

The Southern Fruitcast

Episode 13: Strawberry Fertility and Disease

Management with Dr. Jayesh Samtani



[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.

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[McWhirt] Welcome back to the Southern Fruitcast. Today, our guest is Dr. Jayesh Samtani. He's an assistant professor and small fruit extension specialist in the School of Plant and Environmental Sciences at Virginia Tech. Jayesh conducts research and extension outreach on strawberries and other fruit crops and is joining us today to update us on the season in Virginia and to talk a little bit about some of his research. Jayesh, thanks so much for joining us today.

[Samtani] Yeah, thank you, Amanda and Aaron, for having me on your program. Appreciate the opportunity.

[McWhirt] Yeah, we're glad to be able to catch up with you and hear a little bit about what's happening out in Virginia. So we heard before we started, we're just talking about the strawberry season. Can you tell us a little bit about how your season is going so far?

[Samtani] So far, this season has been going pretty good. When the strawberries are looking good and we are seeing an abundance of flowers and fruits at most of the farms. At some of the farms, you know, we had a warm November, as we all recall. The November this past fall was warmer than usual. And that kind of promoted a lot of growth on the on the plant. So we had some branch crowns well-formed ahead of time at some of the sites. Not all of the growers faced that situation, but some of them did.

And at maybe, you know, one or two locations, we are seeing that the plants are not flowering as much in the spring. Now, turning around in the spring, because I'm thinking that, you know, they want to be put on some flowers, some just, you know, pre-Christmas and fruits pre-Christmas. And that may have affected how they're going to use it in the spring. And that, as I said earlier, it's just one or two farms that I'm seeing this situation. But at other farms and the plants, the plants are looking pretty good and we are optimistic that we would have a good season.

[McWhirt] Well, that's great. You know, something that's been happening here in Arkansas is we've had two major freeze events - like really historic freeze events. Have you guys have any problems with weather so far this season?

[Samtani] Yes, we did. You know, we had to take some frost protection coverage, with row covers, and some of the growers also used overhead irrigation in the first week of April and then again yesterday with some of the growers had to cover their plants and this is more on the east coast of Virginia. And if you go farther inland and there's been more nights that growers have prepared to watch out for and take additional cautions with putting row covers down, a lot of them in Virginia use row covers for a good part of the winter season as well in order to protect the crown. So a lot of growers have done that and that's pretty typical. That's something unusual for this time of the year. You know, we just have to watch out for those frost lines and think about the cautionary measures. So nothing unusual this year. But, you know, the growers have kind of followed the recommendations are doing well. And we're just looking forward to the abundance of fruits they are going to have this year.

[McWhirt] Yeah. No, that's great. So, are you all just starting to harvest or are you still mostly at Green Fruit Stage?

[Samtani] Yes. So most of the farms are at their green fruit stage. Our harvest is probably going to start trickling in next week. We did see some Sweet Charlie fruits that are starting to redden up this week. And at the Hampton Roads Agricultural Research and Extension Center, we are doing some light picking on those Sweet Charlie's.

[McWhirt] No, that's great. So you mentioned Sweet Charlie. What are some of the other common cultivars that are grown in Virginia?

[Samtani] Yes, that's a good question. We have Chandler, there used to be a lot more glamorous, but more and more growers are not shying away from Camarosa. We have Ruby June that is getting quite popular. Rocco is quite popular. I think there are some growers who said they had challenge in getting the plant material for Rocco. That's why

I think they are in on the number of growers actually going it at their farms are fewer than the year before. But those are the main ones: Sweet Charlie, Chandler, Camarosa, Ruby June and Rocco trickling in this past season. and Camino Real about Camino Real that's a pretty popular one too. So, Sweet Ann is starting to trickle in on the East Coast of Virginia, our growers are trying to sweep down in the field but that doesn't take rain conditions very well during the harvest season.

[McWhirt] So another thing that you've been working on is, you know, determining some pre-plant nitrogen rates in strawberries for different cultivars. Can you tell us a little bit about the project that you and your collaborators are working on?

[Samtani] Yeah, so this is a preliminary study that I started this past fall, and it's funded by the Southern Region Small Fruit Consortium as well as a grant that they've got internally. And so what we are trying to do is, you know, just looking at different preplant those rates, we are using zero, 30, 45, 60, and 75 as a preplanned nitrogen application dose rate. And that's all excuse me, that's in the fall. And then in the spring, they're going to try to achieve about an additional 60 pounds of nitrogen on a per-acre basis. And we have different varieties. So this is a non-replicated trial. We just want to collect some initial data. We have several varieties and those are Chandler, Camarosa, Ruby June Festival. And then we have three advanced germplasm from Lassen Canyon Nurseries, the 1460, 541240 and 1335. And that's going to evaluate how they do collect some information on the marketability. the total yield, collect some post harvest data with the food size, sugar content so fondness this look at some biochemistry inside the fruit so some biochemical and biochemical analysis. And I'm working on this with Dr. Mark Hoffman at North Carolina State University, and he and I kind of exchanged some ideas on what kind of rates we need to go with. He is also going to help us bring some site analysis, looking at the nitrogen content and the science with these different nitrogen rates. And then I'm working with the faculty at Virginia State University and Dr. [unknown] who's going to help me with the biochemical analysis of the seed chemistries. So we are hoping to get some baseline information. And the reason we are doing that is because, as both of you probably know, that we've got limited studies in strawberry and nitrogen in our region. So we don't have a good understanding of what these newer varieties might need in terms of their impact on nitrogen rates. So we are hoping that, you know, getting this information gathered to help us maybe putting a larger study forward and help us crafter better recommendations from the extension standpoint.

[McWhirt] So are those pre plant nitrogen rates? Are you putting those out before you bed up like in a broadcast application? Are you putting those out through the drip?

[Samtani] Yes. So these are put down before the strawberries get planted and they were laid out and they were incorporated at the time of bed making.

[McWhirt] Yes, that's great. Well, we'll look forward to hearing more about your results as they start to come in.

[Cato] Yeah, it's really interesting, especially with the variety trial that Amanda and I are doing. We see, you know, just a huge range in growth habits for a lot of these different cultivars. Some kind of just jump out of the gate and grow real tall first. Others kind of are a little slower and build on size. So it'd be interesting to see if they're using nitrogen differently, you know, especially more in the front end or things like that.

[Samtani] Yeah. Yeah, I'm excited. And, you know, I'm hoping that we can see some differences and use some of that information to develop a more reasonable proposal going forward.

[Cato] Yeah, that would be really useful. So with, you know, talking about some other work you're doing, you know, you talked about y'all are heading towards harvest. I think here in Arkansas, we're about a week or a week and a half ahead. North Arkansas anyways. I know we were - our Sweet Charlie was coming off early last week I think is when we first started picking berries off of it and a little off Rocco. Yeah, Rocco was the one that's coming up early too. So now's the time that we're going to start seeing how well these fungicides that we've been spraying are actually doing. And so you are actually working on evaluating the SAS system developed by the University of Florida for use in the Mid Atlantic. Can you tell us about what that system is, why you're testing it, and maybe what you're finding so far?

[Samtani] Yeah. Yeah. So this work is actually initiated by Dr. Mengjun Hu, an assistant professor in the Department of the plant pathology at the University of Maryland College Park. And he and Dr. Johnson, who is on staff, sponsored the college's initiative. This works and I'm just kind of following up on since Dr. Johnson has retired, so as of this December of 2020, so I'm just kind of following up. We're looking at this SAS system that FL growers have adapted, they're now using it. But the difference from Florida to the mid-Atlantic is they'll be using row covers and that can influence sort of the use of proposed changes, the microclimate conditions, and then the strawberry plants. So we are trying to maybe apply some micro sensors to see if we can get a better understanding of what the action environment might be with the use of row covers and then trying to utilize that information and adapting the SAS system that way and Mengjun means you would probably have a better understanding of how it is looking. I know that one of the years we did not have as good a result just using, you know, the

SAS system as the product that FL growers are using. That's because they rely more on the weather and weather stations and that doesn't seem to work quite as well with the mid-Atlantic region here. So we have just trying to tune it to see how it row covers and how we can understand the microclimate of the conditions better with the use of the farmers.

[Cato] Right. And so can you just basically explain what the SAS system is in case growers listening don't know what it is?

[Samtani] Yeah. So it is a strawberry advisory system that the University of Oregon, Dr. Natalia Peres worked on it. And what they do is they monitor the weather conditions and then that SAS system triggers so as to when fungicide application needs to go out in the field and that's targeted towards controlling botrytis And that's basically the whole idea. So it lets the growers know that the conditions are favorable for botrytis fruit rot. And we do kind of go ahead and spray a field.

[Cato] Okay. So that's going to be based on maybe humidity, projected leaf wetness and then also temperature. And so yeah, so combining those characteristics to determine how the leaf has been wet long enough and has the temperature been right for infection to happen or spores to be released and things like that. Gotcha, gotcha. And so some other work you're doing with kind of in the same plant pathology realm is your research an alternative fumigants for strawberry? So we know you've done work on solarization, ASD and bacterial endophytes treatments. Would you be willing to share something about that work.

[Samtani] Yes. So most of my work in the big plans, like fumigation, I look at maybe natural disease occurrence in the field, but my focus is mainly on the weed aspects of it and trying to see what kind of non-fumigant alternatives we can utilize to achieve weed control. Because early season weed control can be quite problematic as the weeds can compete with the strawberry plants and the plants are at the younger growth stage. So we are trying to see what kind of strategies we can employ. One of the things I looked at when I first came into this position was solarization, just utilizing the clear tarp instead of a black tarp and then running drip irrigation prior to planting the berries to make sure you have a good 70% capacity of the moisture content is at 70% capacity and doing it for about 4 to 6 week period or solarization. And what we found is in six weeks sun solarization is more effective than a four weeks sun solarization or a 3 week – we have also tried three weeks it more so the three week is probably going to give you like early season weed control and that's probably best you're going to get out of it. But if you go, like, a longer time period starting, maybe we initiated a sun solarization in the

middle of August and that seemed to help a lot better. We got comparable weed control and better in some cases and you compared it to the fumigant 13b. The best thing is what to use and of course it depends on, you know, the higher rate may give you better control like the one treated as things with the rate we used and we got similar or better control of the 60 percent sun solarization. In terms of yield, we didn't really see any difference as such. Any of the non-treated actually was comparable with the fumigated panel before we got a probably one of the reasons we think is because when I started this, it was a new site, it was strawberry production. So maybe the pest pressure was not as high and that may have influenced that we got good yield of that even with our non-treated control. So yeah, I think it's also very site specific. It also depends on how early you can start. For example, if you can initiate a sun solarization to for 8 weeks, that means you have to start end of July. You might even get better effectiveness over six weeks on solar solarization. So the duration of sun solarization is really important and that's kind of the key. For growers who would like to try it, I would say just try just out of a smaller scale, it's definitely better than a non-treatment. I would say in most cases you will see improvement. Maybe not as well as fumigation and some. But again, it could be site specific depending on what kind of special unit you have and what your intentions are in terms of the target pest species to control, whether that species is more tolerant or more sensitive to the influence of our harvest solarization rate and if it's your site. And then with my last PhD student, we looked at anaerobic soil infestation strategy and that includes incorporating a carbon source and then making the soil moisture level about 70% capacity and in this case we excuse for you want to be you want to make sure that they're near feeding capacity in terms of moisture content. So in this case, you don't really need a tarp though you could integrate it inside sun solarization and. But in our case, we just used a black tarp. And the idea is that, you know, you create these anaerobic conditions by filling in water into those beds. So all of the air spaces taken on by water and then that carbon source that you know the anaerobic microorganisms begin to capture your soil profile and you do that for about 3 to 4 weeks period. And then you go back and punch your holes after the treatment is done to make a strawberry planting holes. You don't plant strawberries at that time. You want to make sure that you bring back aeration into the soil. And once you punch those holes, the aeration gets introduced back into the soil profile and then you can plant strawberries after about a 10 to 14 day period of bringing back the aeration into the soil. So the idea is that by then most of the disease causing organisms are anaerobics that they would be driven out of the raised bed and then bringing back aeration. Then hopefully it will not bring back any, you know, anything that goes in the soil gets spilled. So the only way that you would blend, reintroduce anything that the

soil borne would be essentially through the black plant materials that the plug plant is clean, hopefully will not have a problem with even that environment and the soil. So we've seen, again, you know, some years that does really good is we find compatible or better results with as many compared to the big nor definitely better than the non-treated. But with the fumigant it's, you know, either a step up or at par or maybe a step lower depending on the year and again it would be very site specific. So I think growers just have to, you know, try it out at a small scale and see how it does. Because I would think that even the fumigant is not the perfect soil strategy.

[Cato] Right. Now, seems like this is you know, these are good alternatives, especially for growers who are trying to do organic production and then also smaller growers like in our region who don't fumigate or many of them just, you know, have kind of gone away from fumigation as methyl bromide went away, but also for people with limited land. So all the time we talk about rotating land and growers kind of look at us funny and we're like, yeah, we know not everybody has, you know, extra acres set aside. And so I'm sure that there are some people out there that have much higher, you know, pressure from diseases or weeds or things like that, where some of these strategies could be employed is, you know, starting out, like you said, in the small, small area to see if you're getting any benefit. But.

[Samtani] Yeah. Yeah, that's true. And I think one thing that I would want to, you know, just put it to the to the audience is this thing that is, you know, when you are trying to think about is the answer to see what kind of carbon source you may have. Because it seems like from our greenhouse studies, any of the carbon sources would work fine it just depends on what you have available because in our case, you know, a strawberry get planted first thing somewhere on the east coast of Virginia, the coastal plain. And. So you really have to think that they're going to start back or do you have to think about five or six week backwards? They're looking at maybe the middle of August again. And what kind of carbon sources do you have readily available at that point in time. The grower can grow cover crop if they want and then will have that as a carbon source. But sometimes growers may not want to go through that hassle of growing the cover crop. They may not have the land or maybe too much for it. So think about what you have around you that we could utilize as abundance source. In our case, we had a couple of breweries that were willing to are willing to give us the brewers spent grain for free. And all we have to worry about was transporting it to our site. So if you have a pickup truck or you have something larger to carry, that might be an option. Check with your local breweries around you to see if that is an option. Or you may want to grow your own crop and utilize that as a target source.

[McWhirt] Yeah. So one thing that we have in Arkansas is a lot of rice production. And so we actually did a trial, a little demo once to try and just assess using rice hulls as a carbon source for ASD. [I would] be interested to hear from you, Jayesh, what - we were doing it with a grower - and one of the struggles we had was that, you know, you have to keep the soil very well saturated or, you know, very well moist. And so it was a little difficult for him to do that because we were really only doing it on a small part of his land and he didn't really want to water the rest of his plants or the rest of his rows as much. Can you talk a little bit about, you know, how you have monitored keeping the moisture where it needs to be? And a little bit about that process, like really how often do you have to water?

[Samtani] Yeah, so I think that's a good question. It could have become a little bit of a challenge from the grower's perspective. In our case, you know, we did some - at our other research center. Some of these trials are done on the center. So what we did is we pretty much made our beds at the same time. So let's say if you have beds where you don't put in carbon and you don't want to do the ASD - the drip set up - was set up. So we had like an on /off valve getting into each bed. So you may want that extra valve in place where you can open certain beds where you want to do the ASD and those so to keep the values on those beds because they don't want water dripping in but our water was injected through the drip tape after the beds were made. So carbon was integrated, mixed well and then beds were made and then the water injection started after the beds were made. In terms of the moisture, we have access to a moisture meter, so that's how we did it. But if a grower does not want to invest in a moisture meter that has probes that can go in and then you can check. And you don't have to do that all the time because eventually you do get a feel for the moisture and what it would be like by just getting a field by pressing the firmly on the bed so the bed is still firm and feels hard means that we need to probably put in more water and then it begins to soften up, I think that's a good place to stop. You don't want to get it. You don't want the bed to get too soft because that would be like an overdose of water. Just do it just to a point that you can feel like, okay, it's starting to soften and then you just have to keep checking it every day or two and make sure that you're not running low in water and just start feeling the bed on the surface is a good, good way to assess that. It may not be the most accurate way, but at the same time we don't want too many holes getting into your bed with those moisture probes because in trying to really make it impermeable - the tarp should be impermeable.

[McWhirt] Yeah. No, I really appreciate that insight. Those are some great tips for growers who are interested in trying this out.

[Samtani] Yeah, and we are excited.

[McWhirt] All right. Let's switch gears a little bit. We've been talking a lot about strawberries. Let's talk a little bit about blackberries. So Jayesh, you and I and a few others across the southeast that are involved in the Southern Region Small Fruit Consortium are interested in doing some more work on fertility management and blackberry. Right now, there's a survey that you're helping to lead, trying to kind of gauge current practices that growers are using for fertilizing blackberries. Can you tell us a little bit more about what we hope to determine with this survey and how growers can access it if they're interested in contributing?

[Samtani] Yeah. So, you know, this survey, as you mentioned, Amanda, it was put forward by a couple of small fruit extension specialists in the southern region. And again, the sample was initiated by the Southern Region Small Fruit Consortium. So we're really trying to reach out to the growers in these various states that are part of the consortium, just to see what are, you know, what are the fertilizer practices that they are using and their farm numbers. Blackberry production can be quite interesting as well as we have a lot of varieties, options with varieties. We have options with trellising systems, we have options in primocane vs floricanne fruiting varieties. And I think we need to reassess from the extension standpoint, you know what kind of opportunity or it was as we need to recommend to the growers so they can optimize their fruit yield. Also one of the things that, you know, I did not mention earlier that the nitrogen can also influence our fruit yields through is and also can translate into what may be disease and insect susceptibility. So those things can also get influenced by how much of the nitrogen as well as maybe some of the other nutrients that are going into the soil involved can influence fruit quality. Fruit quality has been a challenge for blackberry. There are already attacks based on the spotted wing drosophila and then also a couple of other pests as well as the diseases that then, that can affect its fruit quality. And sunburn is an issue. So it's got a lot of challenges in getting marketable fruits and getting good quality fruits. So we are trying to see of understanding this, you know, fertility rates, what growers are doing and trying to maybe see what we are recommending and then utilizing both of this information to develop future studies that can be set up at maybe two or more states in the southern region and try to get an understanding from replicated studies then from the field, hoping that these experts would help us create better recommendations for the growers who do what they want. Double cropping, so sorry can only campaign on the as well as the different trellises systems. So there's not going to be an easy answer, but it's going to be our efforts going forward and utilizing

the information from the survey and then looking at what the extension currently recommends and then setting up some trials moving forward.

[McWhirt] Yeah, that's great. So we're really hoping that we'll get some good feedback through the survey that will help drive future research. So this is the opportunity for growers to really help have an input in and the direction of this research effort. Jayesh, where do you recommend as the best place for growers to access the survey if they haven't seen it yet?

[Samtani] Yes. If you haven't seen it, you know, I have put those links on my social media sites that I maintain. There's one on Twitter and Facebook you can look by searching for witty Betty by its very and then as far as standing for business information technology environment and science invite some and then also our newsletter has a link to it. So if you want to catch up on the latest news on blackberries, go to the news page webpage and look out for the latest newsletter and you'll see an article, an introductory article on blackberry interrupting about an overview of the blackberry issues. And there's a link to the survey out there as well.

[McWhirt] Yeah. Thanks, Jayesh. So yeah, just to re-emphasize that if you go to smallfruits.org, there's the small fruit newsletter that comes out four times a year and our April edition just came out last week. So if you go to smallfruits.org and search for the newsletter in the April edition, the April edition is all things blackberry. So we have articles from a range of specialist on all kinds of different topics, and we're trying to push forward research on fertility. And we appreciate your leadership on that, Jayesh.

[Samtani] Yeah, thank you.

[McWhirt] Well, Jayesh, thank you so much for joining us here today on the Southern Fruitcast. We really appreciate you sharing some updates on what's happening in Virginia.

[Samtani] Yes, 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.