



Episode 5— Soil Fertility March 19, 2021

Speaker 1:

The Alabama Crops Report podcast, your trusted information source for Alabama agriculture.

Scott Graham:

Hey, everybody. Welcome in to the Alabama Crops Report podcast. I'm Scott Graham, an extension entomologist.

Dr. Amanada Shear:

I'm Dr. Amanda Shear, an extension plant pathologist. We're excited to be releasing regularly scheduled podcast episodes with up-to-date information about Alabama crops throughout the year. You'll be hearing from extension personnel from all over the state with the latest research and management recommendations. How are you doing today, Scott?

Scott Graham:

Oh, I'm doing pretty good. How about you, Amanda?

Dr. Amanada Shear:

I'm doing good. Just waiting for this severe weather to hit Auburn and the Opelika area. I know some people in Huntsville have already lost power today.

Scott Graham:

Yeah. As we're recording here today where it's kind of in the middle of a bunch of weather alerts across the state. Thankfully, a lot of folks were able to take advantage of some pretty days the last week or so, and started getting some field prep done.

Dr. Amanada Shear:

Yeah. That definitely was some good weather for them the last week or so.

Scott Graham:

Yep. Absolutely. All right. Well, our guest today is Dr. Audrey Gamble. Audrey is an extension soil scientist. She pretty much has responsibilities in all the row crops. We'll let Audrey kind of introduce herself. Audrey, how are you doing today?

Dr. Audrey Gamble:

I'm doing great. Thank you all for having me today. Yeah, so like Scott said, I'm an extension soil scientist. I work with most of our major row crops within the state and focus on soil fertility and soil conservation.

Scott Graham:

You know, I will say, I think you're missing a good opportunity to call yourself an extension dirt doctor, get some good alliteration there.

Dr. Audrey Gamble:

We just can't call it dirt, Scott, as you know. We've got to call it soil. I've been called the soil queen and all kinds of things.

Scott Graham:

Cover crop too, right?

Dr. Audrey Gamble:

Yeah, cover crop queen.

Scott Graham:

Yeah, yeah.

Dr. Amanada Shear:

Yeah. You better trademark some of those.

Scott Graham:

Well, what do our producers need to be thinking about right now as far as soil fertility? I know we do a lot of that kind of stuff in the off season too, but there's some things once we get around planning we need to think about as well.

Dr. Audrey Gamble:

Yeah, for sure. I hope that at this point, throughout the fall and winter seasons, all of our farmers have already taken all their soil samples, had those analyzed, and started making some decisions, especially with lime. I hope that most of the lime applications that need to go out for our row crops this season are already put out, because lime can take a good amount of time to react with the soil and bring the pH up to where we need it to be. If lime hasn't been applied yet, that's okay, certainly producers can do it, but I think it's hopefully time now where we're getting ready to make decisions on all our naturing applications.

Dr. Amanada Shear:

So, Audrey you're mentioning making good management recommendations and planning for soil nutrition. A lot of producers will do a soil test. They can go either with Auburn University, or sometimes they use commercial labs. What are some of your recommendations when talking about making decisions based on what the results that they get from these different labs?

Dr. Audrey Gamble:

Sure. I think soil testing is very key in order to make good economic decisions about fertility, whether it be phosphorus and potassium, or liming on our various soil types. Regardless of where you send your samples, I hope you have a good soil testing program so that you know what you're working with in your fields. At that point, I think it's up to the producer once they receive results to figure out how they want to use that information and the recommendations that are given within a soil test report. For example, if a farmer sends a sample to the Auburn soil testing lab, we're going to give some recommendations for nitrogen phosphorus, potassium, as well as lime recommendations and any additional nutrients that need to be applied. We can guarantee that the recommendations that are given by Auburn University are based on research, and it's based on research that's been done in the different soil types of Alabama.

So, I think that's very important for our producers to understand, is that we have so many different soil types within the state, and we want to make sure that any of the recommendations that we're using are based off of information for their given soil types. We're certainly going to take that into account with the samples that are sent to the Auburn lab. Like you mentioned, Amanda, a lot of samples are sent to commercial labs, and that's okay. Sometimes the recommendations that are provided by those labs might be a little bit on the high side and may not be the most economical way of applying fertilizer. But we can use the reports that are generated by those labs, as long as they're using the correct extract, which for most of our soil types is [inaudible 00:04:56] one, we can easily convert those soil test values from the report and get university-based recommendations from that report.

Scott Graham:

So, Audrey, is what you're saying with that basically I send in my soil report to a private lab, they send me back an email, I assume a PDF piece of paper, and then I can just give that to you guys or the folks at the soil lab and they can report it without even have to actually test my soil?

Dr. Audrey Gamble:

Yeah. We can take the information in that report. Again, as long as the correct extract was used, you can contact your local regional extension agent, or me, and we can help you make those conversions. We also have a new online tool so that a farmer can take the results that they get for their various nutrients, pH, buffer pH, all of those things, put them into this online tool, and generate an Auburn recommendation.

Scott Graham:

Yeah. One of the things I think is neat, you hit on it there too, is how different our soil types are across the state. When you look as, an outsider from Alabama, somebody from Mississippi, coming into Auburn and seeing how many different research stations we have, it's almost a little overwhelming to try to feel like, "I need to put a bug trial out on every single one of those." That may or may not be true, but it is neat that we've got these research stations on all of these different soil types. So, in a world like yours, where that's so important, we've got the ability to do that. Not really a question or anything, just a comment there. I think that's great that we've got those research stations, and I think they're very, very important for us as extension scientists and applied researchers, really helps us answer real world questions for our folks out in the state.

Dr. Audrey Gamble:

I appreciate it, Scott, and I do echo that that is extremely important. When these research stations were established, that was definitely something that was considered, is that they tried to establish these stations on areas where some of our benchmarks oil types in Alabama or our most common soil types are present at those stations so that our tests are representative to a wide array of farmers.

Scott Graham:

One thing, I had to go back home, speaking of, I went back home to Mississippi this past weekend. My wife was in a wedding, and I rode through the black belt part of the state. There were a lot of folks getting the ground ready, some sprayers going out with burn down herbicides and things. What kind of makes that soil type unique to the state, and what the folks that are forming those soils need to be thinking about right now?

Dr. Audrey Gamble:

That's a good question. It's definitely a challenging area to farm in the black belt region of the state, which kind of runs starting along Montgomery County and through Dallas and Hill and Hill counties over into Pickens County and kind of makes a crescent shape throughout the center of the state, the soil types in that region have a very high clay content. Some of them, they're derived from calcium carbonate parent materials, and because of that, some of them have a very high pH. Some of them are acidic, but that comes with its own problems in terms of

moisture retention. Sometimes, it can be harder to time trips into the field in those areas because of standing water, or on the other end, when it's too dry, it really just becomes a rock, essentially.

It's a difficult area to farm in, and the pH in some of those soil types can be very challenging as well. Most of our soil types in Alabama, they're going to be acidic, and we have to apply lime in order to bring that pH up to an adequate level for plant growth. There in the black belt, if you're on a high pH soil, there's really not much you can do in terms of management, and there's going to be some very specific nutrient issues that may come into play. So, when we get into those high pH ranges, some of our micronutrients like iron and manganese can become deficient.

That's one thing that those farmers face. One of the tools that we have is just growing crops that are more suited to those soil types. As an example, when it comes to soybean, soybeans are pretty intolerant of that high pH, but we have varieties that are more resistant to some of the nutrient issues that come into play there, like iron deficiency chlorosis. In our variety trials in that region on our high pH soil types, we actually provided iron deficiency chlorosis ratings in our soybean variety trials so that farmers can use that information to make planting decisions, because it's very difficult to correct the problem without using resistant varieties.

Scott Graham:

So, a good opportunity to some kind of a patent out if you can figure out how to change that high pH.

Dr. Audrey Gamble:

Yeah, yeah. Yeah. Some of the things that we can do in other soil types in Alabama, a good example is if you're working on a pH of about six and you want to grow something like blueberries and need a lower pH, well, sometimes you can apply things like elemental sulfur, ammonium sulfate, and that'll actually reduce the soil pH. But because in those black belt soils, it's essentially so high in calcium carbonate, which is essentially ag lime, it just has a really high buffering capacity, and it prevents that pH from being lowered. But, yeah, if someone can figure that out, that'd be great.

Dr. Amanada Shear:

Now that'd be great now that you've kind of given some good recommendations on how to get soil pH in the correct range, what do farmers need to worry about next?

Dr. Audrey Gamble:

Again, in terms of phosphorus and potassium, these are two of our big macro nutrients, apply according to soil test. We love for you to use Auburn recommendations because we do have that research that we've used to correlate nutrients in the soil to yield the various crops. I feel good about those recommendations. Of course, the other big nutrient to be concerned about would be nitrogen. Especially in our cotton and corn acres, farmers are going to need to be making decisions about how much nitrogen to put out at plant, and then eventually their side dress. For cotton, we're typically going to be around the 90 pounds per acre range in terms of maximizing lint yield. Then in areas where maybe we haven't seen adequate vegetative growth in the past, we

may bump that up just a little bit. In areas where we have excessive vegetative growth, we may knock that down a bit, because if we get too much nitrogen for cotton production, you might have to give Scott a call to help with your insect issues.

Scott Graham:

Yep, that's right.

Dr. Audrey Gamble:

Or get into issues with boll rot and things like that. So, again, around 90 pounds tends to be where we're able to maximize lint production of cotton. So I like to put out about a third of that at plant, and then go back with two thirds of that side dress. For corn, it just depends on the level of management and it depends on the area of the state that you're in, but in our more northern soil types, like for example, in the Tennessee Valley, we tend to be able to get away with about one pound, maybe say one to 1.1 pounds of nitrogen per anticipated bushel of yield.

But in the coastal plain, we may be looking more like 1.25 pounds of nitrogen per anticipated bushel of yield, give or take, depending on how much loss of nitrogen you expect. Nitrogen is just difficult to manage because it's so variable and we have so many loss pathways. If we have excessive rainfall, we can get a significant amount of leaching loss of nitrogen, or if we're putting out urea and we have hot dry weather for a few days after we apply, we can have significant losses through volatilization. Sometimes, there's going to be adjustments needed on nitrogen rates, just depending on how much loss you anticipate.

Scott Graham:

Is that part of why you would prefer for cotton, for instance, to split your applications?

Dr. Audrey Gamble:

Absolutely. The more efficient you can be, the better. The more you can split, the more efficient you can be. At minimum, for cotton and corn, you would like to see at least two splits where you put out a quarter to a third at plant, and then two thirds to three quarters at side dress. If you're able to split that up into more applications, that can be beneficial as well, just so you can get it in the plant when it needs it most and when it's taking up the most.

Scott Graham:

You're cutting into my bug trips going across the field. You start getting three and four nitrogen applications out there.

Dr. Audrey Gamble:

Yeah. Well, I hate to do that for your sake, Scott, but if we can avoid those issues for the producers, that's a good thing.

Dr. Amanada Shear:

Well, she's also cutting into my trip. Soil fertility actually goes a long way in preventing a lot of diseases as well. In cotton, last year we saw a lot of Stemphylium leaf spot, and that's more of a secondary disease issue. It's really brought on by deficiencies in potassium that can be brought on by low fertility or even heavy rains or leaching from the soil. Unfortunately, once you're that far in the season, at the fourth week of bloom or later, there's not really much you can do to reduce Stemphylium and some of the other diseases. You can't really rescue them with those foliar applications of fertilizers.

Dr. Audrey Gamble:

That's a good point. The issue with foliar is, let's say potassium deficiency, you want to put out a foliar spray of potassium. Well, you're applying max about four pounds of potassium per acre every time you spray with one of those foliar products. At peak bloom, that's about how much potassium you're taking up every day, three to four pounds of potassium every day. It's just really hard to keep up with the demand through foliar application. If we can make sure that our soil test K is at the right levels to begin with, and that we've taken care of other issues in the field that might be occurring, like compaction or nematodes, that's going to help us increase that availability of potassium and make sure we have good, healthy plants that can be resistant to disease.

Scott Graham:

All right, Dr. Audrey Gamble. We appreciate your time today. A lot of good information. Enjoy having you on the Alabama Crops Report podcast.

Dr. Audrey Gamble:

Thanks. This was a lot of fun.

Speaker 1:

The Alabama Crops Report is a production of the Alabama Cooperative Extension System and is sponsored by Alabama Ag Credit.