretty bad looking. They really wanted to know.

But we sent them overnight. And then by the time we all got on, they were extra degraded. So.

[McWhirt] Well, Emran, we want to thank you again for joining us today. This is some really important information for growers to have, especially where we're at in the season as we head into bloom. So thank you for joining us here on the Southern Fruitcast.

[Ali] Again, thank you so much for inviting me. Important topics to talk and I hope the growers listening these things and will be sending us more samples and we'd be happy to provide the services.

[Cato] Of course. Thanks, Emran.

[Ali] Thank you.

[Music]

[Outro – Cato] Thanks for tuning into the Southern Fruitcast. Our episodes are hosted by PodBean and also can be accessed on the University of Arkansas extension website at uaex.uada.edu/southernfruitcast . Here you can see all of our episodes and provide us feedback to help shape future episodes of this podcast.

[Outro – McWhirt] We'd again like to thank the Southern Region Small Fruit Consortium for funding this podcast. The consortium provides a large library of production and integrated pest management resources at smallfruits.org. We'll be back again soon with more updates on the southeast small fruit industry and interviews with specialists, researchers, and farmers from across the region.