

Insect Control

[00:00] Zac Williams

Welcome to the Fowl Frontier: Poultry Science Unplucked. On this show, we're going to break down the intricate world of all things poultry science. So join myself and my distinguished guests and experts in the field as we dissect the latest research and information on poultry production. Whether you raise broilers, turkeys, laying hens, breeders, ducks, etc., or a seasoned producer or just starting out, we've got you covered. The Fowl Frontier is brought to you by the University of Arkansas System Division of Agriculture, Cooperative Extension Service, and the Center of Excellence for Poultry Science. I'm Dr. Zac Williams, poultry extension specialist for live production at the university, and I will be your host. So as one egg said to the other: let's get crackin'. All right, well, welcome to the show. Welcome back. I like to welcome my guest. We have Kylie, Sherril from Central Life Sciences is here today. We're going to talk all about bugs and pests. The first thing, I'm gonna let Kylie introduce herself. She's going to tell us all about her background, what she does, and what she does for Central Life Sciences as well.

[01:05] Kylie Sherril

So building a program to manage a pest, or whether they've been on one of our products and just don't think they're getting the control that they should be. I go in and a lot of our products are sold through other companies. And so sometimes I'll go in and provide product training or even concept training on why we set the products up like we do for the other companies reps. So I kind of do everything and I cover North America. So sometimes I'm, you know, in California one week and the next week I'll be in North Carolina. So, I'm kind of everywhere in my background is pretty varied. I grew up in southwest Arkansas. We've got, or my dad still has eight broiler houses. Grew up with cattle, horses, had swine, finishing barns for a long time. So I've kind of I've done quite a few different things and can come in on the bug side of things as well as the management side.

[01:56] Zac Williams

All right. Very good. So let's talk about some bugs. What? Or first, I guess, why is insect control important? Why should our producers, why should they be worried about insects?

[02:12] Kylie Sherril

So it's one of those things. If you have livestock, I don't care what it is. It can be Guinea pigs. You're going to have to deal with pests at some point. And usually some type of field fly. The problem is we have those issues. And so we need to kind of be proactive in our plan about it. We don't need to survive on sheer dumb luck. I mean, I laugh, I have two younger brothers. I love them to death. They survive on sheer dumb luck. We as livestock producers cannot afford that. There's too many predictable things. We're all dealing with variable markets, very tight and controlled markets. And so it's kind of one of those things we plan

for our maintenance, we plan for the nutrition those birds are receiving. We need to plan for the pest. There's a lot of times I go in and talk directly to producers, and they have a rodent program in place, but they really don't have a fly or beetle program in place. And the things that we face in the poultry industry are pretty wicked. So a lot of times we're dealing with the housefly and we're dealing with the litter beetle, and both of those can have really, really big impacts on the productivity of that facility, not only impacting the birds, but also impacting those facilities as well. So both the houseflies and the litter beetles can actually break down and destroy part of the facility, whether it's eating the insulation, shorting out electrical equipment. And so it's one of those things, you know, it's going to be a problem. You know, you're going to have to deal with it. We need to have a plan for it.

[03:38] Zac Williams

All right. Very good. So you mentioned a little bit, but what else about, what else can, how other impacts can you have on like bird health? Do they bite? Do they like, what can they do if you get a bunch of insects in the house, what can they do to the birds?

[03:54] Kylie Sherril

So first and foremost, it is kind of a funny thing. You know, when we're placing those birds in that new environment, we do a lot of things to get their attention to that feeding water, whether it's, something shiny, whether it's paper. You think about those insects crawling through those houses, and if there's enough, those birds are going to look and follow those insects around. They're going to eat and consume a lot of those insects. They're not consuming the feed. So a lot of times right off the bat, your feed efficiency is going to be destroyed.

[04:22] Zac Williams

Do you know how it will stop you right there for a second? Do you know like, has there research been done to tell like how much impact you can see?

[04:32] Kylie Sherril

Yes. And so a lot of that is internal data. It's not peer reviewed. But everybody knows there's, there's to a point. But it's very hard to quantify because it's very difficult to get down in the litter without shaking it out and going well, we got 27 litter beetles and 43, housefly larva in the square foot of house. And so we know that strictly. Yeah. It's one of those things if if you notice a high population, those birds are going to get sick.

[04:57] Zac Williams

They're probably eating them. If you see them, they're probably consuming them.

[05:01] Kylie Sherril

Or that's an immediate, feed efficiency concern. And then we get into the disease aspect of it. So those houseflies and litter beetles are very, very competent vectors of a lot of the issues that we're dealing with disease wise in poultry industry today, whether it's highly pathogenic AI, Nemo virus, even something as simple as salmonella and E coli issues,

most of the time we're going to find those in those insects and they're very competent vectors, moving it from house to house in their facility or even between facilities.

[05:30] Zac Williams

What do you mean when you say competent vectors? Like they're very good at it, like they're really efficient at carrying that from one house to another?

[05:37] Kylie Sherril

Yes. So even just, you know, we see house flies and everybody's familiar with house flies. We have to deal. And there's a reason we call them a housefly. So there's going to be a very strong association with either humans or livestock and where those flies are found. And so we've all seen them. We're eating outside. It's wonderful. Not this week, but you're in the backyard grilling hamburgers and the flies are walking across the food. Well, as they're doing it, they're either picking up or depositing bacteria off their feet. If they stop and feed on something, they actually regurgitate their stomach contents to start bringing down that meal.

[06:09] Zac Williams

That's gross.

[06:10] Kylie Sherril

It's gross. But it's it works for them because, yeah, it they're regurgitating bacteria, they're regurgitating, stomach juices. So it starts breaking down before they ever slurp it back up. The really neat thing about it is some of our diseases actually use the flies as incubators, so it's just not picking up and depositing the same amount of bacteria or virus. They're actually using the fly to multiply. And so it may pick it up here and in two days. It may be a maybe 20, 30 or 40 times the amount that they're regurgitating that they ever picked up. And so that's the reason when we call them competent vector, not only can they pick up, but they can deposit and even, you know, help further that virus, that bacterium population along.

[06:54] Zac Williams

So these, these, like the virus, the bacteria, there's no way to know if a bug has it. Right, like they don't make the bug sick.

[07:01] Kylie Sherril

No.

[07:02] Zac Williams

So you can't tell at all like that fly has high path.

[07:07] Kylie Sherril

Actually exactly. So, when we think about different disease and the association with the vectors that they use, it doesn't matter whether it's a tick, louse, whatever it is, the reason that they're have such a good association and such competent vectors is there's no direct, issue with that disease agent and the host or the vector is getting from host to host. And so

because it doesn't do him any good, if it infects and kills them off before they're transferred to their next actual host, next million avian hosts, whatever. And so the insects actually, when we look at the immature stages, anytime they molt, they actually molt part of their digestive tract. So if there's anything that is detrimental that they've picked up as an immature, a lot of times anytime they molt, they're getting rid of that. When they're basically shedding the inside of their stomach and getting rid of everything.

[07:59] Zac Williams

That's interesting. Okay. So, what would you say maybe the most important ones, like if you give me a top 2 or 3, you talked about houseflies and litter beetles. You got another one that's kind of hanging out there.

[08:15] Kylie Sherril

When we talk about commercial poultry production, it's those two all day long. And really, it does not matter where I go, whether I'm in the northeast, you know, whether I'm in the Midwest, southeast, it comes down to whether there's either going to be a housefly problem or a litter beetle problem. And then kind of when we get past that, we can see localized issues with mites or bedbugs or even high beetles, especially if there's a sanitation issue in like an egg layer facility. But most of the time we're coming back to houseflies and litter beetles.

[08:48] Zac Williams

All right. So, house flies, litter beetles. All right, let's talk about life cycles. What would you say? Give me a life cycle of, like, a housefly. Real basic, real brief.

[09:00] Kylie Sherril

So we are going to generally when we talk about insect life cycles, we're also going to consider growing degree days. So some of the same things that we do with our crops and plants. So for houseflies we're going to be right around 21 days. When the environment is perfect. It may be a couple days quicker. When the environment's not great, they may stretch it out a little bit longer, but on average we're looking at 21 day from egg being laid until they are capable of reproducing as an adult.

[09:30] Zac Williams

All right. And what stages are the what stages of that are, going to be harmful to our poultry?

[09:39] Kylie Sherril

So for houseflies, it's going to be the adults. Those are the most mobile. Those are the ones that are transmitting diseases. They're feeding, you know, in the compost mortality and then bringing it back into the house. We can find the larva and we can find the pupa really easy. But they're not as mobile. They're pretty stationary. They're they are going to stay where they have food and developmental resources.

[10:01] Zac Williams

Okay. All right. So what's how what about prevention for houseflies. Can we do or or speaking like chemicals, biologicals. Where are we at on our prevention for houseflies? Or we like the little sticky strips that people put up around their houses.

[10:17] Kylie Sherril

All of the above. So with house, like with any pest, I'm always going to push the concept of integrated pest management or IPM. And that is where we are making a definitive decision to intentionally do multiple things in order to control the pest. We're just not relying on one thing alone. And so our building base for any pest, especially if by pest, is sanitation, and a lot of times that comes down to either removing, disturbing or drying out that larval medium. So we may not be able to, you know, wrap that facility in bubble wrap and keep the flies completely out. But we need to watch for those access points. Do we have, some ventilation screens that are on place? Do we have a major water leak that's close to indoor? Do we have a major feed spill? What did we do with an extreme mortality event? We have all of these things, because houseflies are looking for moist, decaying organic matter and it's got to be have a pretty high moisture to keep them from drying out as it matures. So if we can keep the sanitation right, we're miles ahead. And then once we start building on that, we look at that physical aspect. Do we put out traps? Can we exclude them from certain areas, you know, replacing dust screens along a ventilation area. Then we look at biologicals. And biologicals are some of the most fun management concepts. Unfortunately, it's very difficult to get them to act right outside of nature. So especially for poultry systems, the way we have those houses designed to, you know, as, caustic as that litter is, it doesn't support a lot of life. Unfortunately, we can't take the really neat dung beetles and throw them in a poultry house and expect them to survive. It's not the right environment for them. I there's been work in the past with Bt and some beneficial nematodes. The problem is we just can't get enough of them to produce in a lab setting to commercialize them. And then, you know, we're kind of going up that food pyramid type wedge. And at the very top, that's where our chemical control are. A lot of those are going to be reactionary adulticides, by the time you reach for that, because the fly population is out of control, you may kill off what you see, but they've already reproduced that next generation is already dead, and you're going to have a new batch of flies very, very soon. And so what we need to do with IPM is try to rely on that sanitation and those preventative measures before just immediately relying on that reactionary, because at that point we're behind the eight ball. They've already started doing damage.

[12:40] Zac Williams

You're pretty much just trying to put out a gasoline fire at that point, huh?

[12:44] Kylie Sherril

Yes. Yeah. So at that point, we are we are scraping together what we can salvage. We're not being proactive. And I mean, that's that goes back to the old adage an ounce prevention is worth a pound of cure. That's a lot of times I go into these IPM programs for producers and I go, okay, we're either going to spend time with the shovel work in the preventative

measures here, or you're going to have to buy the equipment. You're going to have to buy the product and spend the time afterward, because the flies are going to be there. So.

[13:09] Zac Williams

Gotcha. All right. So you talked a little about control. What about like, it would maybe talk a little bit more control later for flies? Well, actually, let's cover it now. Control methods. All right, if you want to prevent, like, all the life stages and people when you talk about prevention, what about when we get adults and we have like problems, what are we going to do?

[13:31] Kylie Sherril

So first and foremost part of IPM is understanding zero flies is extremely unattainable. I've been in you know, level two biosecurity facilities where you have to go through so many doors. It's hydrostatic pressure and it does not matter. A fly is going to make it in. And so zero flies are always going to be unattainable, especially because a big part of the facility or managing is the open environment. Our biggest thing is to be proactive and then be ready for, you know, a reactionary control, whether it's due to, a massive mortality event and dispersal event, whatever it's going to be. Yeah. And so typically when I start my producers out on as I go before we even have a new batch, do we have everything right? Did that water spill get cleaned up? Do we have an issue outside? Is the compost right. Have we limited the amount of larval development that is completely around facility before the birds are replaced? Then after the birds are placed, we're looking at keeping it that way. So unfortunately in animal agriculture, when we look at those insecticidal products that are approved to be used and either on animal or in really close conjunction, we're really working between two modes of action. And so it does not matter what that active ingredient is, there's a good chance I'll lay money down on it that nine times out of ten, it's going to come from one mode action. Those are the ones that are a little bit more friendly. They're a little bit more forgiving if we, have an accidental misuse. But that means that we can really build up insecticidal resistance really quickly, especially if we are constantly use them as reactionary. There are a few preventative scramble larvicides, but they have a finite ability, so some of them do have like a 30 day residual. But that also depends on what goes on in the house. If we have, a lot of moisture in that litter, that compounds going to break down naturally because that's, that's what it's designed to do. Unfortunately, we do not have those products anymore that we can play out there for six months at a time. And that work is good. You know, on that six month is what they did the first time. And there's reasons for that. And you go back to Silent Spring and some of the better things we're trying to do as an industry. But we, that's why we have to rely on that sanitation. There's not really easy fixes. Now, if we do have an issue. We had a water spill. We have a feed line break, massive mortality. Whatever it is, we can come in and fog those houses. We can spray those houses and knock that initial population down. One of the better things we can do is make sure that we're monitoring the whole time. Do we know what areas of the houses are producing flies? Is, is, you know, is there a stream we didn't realize was off? And so that's where the sticky traps come into play. Whether it's the old school sticky ribbons, there's big, long sticky tapes that you can run down the entirety of the house, or there's just, you

know, the bag traps, the different traps you can hang up. But the deal is you need to check them often, don't put them up. And then five weeks later go, oh, it's full, it's full. I don't know when it got full or hey, I just noticed, you know, all the way into the end of the batch that the, the traps on one of the house by the cool cells was producing a lot more flies than the ones that down there by our, our large dead fans and so it's monitoring, it's doing all of these things throughout the batch. One of the biggest things, that has become, especially when you get the disease aspect, is when we have a disease outbreak or a mass mortality event, you know, unfortunately, we have to de-pop that facility. What is the plan then? Because a lot of times at that point, management has went out the window. We're focused on everything else. And so a lot of times in these IPM programs, because at some point, unfortunately, we're going to have to deal with disease is, you know, having plans in place with those reactionary products to knock the fly population down so it doesn't disperse out. So we don't affect the next house. So we don't infect, you know, the other farm, it's a quarter mile down the road. So we have we have our options. But it all comes back to the individual producer. Do they have time to do some of this? Do they have the money to do something. This is what is their budget, their limitation or hey, the kids went back to school. So the two high school kids, they went back to school and now we don't have anyone to do shovel work.

[17:46] Zac Williams

So let's talk about the I want to get back to the monitoring for a few minutes, because I think this is something that I'll have ever seen in a chicken house, like any house I've ever been into, is like a fly strip. You're like, well, I counted that one yesterday and I went down and there's a trap down there. How should they? What would like an ideal pest monitoring or insect monitoring setup look like for, say, like a typical broiler house.

[18:11] Kylie Sherril

For a, you know, the typical solid side brooder house, what I'm going to go into and the places I'm gonna look at, I'm going to look next to our door, look at that cool area. Because generally there's a lot of water, if nothing else is a really high humidity area of the house. And so I'm going to probably put 4 or 5 traps down there. And then I'm going to probably put one next to each one of my fans or each one of my smaller exhaust fans, and then go down to my tunnel ventilation. That's going to be a little bit harder because we're moving so much, too much air. The flies really aren't moving. And so it may be more of a fact of just making sure that, you know, instead of putting a sticky trap, I may put a spot card. So one of the simplest technologies ever to exist to, look at housefly population is to take a regular index card and just slap it up on top of one of the beams, you know, put it 5-6 foot. For me, it's going to be six foot because I'm short and I'm not very ladder all the way down the house and you leave it up for a week, you pull it down and you count the number of spots. And all of that is is either regurgitation, or defecation spots. And we know if a certain number of spots, it gives us an idea of what the housefly population is. And so it's really simple, really cheap especially don't have to deal with sticky or afraid that the dust is going to do the sticky. And I mean, you put those every 25ft on the house, put them in, put them in the wall. The sticky end. And if you're getting more than 100 spots on that card in a week's

time, then that typically means we've got a high enough population. We really need to start doing something if we're not doing something already.

[19:47] Zac Williams

That's interesting. Is there certain ages so they should they do it from day one to load out, or they should have farmer monitor like either early or mid or late during their grow out or just all the time.

[20:00] Kylie Sherril

It's really going to depend. And so a lot of it comes down to did they have an issue in the previous batch. What happened. You know where they out for a week. Were they out for three weeks. Were those houses sealed up where they left open. Did they leave litter. Was it a D? Was it a DK only situation or were they able to completely clean out that house? I have some people. It doesn't matter what they do. They they start from day one. I have some people pick it up about two weeks in because going back to our house, my life cycle, you know, we're pretty close to that 21 days. And so if they start in week two, that's going to tell them, you know, how quickly that fly population was getting in. A lot of times I have especially for the producers that are in pretty close proximity to a lot of other farms, especially if not their own farms and they're worried about disease outbreak. I have, take, traps and monitor outside the houses. So either work as a gradient pattern starting from the house, all the way to the fence, especially, you know, winds out of the south. I'm going to put several more on the south, in between houses. So maybe they have a house, everybody has one where it does not matter if you're going to have a disease issue, it's going to be that house for whatever reason. All right. Put monitoring traps between it and the other house. Figure out when your flies are moving, especially like if you have to go in and use that fogging adulticide to knock down the population of the house. Did we get them or did we just make them leave the house?

[21:25] Zac Williams

Gotcha. I have an interesting question. How far can a fly travel?

[21:30] Kylie Sherril

So it varies, it varies. And, you know, we really have four main field flies that we deal with in animal ag. The two pastured ones, they like cattle. They're not going to go very far. It's going to take a lot for them to go. Unfortunately houseflies that we deal with, with the poultry facilities, they don't mind traveling there, you know, I call litter beetles will turn of the Terminator so I won't come across houseflies Terminators. But they'll they'll take off and go. It's nothing for them to do ten miles. And a lot of times it doesn't take a lot of, environmental disruption to send them away. It may just be decided. It's a breezy day. I'm going to. I'm going to go and go.

[22:05] Zac Williams

I mean, so they get hit up a lot of farms, or even, like, you know, like, around, like here in Springdale and in this area, you got processing plants that would they could definitely go from one to the next, the next and probably hit up some farms as well.

[22:20] Kylie Sherril

I mean, the small town I grew up in, for a long time, it was a broiler processing facility, and it was right off the paved road. It was right across from the only gas station. And so there was times you didn't stop and get gas there because, you know, if it wasn't the feathers blowing across the highway into that parking lot, you know, he always was battling flies. Yeah. Because they were they were coming in. They just the chickens were always there at the plant. And it became an even bigger concern when it went from being a broiler processing plant to a hen processing plant, because there's a lot of stuff that can get in the breeder and layer flocks that will absolutely decimate it.

[22:58] Zac Williams

Yeah. So that's interesting. So your fly might also be your neighbor's fly and maybe your neighbor's fly from. And yeah. So yeah, flies are pretty bad. Anything else you want to say about flies?

[23:15] Kylie Sherril

We've really covered it. The only good thing. And we'll kind of get into this about litter beetles. It's typically it's a one or the other problem. And really some of our open sided curtain houses, maybe retrofit houses, especially in the broiler side. It's typically more of a house fly issue because they can get through really easy.

[23:33] Kylie Sherril

Really. Our solid side, more conventional type broiler houses, it's more litter beetles is it has to be a pretty bad issue for house flies to really build in that. But also we have a very different so both like moist, decaying organic matter, but litter beetles can survive in a lot less moisture because they got a thicker exoskeleton in that larval form than what the house flies do. And so our biggest thing on house flies is if you can get the moisture out of the houses. You're you're miles ahead.

[24:04] Zac Williams

Good to know. Okay. So moisture control we talk about that all the time. So when we talk about like, ventilation and litter management, it all comes back to moisture control. So there you go. Moisture control is also good for for house flies. All right, let's, let's move on to litter beetles. This is the one that people either have them or they, Or it's just like you'll never find one, right or else, like the floor is moving practically.

[24:32] Kylie Sherril

So, like I said, I call litter beetles Terminators. They are absolutely unreal what they can live through, but it kind of goes back to the group of beetles, the darkling beetle family that they're part of. These are usually like desert dwelling beetles, and so they are very good at surviving on a lot less moisture. And in some pretty, pretty difficult conditions. So their life stages is a little bit different, a little bit longer. A lot of times it's going to be a lot closer to those 40 days. However, litter beetles are pretty hardy, and so a lot of times, even out in the

commercial poultry house, we expect them to live for a year. They have tract colonies that have lived over two. I mean.

[25:14] Zac Williams

That's incredible for a bug.

[25:16] Kylie Sherril

It takes a lot to knock them out. And it's one of those things as populations can absolutely explode because as soon as that adult female emerges, she can start laying eggs and she can lay like 200 eggs every five days.

[25:30] Zac Williams

Oh my gosh.

[25:31] Kylie Sherril

Give her a month, she's over a thousand. And so you think about how many months she's able to sit there and build. And then each generation behind her building, it doesn't take a lot to just see that population explode. The aggravating thing is, is and one of the issues we have with them, I can remember being little and my grandpa still had pole barn houses and in production, and I can remember being teeny tiny, and he would have the sticky plastic around the bottom of the pole. What we were trying to do was when the larval, the larval stage went to pupate, they were trying to find a refuge. One, to get away from chickens, too, because the adult beetles were going to eat on them. And so they were bearing in to any wood structure they could find. And so one of the physical control methods they were trying to use at that point was exclusion from ever getting to that one. So, I mean, there is there's plastic three foot up and sometimes it's sticky, sometimes insecticidal impregnated. But now especially they're solid walled houses. And I mean I've seen it I've seen it in my dad's houses. We blow in, you know, insecticide treated insulation. And within two years, between the mice and the litter beetles tunneling through it and eating it, it's ridiculous.

[26:43] Zac Williams

This is like Swiss cheese.

[26:45] Kylie Sherril

Yes. I mean, it is absolutely unreal what they're doing. Just burrowing away as using it for refuge. There's a lot of times, when producers completely clean out a house, they'll start notice the pitting in all of their floors because, well, you know, they can dig down into the dirt. Yeah, use it as a refuge. And, I mean, it's it's pretty, pretty wicked. I mean, there was some studies done in the southeast, pretty sure in Georgia where they had a 67% less energy usage and houses that was using a little beetle control. That's just, I mean, 67%.

[27:22] Zac Williams

That's pretty that's incredible that they've done that much damage to the structure of the house.

[27:27] Kylie Sherril

And I mean, the pictures the pictures are absolutely unreal because what they were doing was taking thermal images of those houses, temperatures and looking to see you show you where the different, energy and heat loss was. I was at some turkey facilities last week and they were cleaning out and they go, well, this is a pretty new facility, but come here and look at this. We opened up the computer rooms in the control room floor. It was moving with the immatures and with the adults. And so I was like, okay, those have come in from out there and they go, these houses are less than a year old. I said, well, even though you'll do a really good job because, you know, turkey breeders, they completely pull out that layer and do the five weeks, you know, so we're not building on years worth of litter, unfortunately, sometimes. But those larva was still as soon as the heat dropped in that house, as soon as those doors open, those birds were being pulled out, the environment changed. It was no longer as friendly for them. And so they went to move for refuge. And so they were moving through the walls. They were moving, you know, across the floor. If you think about just how much was out underneath the grass that we couldn't see.

[28:32] Zac Williams

Yeah, that's that's incredible.

[28:35] Kylie Sherril

And that was before the inflight insecticide, just changing the environment. Something to disperse out and go looking for refuge.

[28:41] Zac Williams

That's interesting. So what about control for litter beetles?

[28:48] Kylie Sherril

This needs to be a full, full event a lot of times. Especially for solid side brooders, this is going to be what most of your headaches going to entail is trying to get that. Because what we need to do is be very quick and it's very labor intensive between batches anyway, doing maintenance. But we also need taking the time to apply the insecticide right for these guys. So like I said, as soon as the heat's out they start looking for refuge. So if you've got 6 to 10 in a litter, a lot of times they're just going to go straight down. A lot of times, you know, before that house has been decayed, you can go over and flip those cage. You need to start right under where those waterlines and those feet lines where. And that is where the floor starts crawling, because that was enough that it provided refuge, kept the heat in that. There, there. But there's a lot of times you go to that concrete wall and you dig down in there thick, just as thick against that concrete wall. One of the best things people can do, even if they cannot, you know, completely remove the litter out of the house, is pull it away from the walls. Tried, you know, even if they don't completely windrow it, get it away from the walls and be able to spray, you're not spraying the entire floor, spraying up against the walls and trying to lay down the insecticide directly under the waters and feeders, because that is where those insects are going to go, because, hey, we've got warmth, we've got water, we got feed right there. A lot of times if they're coming up, if they're using the walls as refuge,

so they're gonna have to go against that insecticide. If we are cleaning out before, you put new bedding in, something as simple as putting boric acid will really help for little beetle control.

[30:20] Zac Williams

On the on the floor, on the dirt pad.

[30:21] Kylie Sherril

On the pad. And then go and replace that bedding and then put the insecticide on top of the bedding. And so it's kind of one of those hidden secrets without being a secret. But if we can, include an acid into or in conjunction with our insecticidal treatment, we get a lot better efficacy because that acid is helping that insecticide, penetrate the wax layer on that exoskeleton easier. And so, I've seen some studies where looking at the timing of putting in any, litter and then it's like a plt and then putting insecticide back on top of it. And that's one of those funny things. If you read the bag, read your label under 40, you're wanting 30% moisture in that litter, 30% moisture in that litter is a lot.

[31:10] Zac Williams

Yeah. That's pretty yeah, that is pretty high.

[31:12] Kylie Sherril

It's one of those things that I, you know, I've used it for years. And then we did a one off study and I was like 30% moisture. And I just keep adding water in, like, if I walk into a farm on the floor, is that what we've got problem. We're drying that out. And so sometimes that can even help us on our litter amendments. You know, lay that down like that granular powder down and then come in with that liquid spray on top. So that's but that also gets into, you know, what equipment is available, what product they're able to get their hands on. Because like I said, a lot of the stuff that is, approved for near use on poultry is going to come out of one for our darkling beetles w do have several other, modes of action types of insecticides that can be used, but we have a longer waiting period, so it's just not okay to give it 24 hours to dry. It's 4 to 6 days. It's 5 to 7 days. So unfortunately, with some of our turnarounds that we've seen, you don't have time between dealing with your litter, doing your maintenance, and the need to set up for that new batch to really put that in effectively. So sometimes we have to be a little bit flexible on what we use, just for the fact that we don't have the time to get it done.

[32:19] Zac Williams

Understood. Okay. So you talked about control. What about when they get into so when they're fleeing the house or like, moving to a different and they go up in the walls and stuff, is there anything they can do for the ones that get into the insulation and into the structure of the house?

[32:34] Kylie Sherril

It's it's very difficult to treat because unless you're willing to, you know, take those walls apart every time it is. I mean, any insecticide you're going to put into that is only going to

work for a finite time. It's not going to work for the next two years or whatever else. I've seen those clients that it doesn't work that well. One of the best things that I've, that I've, I've seen really good success on that I've been telling producers is especially if it is a litter beetle issue, there are insecticides that we can come in with and apply when birds are there and just apply right against the wall. So basically you're spraying your concrete or spraying your footers. And what we're doing is we're applying insecticide where those fields are going to crawl over. Now litter beetles will travel. They do have the ability to fly, but they're pretty lazy. It really takes a pretty good change environment to get them to move. The problem is they fly at night and they are attracted to light. And so, you know, we've all heard about unfortunately, you know, Irving encroachment, urban sprawl. And it's usually a fly issue because they're ready to move. We have seen complaints and issues with a dispersal event with litter beetles causing issues with the neighbors next door. And a lot of times it was something, where they had a longer layout period where they, they were completely removing litter, doing some major maintenance whatever and those beetles, you know, after a while they're like, well, environment's not getting better here.

[33:58] Zac Williams

Got to go someplace else.

[34:00] Kylie Sherril

And so they were attracted to security lights, lights, the houses.

[34:04] Zac Williams

That's interesting. So you talked about monitoring, housefly populations. How do we monitor litter beetle populations other than, like, grabbing a handful of litter? And if it wiggles, you got a problem.

[34:19] Kylie Sherril

And that's a pretty simple. It's pretty good. But, you know, you grab that handful that are under the feeder, and if it goes to moving in and wiggling you, you've got a problem with that. We've got to make sure the next round we've got treatment for it following release. We do have some kind of homemade traps. We can use one of the simplest. Once again, simple. Sometimes it's the best thing we can do is take a piece of PVC pipe and stuff it full of corrugated cardboard and leave it out, and then bring it out and see how many people, how many adults are within that. Now it's it's a little harder on little beetles to say, okay, if you have 50 litter beetles per square foot, you've got a problem. It's more of a monitoring. If I sprayed in between batches and we're on week number four, and I've noticed that the Beetles are moving, I could see them again. Well, maybe that is because we have some insecticide resistance. Whatever I used in between batches was not effective. So sometimes it's as simple as just monitoring to make sure that we've got a good kill and we don't need to switch between our mode of action groups.

[35:16] Zac Williams

Gotcha. Okay. Other places in the house. So you talked about like where flies come in. Well, about litter beetles. So, you know, most of the time you're going to see them under

feed and water lines. Are there are there other places where you can see like, oh, you know, feed water lines might be. Well, you may have always have litter beetles there. But what about like other places in the house. So if you if you see water litter beetles like in the center of the house, like against the walls, like at what point do you have a problem?

[35:45] Kylie Sherril

If you see if your floors are moving down the center of your house, you got.

[35:49] Zac Williams

Yeah.

[35:50] Kylie Sherril

Because those litter beetles are going to be congregated under those feet of water lines. That's where the moisture is going to be. That's where the feed is going to be. And usually they're between the lines of up against the walls because they're either coming or going to that refuge. Yeah. So if the floors are moving right down below the house and you have like an odd water leak or something, you.

[36:12] Zac Williams

Know, okay, this was curious because, you know, sometimes they, they like they get overcrowded in one area. Do they move to another area and then you'll see them.

[36:20] Kylie Sherril

Or they, they will to a point. But litter beetles, like I said, you know, sometimes those larvae are, are bearing down, away from the adults because the adults are going to eat on a just, you know, as quickly as you get on anything else. That's one thing, litter beetles, though. You don't feed, they'll eat on manure, they'll eat other beetles or eat dead birds. They'll eat, you know, bars. There's been times, you know, if if you have a mortality or a disease event and chicken's not dead, but they're not moving, especially if it's something that hit towards the end of that, batch of the broilers. We can actually have those water be able to start feeding almost like birds just because they're not they're not well enough to.

[37:00] Zac Williams

Yeah, they're pretty opportunistic. So they do bite birds like feet and paws and south of item. Oh, yeah. Or like if a bird sits down though.

[37:09] Kylie Sherril

A lot of times it's on the breast. You can put those broilers over, especially if, if, you know, you've got a heavy strain that breaks down quicker.

[37:18] Zac Williams

Or whatever, or just like, likes to sit down, or.

[37:20] Kylie Sherril

You can flip them over and a lot of times that scabby nose on the breast is actually what are beetle bites?

[37:25] Zac Williams

What does that look like? Can you explain it? Just like just like it looks like bug bites.

[37:29] Kylie Sherril

It looks like it looks like scabby.

[37:31] Zac Williams

Okay.

[37:32] Kylie Sherril

Because you think about poultry. You know, our broilers, we've made it towards a really easy to clean. And we get a pretty finished bird at the end. And so they're very, very thin skinned. It doesn't take a lot to, you know, scratch or.

[37:45] Zac Williams

To those bug bites from litter beetles. Do they cause any problems in the plant?

[37:49] Kylie Sherril

They can. So it is it's not necessarily, you know, the. Yeah, hopefully we don't have birds running through the plant that have been completely.

[37:57] Zac Williams

Well, yeah.

[37:58] Kylie Sherril

It's been a lot of times we're looking at a secondary infection. And so they bite that cause an opening in the skin. And then that gets infected with something else. And so that's where it's sometimes, you know, a, digital termite dermatitis outbreak can be furthered along by that.

[38:14] Zac Williams

Okay. Makes sense. All right, so we talked about, what point do we get out of hand? But let's talk a little bit about IPM. What kind of wrap up, what IPM what can you explain the purpose of an IPM and what they are?

[38:33] Kylie Sherril

The biggest thing for an integrated pest management plan is that we have a plan. And it's it's one of those things it can be as complicated or as simple. We can base it off of whatever the person wants. And so I like food, I like to cook, and it's as simple as pie plain your IPM implement it and then go back and evaluate. So you know, we can come up and we can draw this beautiful plan. But if you never use it, it doesn't do any good. Or if you use

it and then you really don't know whether it changed or anything, because you never went back and looked to see if there was a difference or noticeable difference, then it didn't save you any time. Because there's a lot of times we can create a really complex IPM and then get a little ways down the road and go, well, we thought we were going to need all these extra steps, but we really don't. Or we thought we may need to buy a different sprayer equipment and what we have is going to work. And so like you said in the beginning, is sanitation, sanitation, sanitation. When we when we talk about IPM, we break those into four categories. Whether it is cultural, which is your sanitation and husbandry, a physical control method, a biological control method, or for going back to the the chemical control. And at the base, it's sanitation. I walked into producers and and been very frank and go, hey, you have sanitation issue. I can bring you a lot of product. You can spend a lot of money, a lot of times product, but it is not going to do a like a good because you're not getting you're not willing to put the time to the sanitation. And like I said, housefly sometimes that's, that's it's the beauty of the simplicity you remove, you just started you to drop, you dry out that larval material. Your housefly problem goes away.

[40:06] Zac Williams

Yeah. I think you'd be amazed at how often things can be solved if we keep things clean.

[40:12] Kylie Sherril

Yeah.

[40:13] Zac Williams

And it's what you saw. At least I have a lot of headaches if you just keep it clean and keep stuff, like, picked up and.

[40:19] Kylie Sherril

And I mean, be be prevented. Be prevented. That's where it goes through, you know, especially with House flies. We have, quite a few commercially available housefly baits. They're all different modes of action. Most of them differ, from what we can use on animal or what even some of our firmness sprays are out. And so if we have an issue with some of the products that we spray, sometimes it's as simple as having a really good scatter bait program. Now, unfortunately, as you get cage layers, we can't put those scatter baits inside the house to scatter baits. But for most of those labels, we can mix it with water and paint it, you know, on the wall on those, on those different structures. The company I work for, we have a couple different ones that we've made. It's a bait. It's still a bait, but we've made it to where you can spray it on the walls and still keep it out of those. Those chickens reach, you know, our, our open sided houses. Make sure that we've got scatter bait on the outside, whether we got it on the ground and when we've got it in bait stations, you know, be proactive. Don't don't wait until there's a problem. That is that is the biggest thing with IPM is don't wait till you have a problem. Have a plan to be proactive.

[41:23] Zac Williams

Okay. So who who does the IPM is that up to the farmer or they work with their producer? Or is that something that, like you guys help with or.

[41:35] Kylie Sherril

All of the above. So I've, I've spent time in extension and we were doing them as part of the extension. There's consultants not as they're hitting, they're hit and miss. As far as pest consultants on the integrative side of things, just because the bees that an industry. Yeah, it's a little hard to walk up to the gate and walk in and go, hey, I've got a solution for you. You know, so really hard on that biosecurity and just not letting everybody, wander in a lot of times, like IPM, I mean it, the producer, that farmer, whoever is going to be the main part of that IPM needs to be part of it. And so some of the things that we've seen, especially, for those that are grown broilers, is a lot of times they're not in charge of putting out the insecticide anymore. A lot of the larger companies have gotten to where it is a third party company that is going in, or any, you know, will will reimburse you for, but you can only buy these materials right now, which is great, but you can have two houses side by side and have different insecticide resistance coming in. And so that's something to be vocal if you want IPM. That's because hopefully if you have a, a standard pest control company that's coming in as a third party in spring, they should be doing that.

[42:50] Zac Williams

They should.

[42:50] Kylie Sherril

Yeah, they should be you know, they should be coming in and going, hey, we've got a schedule. We're going to be applying this insecticide. And this is what the label looks like. This is what the SDS looks like. Once we spray, we have to show the house. When you go back in, we have to ventilate. You have to go into the respiratory respirator. You need to wear gloves and clean the waters or whatever. They should be giving everybody a list of that. And if they're not, we have got some problems because that that's major OSHA violations, not only on the company but for the farm as well. It'd be like if you walk into a hotel and they just spray for bed bugs. I want to tell you. And then all of a sudden, you're safe. Yeah, it's kind of the same situation.

[43:27] Zac Williams

Okay. So what about. So you talked about modes of action. And you said there's 2 or 3 different modes of action, primarily.

[43:40] Kylie Sherril

No. So we have several. There are I think there's over 30 that are recognized. We know how we work. We know the mode of action, of how that insecticide is affecting that insect.

[43:52] Zac Williams

Can you give us an example when you say like mode of action, can you give an example of just one?

[43:57] Kylie Sherril

Okay. So, some of our friendlier ones that are so effective for pest, works on different nerve and impacts electrical system and why it works for insects and doesn't immediately kill us

is because we do not have the same nerve junctions. We're not using the same gateways, the same molecules that the insects are using. That's the reason that like DDT was really effective. It didn't do anything to the humans. It had to be really bad case for anything in humans. It was great for the insects, but we also had the aquatic impact. We also had an avian impact. We you know, it was fine for a mammalian system, but not others. It's kind of the same way with, and the reason that we only use a handful of them on animal tag is, you know, it's we don't want to kill off what we're trying to treat. We don't want to, you know, make that bird second. So there's, especially when we get into our larger livestock. So let's say beef cow. If it's an animal product, it's probably you go back to 1 or 2 adult sites, and there's one of them that is not as friendly to human systems, because we do have some of the same. But the issue is everybody reacts to it in different ways. Some people are a lot more sensitive to it. So that one has really decreased on the on animal labeling. Basically, what is labeled underneath that for all animal used today has not. It went to market over 20 years ago. Okay. It's very hard to, get through the EPA now because we have so many more sensitivity. And, you know, it's not even this use. I was with a girl. We were at. We use this an insecticide at your tags for cattle. She couldn't be in the barn when we opened up the tag. Oh, wow. Five minutes. She'd be.

[45:49] Zac Williams

So she was super sensitive to it.

[45:50] Kylie Sherril

Or super sensitive to it? And so it's the same with avian. You know, there's a lot of more sensitivities in the avian versus mammal systems. And then we look at tolerances. So unfortunately, especially eggs, there are the limits for any kind of insecticide tolerance, any kind of tolerances at all is. So mind you it's unreal. So basically if anything is used it's going to show up in the eggs, it's going to show up in the chicken, especially because we are, you know, growing that as quickly as possible. A lot of times your insect cell residue is going to be in the fat. So if they're healthy it's going to be in that fat tissue. But there is a website that I will share with you that is a free website. You can type in that active ingredient and it'll tell you where it lays into what those modes of actions. I mean, we think about these modes of actions and how we use them. It's as simple as turning off lamp. There's lamp in the corner of my living room. I can flip the switch. I can pull the plug, I can flip the breaker, or I can bulldoze house down. Each one of those is going to turn off that lamp. However, some of them are going to have a little bit better effect on the ecosystem around it. You know, I really don't want to have to bulldoze a house down with a carry off lamp. I'd rather, you know, flip the switch. And if the flip the switch doesn't work, then pull the plug. Yeah, turning off the breaker or whatever. And so that's the same thing when we get to looking at these modes of actions is how finite are they or how are they going to impact that pest? Is it going to impact any pest or any insect? Is it going to only affect a certain family? Do we have to worry about, aquatic issues, dove have to worry about avian influenza influences and how it reacts?

[47:27] Zac Williams

Okay.

[47:29] Zac Williams

Do you know if there are differences between, like, sensitivities amongst avian species, like, are there some that like ducks are really sensitive to versus like chickens?

[47:39] Kylie Sherril

Yes. And so it's really fun. If you ever dig down into what species are used as signal animals for toxicity tests, bring product to market. Our team does everything. We have a formula that works. And then our toxicologist goes through and she's doing everything from eye irritation, inhalation dermal studies. And she's using several different things. And so most of the stuff that's on the market now, we know which animals are going to be kind of those signals. And those are ones that are generally used for tox testing. But yeah, but and I mean, this this is I mean, it's just like between humans, you know, whether it's a food sensitivity or whether it's an allergy or, I mean, it's something as simple as a spices in certain food. You know, we all react to them very differently. And it's not to say that, you know, birds aren't gonna be the same way. Even within chicken, even within our, you know, Cornish based broilers that we're using now, even some of those flocks, there can be differences doing what strains were used and how closely related they are.

[48:39] Zac Williams

Okay. That's interesting. So read the label.

[48:41] Kylie Sherril

Read the label and label is federal law. So don't don't don't go off the label. That label is there for a reason. We've done all the safety stuff, so you don't have to.

[48:51] Zac Williams

Um, how often should a producer change, like change modes of action for his pesticides? Should he wait until he has a problem or should that kind of be more of a scheduled thing?

[49:02] Kylie Sherril

I prefer to put people on a schedule just because, to me, it takes so much more time and effort to monitor the population. A lot of people don't want to do that. I do have some groups that would rather monitor. The other thing that I do is especially if there's any kind of housefly issue, whether it's on the outside of those broiler houses and they're just trying to, you know, kill off anything before it reaches the house. Take out your 3a, your pyrethroid, anything that's got animal language. Don't use those for your litter beetle control. Leave those for your house flies for those mass mortality events. Because unfortunately, they're the most friendly. They're most forgiving if there's an accidental misuse or exposure, but they're also some that we have the greatest amount of insecticide resistance to. And it's one of those things. Unfortunately, there's not a lot of places left that you can send houseflies or litter beetles to and get them tested to see what insecticides they're resistant to. There used to be quite a few places like that, and I just kind of went by the wayside. But I

would do on a schedule, figure out what products you can get. Especially, you know, we're talking about nationally, internationally, figure out what pesticides you can get, what mode of action they go through. If there's some, you know, oh, well, I can put hay down. So from the months of May until October, I don't have extra time. I'm doing the bare maintenance and then I'm in the tractor somewhere else. And so I'm not gonna utilize anything or any products that's going to require a lot of time and effort during these. There's little things and I mean it's it's adjustable. You don't have to have a PhD to get this done. Sometimes it's as simple as getting it started and figuring out how those products within that IPM is going to work best for you.

[50:46] Zac Williams

All right. Good. Any other parting words of wisdom for our listeners?

[50:53] Kylie Sherril

Well, one poultry is a hard industry. It's not as easy as what it used to be. Y'all are doing great. And if you're not doing great, yes you are. But get your IPM in place. Get those plans in place for those pests. You know which ones you have. And even if you do, if you don't know where to start, extension is a great place to start, especially if you're in a poultry heavy community or county. Those guys know where they're doing. And if they don't know it firsthand, they know who to send you to.

[51:20] Zac Williams

Yeah, they can always reach out to us and we can, if we don't know, we'll point them in the right direction. So. All right. Well, thank you, Kylie. Thanks for coming on the show. And thanks everyone for listening. And we'll see you all next time.

[51:44] Zac Williams

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