

## Weeds AR Wild S3 Ep13. See and Spray Ultimate

### **[00:01] Intro/Outro**

Arkansas Row Crops Radio, providing up to date information and timely recommendations on row crop production in Arkansas.

### **[00:12] Jason Norsworthy**

Welcome to the Weeds AR Wild podcast series as a part of the Arkansas Row Crops Radio. My name is Jason Norsworthy, Distinguished Professor of Weed Science for the University of Arkansas System Division of Agriculture. And today, I'm glad to be joined by Lauren Lazaro. Dr. Lazaro is with John Deere and then also a graduate student of mine, Mr. Tristan Avent. Lauren, glad to have you on today's podcast.

### **[00:39] Lauren Lazaro**

Thank you. I'm excited to be here.

### **[00:41] Jason Norsworthy**

How about you, Tristan?

### **[00:42] Tristen Avent**

Great to be here as well, Dr. Norsworthy.

### **[00:44] Jason Norsworthy**

We're out of the heat, aren't we?

### **[00:45] Tristen Avent**

Yes, sir, we definitely are.

### **[00:46] Jason Norsworthy**

I'll tell you what, folks, here it is. It's middle of June getting towards the end of June and it's starting to get warm. So today we're wanting to talk some about the John Deere See and Spray Ultimate. This is a new sprayer that John Deere launched I guess, Lauren, it would be this is the first year that we've got commercial units out there spraying, is that correct?

### **[01:09] Lauren Lazaro**

That's correct.

### **[01:10] Jason Norsworthy**

And so with that, John Deere has partnered with, I guess, six, seven universities across the – five universities is what she's showing me now – five universities across the U.S. to actually test a prototype of this See and Spray Ultimate. And for those of you that aren't aware of the See and Spray Ultimate, tell us a little bit about the See and Spray Ultimate. What is really what's the value? Why would a grower have interest in the See and Spray Ultimate?

### **[01:35] Lauren Lazaro**

Sure. The See and Spray Ultimate is a dual tank system that has a dual boom system as well. So we've got a broadcast boom and a See and Spray boom, which is a targeted sprayer. From the tanks all the way to the nozzle tips the solutions remain separate, and this really allows for expansion on various herbicides

that can, you know, really help with various things like tank mixes that may not be allowed, potentially antagonism effects and allows for fewer passes across the field.

**[02:08] Jason Norsworthy**

So basically you're taking in with two tanks on a sprayer. You're able to put one material in a tank, another material in a different tank, spray the amount of different, basically, nozzles and hence, maybe mitigate some of the antagonism that we see when we routinely tank mix products, is that correct?

**[02:28] Lauren Lazaro**

Correct. And those sprays are happening simultaneously.

**[02:31] Jason Norsworthy**

The simultaneous application. And Tristen, I know you've been part of actually testing that. Where you've looked at some herbicides such as, I think dicamba, graminicides, and was it Clethodim? That's right, Clethodim or Select, the Select-type products. We routinely see antagonism when we mix those with auxins – 2,4-D, dicamba. I know volunteer corn is a major concern, probably more so in the Midwest than it is down here, and we can essentially take it out with a high degree of success when we use something like the See and Spray Ultimate when we're able to separate those. Is that correct?

**[03:10] Tristen Avent**

Yes, that's, that's definitely correct. We saw alleviation of antagonism by utilizing that dual boom system with See and Spray.

**[03:18] Jason Norsworthy**

You know, I really, I think that's one of the major benefits of this See and Spray system – the dual boom. But really, also this is a targeted spray system. So, this is where it's only going to spray at least the See and Spray portion of the boom is only going to spray where weeds are located. And I know with that, Lauren, you guys have collected a lot of research, that being John Deere, we've collected research tell the our listeners a little bit about what you guys are seeing from a reduction in herbicide use and how do you really maximize that reduction in use.

**[03:54] Lauren Lazaro**

So there's a lot of variables that play into that, such as weed density and sprayer setting. So there's something called sensitivity levels where we have ranges from levels 1 to 5 that the grower can choose. So, a level one is you are going to be spraying more, essentially, you're going to be less confident about what you're seeing is actually a weed, whereas a higher sensitivity level, that level five, you're going to be spraying less because you're more confident that there is in fact a weed there in what you're spraying. You can also adjust the buffer edges. So how much of an area is being sprayed? So all of those different variables played together on how effective that machine is going to be.

**[04:36] Jason Norsworthy**

And so basically that's going to influence what we call hit rate, whether it hits the weed or it misses the weed and, you know, weed size based on what we've seen – and Tristen I'll let you chime in here – but, you know, weed size is probably important. Weed species is important. And then what are you seeing in terms of the extremes? What kind of hit rates are we getting or what kind of miss rates are we getting based on those sensitivity settings?

**[05:01] Tristen Avent**

Yes, sir. I mean, this this can go back to my long-term study. I actually talked about this at the field day last year. And for those of you that were there, thank you for being in attendance. But that low sensitivity setting, we did have some escapes at the end of the season. And I don't want to put a number to it per say, as to how many weeds were missed at this point in time. But we did miss some weeds at the time of those applications. Now, our high sensitivity setting was comparable to that of our broadcast program. And essentially what we've seen this year, because those, those plots are in the same place that they were last year, we're actually seeing more weeds in those low sensitivity plots as a result of those escapes going to seed from the previous growing season.

**[05:46] Jason Norsworthy**

So what I think that tells our listeners is if you have the John Deere See and Spray Ultimate and you want to turn that sensitivity setting down where it detects fewer weeds, yes, it's going to save you more money this year. But there may be long-term ramifications there from a standpoint of greater seed bank inputs. Would you agree with that?

**[06:05] Tristen Avent**

I would agree with that. And that's also going to lead to us actually spraying more herbicide the following year, costing us more money.

**[06:11] Jason Norsworthy**

Exactly. So really with that, we may reduce the savings when we turn that sensitivity setting up, but we're probably more likely simulating what we see in the broadcast and actually the data that we have thus far says when we turn that sensitivity setting up, it does look a lot like a broadcast system. Would you agree with that?

**[06:31] Tristen Avent**

Yes, sir, completely.

**[06:33] Jason Norsworthy**

You know, something else that was mentioned here and I think, Lauren, you mentioned it just a moment ago, is, I think densities and also of residual herbicides. And I think a key takeaway from what we've seen with the See and Spray is it's not that you take residual herbicides out of the system. Would both of you agree with that?

**[06:52] Tristen Avent**

Absolutely.

**[06:53] Lauren Lazaro**

Yes.

**[06:54] Jason Norsworthy**

And so for our listeners here, I think a really a key component is to start with a strong residual. If you have a weak residual up front, your first application is essentially going to be broadcasting because you have high densities. If you're going to have a lot of success with this, See and Spray, you're going to need to have low weed densities and it all starts with a very strong residual herbicide. Whether it be cotton, corn or soybean, which are the crops really we've been dealing with to this point. You know, John Deere, I think of them as really a company that's a leader when it comes to innovation, innovation of farm

equipment, innovation of sprayers. Lauren, can you just comment a little bit in terms of I'm sure that John Deere is working diligently to move to the next step of innovation. Can you give our listeners just a little sneak peek as to what's coming next?

**[07:50] Lauren Lazaro**

Sure. I mean, I guess first thing is all the data that we're collecting with our universities and our farmer partners is that we're continually building and improving upon our current platforms as they stand. But in the near future, we're looking at potentially increasing the tractor speeds, expanding what crops we're working in, and narrowing our rows.

**[08:11] Jason Norsworthy**

So you said increasing the speed. Can you tell us what the current speed of the sprayer is?

**[08:16] Lauren Lazaro**

The current speed is 12 miles per hour.

**[08:18] Jason Norsworthy**

Okay, so it's 12 miles per hour. And the intent is hopefully here in the coming years, we're going to try to try to increase that. Can you tell us a little bit about the, what makes this sprayer the set up, I think the boom itself, different from what we think of just a standard commercial sprayer because it is quite different.

**[08:37] Lauren Lazaro**

It is. It's very different. So we have extra weight in terms of cameras, vision processing units and other sensors that go along with having a dual boom system. So with that, our boom material is carbon fiber instead of steel. And that really helps eliminate a lot of our weight issues as well as make it a more stable boom.

**[08:59] Jason Norsworthy**

Okay, Tristen, you know, we've also got some work out here looking at cover crops. I wouldn't say that cover crops are largely implemented in Arkansas, probably much more in Tennessee. Tristan is from Tennessee. And when you think across the river, they've got a lot more use of cover crops. And one concern that we had is when you kill a cover crop, is the See and Spray actually going to be able to recognize those weeds in that cover crop even may be beneath the cover crop to some extent, and make an accurate spray. Can you tell our listeners a little bit about what you've seen in some of your research there?

**[09:35] Tristen Avent**

Sure. Dr. Norsworthy. We've looked at both a cereal rye cover crop or a fallow system, and then our other true cover crop system was actually hairy vetch or a legume cover crop. And so the one I really want to talk about is the cereal rye cover crop because that puts on a lot of biomass, right? What we saw with that system is that the cameras were actually very capable of seeing through the biomass. Now, I will admit that we didn't roll the cereal rye. I think that could play a role in that. So it was standing cereal rye. We were able to see through the canopy and detect weeds that pre and post and now post this week. So we've gone all three applications and we've done a very good job at detecting weeds through that cereal rye biomass. But I do have to say that that was done at a medium sensitivity and you know, it could differ with different sensitivity settings.

**[10:27] Jason Norsworthy**

You know, so when I think of crops, I mean, early on you don't have a lot of crop out there. It's basically I mean you think a pre emergence is basically bare ground as that crop progresses, you get more and more height. And then it seems to me that at some point you're going to get to the critical, critical issue of actually being able to see the weeds just due to the height of the crop and the position of the cameras, how much leeway we do have. And Lauren, I'm gonna turn to you here. How much leeway do we have with that crop? I'm assuming we can't get out there into a three-foot-tall crop. A crop is 90%, canopied. Where are we talking about in terms of cut off, in terms of use of the See and Spray to actually truly target weeds and not make a broadcast application?

**[11:14] Lauren Lazaro**

Well, that's that's a great question. I know, Tristen, you've run right into this quite a bit with our small plot machine. But, you know, it's really crop dependent to a certain point. But well how far up can we get.

**[11:32] Tristen Avent**

You know, for me, my limitation is obviously high. I think with the commercial unit, you know, Cotton, we have a much thinner canopy per say than we do with soybean. Corn I think our limitation is actually height. It's very upright. I think we do a good job of looking down underneath corn. But soybean, I think, is probably where we're going to have an issue the most.

**[11:54] Jason Norsworthy**

You know, based on what I've seen out here, just my comment on that is 20 to 24 inch soybean. They're going to start trying to lap if you're, well, if you're on a 38 inch row, I think some of this is dictated by row spacing as that row spacing closes, I think you're going to have an earlier cutoff, at least from a high standpoint, because really with the See and Spray Ultimate it's all about being able to see the weed with the camera. If we can see a weed, we can spray a weed. But if you're not able to see that weed because it's under the canopy or a camera isn't positioned such that he can see it, more than likely you're going to going to miss the weed. But, you know, when we think about canopy formation, I've done a lot of work where around 90%, once we get 90% canopy formation, for the most part, a lot of weed emergence ceases. I mean, the best thing that we can do to suppress weeds is just get a canopy out there. And I think we're going to have for the majority of that time, up to that 90%, we're going to have utility of things like to See and Spray Ultimate. We may have to do some broadcast there late, as we're approaching canopy formation. But prior to that, I think we're going to have full utility of things like the John Deere See and Spray Ultimate. Lauren, is there anything else? I don't want to make this necessarily a long and drawn out podcast. Is there anything else that you would like to say in terms of John Deere. Your work with the See and Spray or your work with the collaborators? What are some other takeaways that you've seen that you'd like to share?

**[13:34] Lauren Lazaro**

I just think we're very thankful for all of our collaborators, both in our small plot and our commercial machines, but especially our university partners who put a lot of work and effort into this, the graduate students work so hard and they're really helping us learn more about the future of the technology and really asking those hard hitting questions. And, you know, we're just thankful to y'all here at Arkansas for our working so hard and working with us so closely. And I think that's just a great model for all of us moving forward.

**[14:03] Jason Norsworthy**

Well, it definitely has been a pleasure to work with John Deere and to fully understand the benefits as well as, I think, the limitations of the technology. You know, in terms of growers, it's not only understanding the benefits, but what are the limitations, because otherwise you have issues that you run into within the field. So I really appreciate the partnership with John Deere and I appreciate Tristen, having you on and I appreciate the work that you do as a PhD student working specifically on this project. So any other thoughts for our listeners, Tristan, is as we let you go.

**[14:40] Tristen Avent**

No, I'd just like to say thank you for all your help, Lauren, and thank you for letting me be on the podcast today. And thank you all for tuning Into the Weeds AR Wild podcast today.

**[14:52] Jason Norsworthy**

Again, I really appreciate our listeners for tuning in today. Thank you for joining us on this episode of The Weeds AR Wild podcast series on the Arkansas Row Crops Radio.

**[15:06] Intro/Outro**

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