Episode 40 Mixdown PROOFED

Mon, Apr 11, 2022 12:56PM • 1:15:37

SUMMARY KEYWORDS

beekeepers, bees, pesticide applicators, hive, pesticide, colonies, bee, viruses, fungal pathogens, people, beekeeping, labels, honey bees, talk, pathogens, amy, training, varroa, question, work

SPEAKERS

Guest, Amy, Honey Bee, Stump The Chump, Jamie

Jamie 00:10
Welcome to Two Bees in a Podcast brought to you by the Honey Bee Research Extension Laboratory at the University of Florida's Institute of Food and Agricultural Sciences. It is our goal to advance the understanding of honey bees and beekeeping, grow the beekeeping community and improve the health of honey bees everywhere. In this podcast, you'll hear research updates, beekeeping management practices discussed and advice on beekeeping from our resident experts, beekeepers, scientists and other program guests. Join us for today's program. And thank you for listening to Two Bees in a Podcast. Hello, and welcome to another episode of Two Bees in a Podcast. In today's episode, we'll be interviewing Dr. Andony Melathopoulos from Oregon State University. He'll be with us talking about pesticide applicator training. We will follow that with a segment where Amy and I discuss honey bee viruses, bacteria, and fungal pathogens. And of course, we'll end today's podcast by answering questions from our listeners. We hope you enjoy this episode of Two Bees in a Podcast. Amy, I guess you know that one of the most important topics the beekeepers seem to always ask us about pesticides and the impacts of pesticides on bees. Do you get a lot of pesticide questions?

Amy 01:33
I do. I do. I do.

Jamie 01:35
Like what percentage, do you think, of your questions are pesticides? I feel like for me, over the last decade, it's kind of going down because 10 years ago it was the thing, but now people are understanding a lot more about it. So I feel like it's something that I get asked less and less.

Amy 01:50
Yeah, I want to say it's not really the questions that I receive. But when you bring up honey bees, the first word that kind of comes out is pesticides, right? When people think of the issues or the problems

that are going on in the honey bee world, they say, "Oh, we hear the pesticides," so it's a lot of just comments, I think, about pesticides.

Jamie 02:06
Well, as beekeepers, bee scientists, etc., we almost always think about the impacts of pesticides to bees. But there's another angle to think about as well. There's this whole group of individuals who apply these pesticide applicators, these individuals who have to be trained to apply these things safely, making sure they follow label, etc. So anyway, we're very fortunate to be joined by Andony Melathopoulos, who's an Assistant Professor of Pollinator Health Extension and the Department of Horticulture at Oregon State University. Andony, thank you so much for joining us to talk to us today about speaking to pesticide applicators.

Guest 02:38
I'm so excited to be talking to Two Bees in a Pod.

Jamie 02:41
I know. What's funny is you guys have a podcast up there, pollination, we have a podcast here where we're interviewing one another, I'm like really excited about it. What our listeners are going to discover through all of this is that you have a smooth podcast voice and a great personality for podcasts. So what's gonna happen is everybody's gonna leave us and migrate to you after this segment.

Amy 02:59
So yeah, we've got the podcast face, you've got the podcast voice.

Jamie 03:03
Well, I don't know how we should all feel insulted at this moment. Simultaneously Amy, you managed to insult all three of us. Anyway, Dr. Melathopoulos, let's get into what we actually brought you here to discuss. What I want to start before we get further -- all of our listeners hear me say this anytime we introduce a new guest -- can you tell us a little bit about yourself and how you found yourself working on behalf of bees and pollinators in general?

Guest 03:31
It's funny, I consider myself more of a people person than a bee person. And I kind of trace it back, I started my master's in Dr. Mark Winston's lab at a real Renaissance point in that lab. There was Jeff Pettis and Danielle Downey, where Jeff was the postdoc and Danielle was my fellow master's student from Project Apis M. And the thing that I really loved about that is Mark would get us on the road all the time talking to beekeepers and talking to regular people. And I remember one huge pivotal moment for me was Mark sent me to the Alberta Saskatchewan and Manitoba Beekeepers meetings with Bill Wilson from the USDA. And I had never really run into somebody who was able to communicate with beekeepers so effectively and so efficiently. And that really changed my life, both being in Mark's lab and seeing a real extension pro working with people. I knew that that's what I wanted to do. And so after that, I worked at the National Honey Bee Lab in Canada with Steve Pernal. It was an area with

some of the best beekeepers I've ever met and some great mentors. Then I took a turn at age 40 and started studying native bees and pollination, and then ended up here in Oregon. After a huge pesticide kill in 2015 there were some shade trees that were treated with insecticide and a taskforce struck in the state. And they decided that they really needed an extension position to be able to work with pesticide applicators.

Jamie 05:08
Well, I have to admit there are about 50 things I want to ask you about through all that. I'm going to try to temper my excitement but number one, I wasn't aware that you had been at Mark Winston's lab, what a really cool experience. Actually, I had narrowed down my choices to that too. We could have ended up in the same lab together.

Guest 05:24
I was a small, skinny guy at that time, but I do remember you coming through.

Jamie 05:28
Holy Manoli. That's impossible, really. I was thinking we've got to be about the same age. I just don't remember who was there when I was there. That's so crazy. Anyway, neat. It's neat how this does and the other thing is, too, you mentioned, specifically, that bee kill in Portland. I remember that very specifically, as well. I remember when that happened. I was getting a lot of questions about it. And I saw this position kind of come out of that and it's really cool and exciting that you got that position. The last thing I'll say, it's really neat that your midlife crisis was native bees. You were working with honey bees. You turned 40 and then you do native bees. I always tell people my midlife crisis is I'm going to get a camel. That's always the thing I wanted to have.

Amy 06:09
How's that going for you?

Jamie 06:11
It's not. Well, I'm midlife but I've got four kids, so I've got to wait until a little bit later midlife before I get a camel. Anyway, let's move on. It's a really cool background. Let's talk about what we're here to talk about.

Amy 06:21
So Andony, I feel like Jamie had heard you speak about native pollinators. And I think it was an EPA training. Was that right? Is that what you were speaking at?

Jamie 06:31
Amy, we had attended a couple of different meetings together. And I was just incredibly impressed by all the things he said in the inputs. I was like, Amy, gotta have this guy on our podcast. That's kind of the background from my perspective.

Guest 06:41
Warms my heart because I'm a huge Jamie Ellis fan.

Amy 06:45
Great, now we can just fanboy.

Jamie 06:47
Let's just go back and forth, Andony. It's my turn.

Amy 06:51
Okay, well, we're really happy to have you here. And I know that you've trained, I mean, thousands, 7000 pesticide applicators, and you've done recertification classes. Something that we wanted to bring you on to talk about was the process and who pesticide applicators are. So would you be able to tell us who's your clientele? Who do you train? What industries work with getting continuing education as a pesticide applicator?

Guest 07:19
Yeah, that's a great question because there's lots of pesticide applicators. I'm a pesticide applicator. This morning I treated my cat for fleas. I use imidacloprid on the back of her neck. And so there's all sorts of pesticide applicators. But as soon as you're applying pesticides, either for business or if you're applying what they call restricted use pesticides, pesticides you can't go to Home Depot to pick up, you need a license. To get a license, I had to get my own pesticide license, it's a very tricky, you have to take a long exam and it's really tough. Once you have that license, in many states, they've built in these continuing education programs to retain your license. So you don't have to retake the exam, but you can stay current on some of the current issues around pesticide safety, pesticide resistance, integrated pest management. It's a really great program and many of the states, I think most of the states have this in place, and extension plays a huge role in delivering that education. I think many states have what they call pesticide safety education programs which organize the bulk of these trainings and pesticide applicators show up and they're able to stay current. And I think pollinator protection is just one of many things that they learn. Current topics on how to keep their license active and be responsible pesticide applicators.

Amy 08:46
Sure. So in the process of their training, they learn how to apply the pesticide, when and where the laws and regulations, and of course, the pollinator protection is just kind of a small piece of that whole pesticide applicator training. So you're talking about staying up to date. Why would you say that doing this training is important?

Guest 09:08
Well, I think because things are constantly changing. And with pollinators specifically, there's a lot that's been changing. If you had gotten your license five years ago, things like fungicides and pollinators and bees would not have been an issue that you would have been trained on. These are emerging issues.

New products come on, and they've got different environmental hazard issues. And so this allows a pesticide applicator, who's a very busy person, probably running a small business, doesn't have a lot of disposable time to kind of come into a room and kind of learn all they need to learn to stay up to date.

Jamie 09:45
Andony, one of the things that really struck me when I first got to the University of Florida, so my background is just I kept bees for a long time, since I was a kid, and so I've applied, regularly, things to control Varroa and all kinds of stuff in the past. And so it was very simple. The logic behind it was simple, the application of it was simple. And then when I became a faculty member at the University of Florida, I realized how much training and experience goes into applying pesticides, for example, on row crops around houses and things like that. So you're right, we've got these restricted use pesticide licenses. But one of the things that I think is super important to know is that, as beekeepers, while most of this is reserved for people who are applying pesticides out there, in my opinion, even though beekeepers don't need these licenses to apply the things that they apply to their colonies, I personally think every beekeeper, especially commercial beekeeper, should consider getting a restricted use pesticide license because it teaches you all that stuff you just said, safety around pesticides, understanding what it is that others have to do to be able to apply pesticides, because I think it makes you a better educated beekeeper, especially if you're a beekeeper, for example, who uses your colonies to provide pollination services or honey production services on crops. So you're out there, you know what these individuals who are putting pesticides out are having to go through, you understand what restricted use pesticide is, you will learn a lot, and I will tell you with certainty, UF required us, as new faculty, to have restricted use pesticide licenses if we were going to do any pesticide education at all, and it really made me understand pesticide safety, pesticide applications a lot better. And I really felt as a result of that, it's something that could benefit beekeepers tremendously, even if they feel they wouldn't use the license themselves. I mean, what do you think about that, beekeepers getting that kind of information and training?

Guest 11:49
You set it up real well because one person who has been my mentor and talking to pesticide applicators is actually beekeeper Harry Vanderpool, who's the vice president of Oregon State Beekeepers Association. And he is such an effective communicator because he retains his license. I see him often in the audience, taking recertification credits to maintain his license, but he uses it, I think, primarily, I think he's got a small acreage. But for him primarily, it allows him to really put himself in the shoes of his growers and understand worker protection safety standards and how that's coming into play with how he can move bees in and how he needs to be notified. There's all sorts of aspects outside of pollinators and pesticides that a beekeeper going into an agricultural area should be aware of because the regulations, they're a worker working on a piece of land where pesticides are being applied. They come under pesticide safety regulations as well. And so I think, Harry, not only by taking the courses has he learned how to communicate effectively, he understands the position that pesticide applicators are in, but he also understands, as somebody going into an agricultural area, how to stay safe, and what the current laws and regulations are.

Jamie 13:13
Exactly.

Amy 13:13
I think that's awesome. Yeah, that is the best kind of liaison we can have, someone who understands both worlds who can kind of bring it into the middle. And of course, I'm sure he's sharing his education with others around him as well. I think that's like our perfect liaison between the two industries, the beekeeping industry and the ag industry.

Guest 13:32
Harry is the perfect liaison. I'll just say it.

Amy 13:36
That's great. Can we just clone him and have a couple of him just throughout the --

Guest 13:40
Wouldn't that be great? That'd be awesome.

Amy 13:42
So, Jamie and I have spoken, we've done a segment about pesticide labels and what to label, we've talked about different miticides that beekeepers use and it's really hard for us to put together, I guess, fact sheets to say this is exactly what you need to do, because sometimes the labels are changing. So I kind of want to share our conversation over to looking specifically at pesticide labels. Will you talk to us about what a label is? And maybe some of the pollinator protection information that goes on to these labels?

Guest 14:13
Yeah, absolutely. I think Jamie had a fact sheet, I mean, when I was starting up, where he was documenting sort of these changes that were taking place in terms of labels, trying to provide the beekeeping industry with some information, because we are in a period of transition. Before 2014, there really wasn't a risk assessment, a formalized risk assessment procedure for pesticide applicators. What I mean by risk assessment, if you looked at an old pesticide label or a label that was before the risk assessment came into place, you'd see something called an environmental hazard statement. And in the environmental hazard statement, there be something that says this product is toxic to bees or this product is highly toxic to bees, and then it would have some sense of how long that product would remain active and say do not apply when this bees are actively foraging or do not apply when bees are foraging on the treated area or on blooming weeds in the area. That statement was the same whether you applied it on a plant that had no flowers, if you applied it at a high rate, if you applied it at a low rate, it was not a risk statement, it was a hazard statement, it just would give you a sense that there was a possibility of bees being exposed, but it didn't give an applicator any sense of in what context they can apply it or what kind of mitigation they could use to avoid exposure to bees. That's changed. And as a consequence, the labels are reflecting that change. So an applicator goes into a training, is

confronted with maybe two or three versions of labels now: the labels that were entirely focused on these hazard statements, these newer labels where you go right to the crop, and it tells you give the beekeeper 48 hours notice, wait till petal drop. There was a temporary moment right after actually the bee kills in Oregon, where a bee diamond appeared on the label. All of these things the pesticide applicator has to navigate and there are subtle differences between them. Let me leave it at that and answer the question. Applicators have these labels in front of them and they're not all saying the same things, currently.

Jamie 16:28
Andony, I think there's a great example of this in Florida. I put this on my notes. And it's funny because everybody wants to come to the state specialist to try to figure out, how do you interpret this? What's the best way to interpret this? I'll give you this example: In Florida, there's a handful of things that are used on citrus to control a little psyllid called the Asian citrus psyllid, which spreads citrus greening, which is a huge big deal for groves here in the state of Florida. And of course, citrus honey is so important for our beekeepers here. Okay, so a lot of pesticide labels will say things like, you can't spray while it's in bloom. I've never thought about this. It's one of those questions I just really never considered, Amy. I'm like, okay, well, plants in bloom when the flowers open. So then the growers are like, well, guys, when is a plant in bloom? They literally went to our regulatory agency to say what does it mean when a plant is in bloom? Because they said, essentially, the stress caused on the citrus trees can force them to bloom out of season. You have 10 15, 20, blossoms, maybe 100 blossoms on these citrus trees out of quote, bloom season, when you'd expect to see it. Maybe March, you might see it as early as November or December. Stress blooms. So is a plant in bloom if there's one open flower on one tree? Does it have to be one open flower on every tree in a grove? It got really complicated fast because the citrus growers are saying, essentially, if we can't use this while citrus is in bloom, we never can use it because we can almost always find a bloom amongst 1000 trees. And then of course, the beekeepers on the other side are saying, well, it says here, you can't use in bloom, don't put it out if there's a flower on that tree. So of course, both sides and the state turns to us to define bloom. It just gets weird fast, because the label language, to me, wasn't very specific and the federal government and the regulatory agencies were leaving it up to local groups or states to interpret what this language means. I mean, do you see that as these labels shift? Are they shifting towards more specificity so people can actually regulate against these labels? Or is it still vague, in your opinion, the issues that they've been seeing?

Guest 18:43
My sense is that they're getting a little bit more specific. But as, I think, your example points towards, a risk statement really is, in any sense, it's always going to be generic. The analog to what you described is when you have a blooming weed in a row. What we recommend to growers, if they're going to put an insecticide on that's toxic to bees, they should mow down the clover between the blueberries or between the cherries or whatever. But the next day, there's going to be a clover bloom the very next day. So there's an area of judgment that does roll in and the labels are giving broad recommendations for risk. And I think the situation that you described is one that, I think for EPA, they would like to see the beekeeper and the applicator come to some kind of agreement, almost like the label is not designed

for that. Maybe just to back up, when we're talking about risk, the thing that I sort of leaped ahead, I'm so excited to be on the podcast, is that the old statements that are on pesticide labels, the hazard statement doesn't take into account whether exposure is likely. And so exposure, I think you laid the first issue and the key elements of the label is whether there's a bee attractive bloom in the spray area. And that typically is the crop. But it could also be blooming weed, it could be something in the drift zone. The pesticide can't just stay where the sprayer is. There's going to be some amount of drift. That's one of the key drivers of risk is whether a pesticide is going to end up on something that's bee attractive and whether it's toxic. But then also there is this element that's built into the risk assessment, even on the old labels, that some products like the spinosad products will break down in three hours. So if an applicator applies it after the bees stop being active in the evening, by the next morning, that product will have dissipated sufficiently, that if a bee came into contact with a petal that was treated, there wouldn't be enough material left there to be acutely toxic to the bee. So that's what the current label is trying to capture, this very complicated model of how a bee gets exposed and how that exposure affects the colony. As we know, sometimes these effects can be delayed and they're very contextual, the colony already had Varroa problems, and a month later is declining, and why is it declining? It gets very complicated. So the risk assessment has to sort of balance all of these issues off in a very complicated world. But they have to. People have to do it, people have to spray pesticides. So it has to, in a current moment with the best science, using a roughly good model, be able to make a statement.

Amy 21:41
Yes. So, we're talking about managed honey bees on a larger scale and with agriculture commodities. Can you just quickly tell us what other industries do use pesticide applicators because I do feel like even our backyard beekeepers are affected in some way or another with someone who is a pesticide applicator around them even within super urban areas. What role did those applicators play in pollinator health?

Guest 22:09
That's a great question because my position was created not by an agricultural pesticide application, and in fact, in Oregon, when the shade trees, the Linden shade trees were treated, it wasn't even a honey bee issue, it was a bumble bee issue. Honey bees visit Linden, but really what was on the ground of that Target parking lot on National Pollinator Week in 2015, were a lot of dead bumble bees. So I would say that when I go into a training, there's a handful of growers. The vast majority of the people there are right away managers who don't even use insecticides. So most of the people who apply pesticides are applying herbicides, trying to control weeds across the state. But then there's a big contingent of people who are working the landscape trade. And for them, it's exceedingly complicated because some plants flower and they're beautiful, but they don't attract bees at all. Some flower and they're beautiful and have no pest problems at all. There's a lot of horticultural plants that are really fine. One that I think is of national concern are Linden trees. Linden trees are great honey bee plants, a summer blooming tree that can pound out the nectar. You can't really compete with a linden tree, but it does build up aphids. And if those aphids are planted in a parking lot, the person who does the design puts them in the parking lot, shoppers are going to find they got sticky stuff all over their car. And so

suddenly, you've got a conflict. So the key thing, I think, with a lot of these things, and when we train a lot of urban applicators is just like, go to your planners and make sure that when you're planting your landscapes, you're not planting something that's going to be pest prone for 50 years, because that's going to require care the whole way through. They've got a complicated situation because a lot of people who are doing landscape management inherit these problems. They've been called into the Target parking lot in Wilsonville because there's this problem they need to deal with. So they also go to the recertification class and we have in our training, specifically, we have examples, we try to stream our training towards the people who are attending so that we have examples, specifically, where we think the two or three pinch points are going to be in their work with respect to pollinators, because in most urban landscape management, there's really no conflict.

Jamie 24:36
Andony, I really think you set up this kind of next question that I'm going to ask really well. So we've talked a little bit about the issue, who pesticide applicators are, why they're important, what role they play in pollinator health. You've talked about the CEUs and the exam. We've talked about label language and how it shifts and the risk statement versus hazard and all of these things. So let's talk specifically about your program. The whole segment here is about speaking to pesticide applicators. So you've trained lots of pesticide applicators. So could you tell us a little bit about your program? It's an extension program, so of course, there's going to be probably objectives, etc, you probably have developed materials, handouts, you offer training events, you probably do some follow up and program assessment to determine the success of this programming that you offer. So with that setting you up, could you tell us a little bit about what you do at Oregon State to ensure that these pesticide applicators are appropriately trained, as well as are going to do everything they can to be good stewards, so that pollinators can benefit?

Guest 25:35
Well, okay, sure, let me take it all the way back to like Bill Wilson. So Bill Wilson would go into a room of beekeepers, he would assume nothing about them, he'd learned their names, he was kind to them, and he would give them exactly the information they needed. The thing I loved about Bill Wilson's presentations is he rarely had a graph. He had a number. 98% control of Varroa, that's what you need to know. And I thought, huh, for a busy person, you don't need to inundate them. And I quickly realized I was dealing with probably one of the most distractive captive audiences I ever was going to encounter. You get a room of 200 people, they're doped up on coffee and donuts, they've got busy lives, they kind of have to be there to get their credit. I knew that I had 60 minutes. And I had to be concise, I needed to be to the point, and I also needed to respect -- and this is what Harry taught me as well is that these are busy people, very intelligent people. You don't need to go in and just give them like, "You guys and gals are ruining bee health." You start a conversation like that, in that context, like the phones just light up and people are just tuned out. The training is called being soft on pollinators and hard on pests. And it's like, just real clear at the beginning. And we're going to teach you here how to do this. What I did originally is I use these clicker questions at the beginning, so I could see what they knew to begin with. And that allowed me to get some sense of whether the training was effective. So I would ask them a question. So here's a question for you. One of the first questions I asked them, I

say, okay, by law, can you apply a pesticide at night on a bee-blooming crop? If the label says, Do not apply this product when bees are foraging in the treated area? So you read that, and it's like, I don't know. And so the answer is, you can't. It signifies that the product has a long residual time, it's going to be active the next morning. And they kind of get a sense of like, oh, maybe I don't know this. And it gives them a point of reflection, I think. I really wanted to make those trainings very active. And so that as we go through the questions, they have to make a commitment. They have to make a commitment to an answer. We can talk about it. And then as we go forward, I asked the same question later, I give them some examples of real labels. And within that 60 minutes, I think they were scoring, maybe 25% of them understood that label language, by the time they left 95% of them understood it. And so I knew that the training was effective, and it was coming through. But the other thing I learned is, I had a question there. I said, "Hey, OSU has this great extension publication on bees and pesticide. Have you ever seen it?" And we've been pushing that for years, it's had multiple authors. It's a real, wonderful piece of work, and we're coming up with a revision. And everybody said they'd never seen it before. I was like, huh, isn't that the oddest thing, the kind of premier flagship extension publication, and nobody's seen it. And so what I did then is I came up with a postcard with the key things they needed to know about the label, rendered it out really flat and clear, very little text, just as much text as you give them information, and make sure everyone had one. And they left the room. I got this because I knew the bee protection protocols in California with the almond growers had this little card that would go in the truck. And I thought, "That's what I need." They're never going to pick up that extension publication, they need something they can put in their truck, or in their coffee room, and it's there so that they can remember what they learned in the course. So that was the general approach was kind of like they got 60 minutes, I want to be very focused with what they're going to learn, I want to make sure I can measure that they're learning it, and I want them to walk out of the room with something that helped reminds them what they learned.

Amy 29:33
I like the way you extension. Yeah, my master's degree is in extension education. So Jamie and I have spoken about this pretty often and I just hate wasting time. And I don't like putting together a program because I have to put together a program. I want it to be applicable, I want it to be practical and it sounds like that's what your program is doing for the participants that are coming to your training, which is great. It's awesome. You're interactive. If someone can leave with one or two things that you had meant for them to leave with, I think that's a win. It's a huge success. To train thousands and thousands of pesticide applicators, I'm assuming that you've had great success stories, and you've had people who are applying their pesticides appropriately where they are getting rid of pests, but also, they're soft on pollinators. So, how do we find that fine line? So I think that is amazing. So I applaud you for that. Thank you.

Jamie 29:39
Amy is actually trained.

Guest 30:36

Well, thanks so much. And I will say that there are other extension educators across the US. There's a small working group working on these managed pollinator protection plans, and Ana Heck in Michigan is leading that effort up. We're trying to coordinate, share these resources, because I think, coming up, it looks deceptively simple, but it took me years to kind of get it down to the point where it's like, that slide's way too complicated. I gotta render that work. And so I think one of the key things in extension is that we cross states, we share information, and we are able to roll out success stories better.

Amy 31:13
Yeah, definitely. So I guess my last question for you, for our listeners out there, I don't know if it extends beyond the United States, but where would someone be able to find a local pesticide applicator training? Are there trainings around the nation? Do they have to go through your training? What recommendations do you have for those that may be interested in attending one of the trainings?

Guest 31:36
Yeah, so we do have an online training but only gets you Oregon and Washington credits. But I think in your state, there's going to be a pesticide safety education program. But also some of the companies like Wilbur Ellis will sponsor their own class for training as well. So there are trainings all around and you just need to contact your Department of Agriculture. They've got a list of all the sponsors of these trainings. And let me just say one last quick thing. The thing that's been so effective in Oregon is that the state of Oregon has made the pesticide training for pollinators a core credit. So not all credits are equal. You have to get a minimum amount of these core credits. And so I am really busy because people really need this credit. And I think for other states, if there are other states listening to this, I think it's a very easy lift just to make the pollinator training a core credit, and then suddenly, you're getting a lot of people coming to your class, and you're being asked to give a lot of classes.

Jamie 32:32
I think that's a really good point. I'm wondering, Andony, how much of the training can be offered online through modules that don't require you to be present? Are you guys heading in that direction where they can do all their CEU acclamation or sorry, accumulation online?

Guest 32:47
Yeah, well, it's all online now. Right? I think there's something about like, I love walking around the room. I have to say, I'd be remiss if it went online. Like sometimes at lunch, I'll go pick up the clickers and I can see the doodles on the hotel notepad they've got there. And they wrote down like, bees and this guide, and I'm like, "Okay, that's great." I really miss not seeing their faces.

Amy 33:13
Drawing goals on the pesticide labels.

Guest 33:17
Great artists out there. I'll tell you, amazing art out there. But I think it can be done online. I think increasingly, it's online. And I think it just requires good, as Amy was talking about, a good educational

professional to sort of drill down like, what do you need to get across and just having some ways to assess their ability to comprehend some of these basic concepts. Let me tell you, folks, take a look at some of these pesticide applicators in these hazard statements. They are not clear.

Jamie 33:44
Absolutely. Right. Yeah. And I think one of the benefits of course, we have an international audience with this podcast, so a lot of people might be listening to this and wonder, well, what's our equivalent of restricted use pesticide license? Or how do we get similar information? But I will tell you, in much of the world, my colleagues are facing very similar issues about providing pesticide safety training, not only for beekeepers, but for those who are applying these pesticides, these pesticide applicators, so it would probably be fairly easy -- wherever you're listening to us -- be fairly easy for you to contact your nearest bee scientists be extension specialist, the individual who goes around training a lot of beekeepers, and ask him or her where it is these resources are available because pesticides stewardship has been a big issue forever, really, but it's an increasingly big issue. And Andony, it's really great to know that people like you are out there, not only training the beekeepers how to respond to pesticides being used around them, but equally important and maybe more importantly, training pesticide applicators, how to remember pollinator stewardship as they're applying these pesticides. So Andony, I want to thank you so much for joining us on Two Bees in a Podcast.

Guest 34:55
It was my pleasure. Thanks for having me, you guys.

Jamie 34:57
Absolutely. Everybody, that was Dr. Andony Melathopoulos, Assistant Professor of Pollinator Health Extension in the Department of Horticulture at Oregon State University.

Honey Bee 35:13
Have questions or comments? Don't forget to like and follow us on Facebook, Instagram, and Twitter @UFHoneyBeeLab.

Amy 35:28
Welcome to this segment of Two Bees in a Podcast. Jamie and I are going to talk about, I guess, just different pests and diseases, and diseases specifically. We always hear about bacterial diseases or viral diseases or fungal diseases. But sometimes we don't realize what falls under each of those categories. So I think we just wanted to have a general overview of what these are, how they're related to honey bees specifically, and how they affect us in our everyday beekeeping practices.

Jamie 35:56
That's a neat intro. When I started keeping bees when I was a kid, it was at least, at the time, a surprise to me that beekeepers had to take care of bees. I grew up, my grandfather was a dairy farmer, so I grew up with this idea of course, you have vets come out and take a look at your cattle, etc. But the idea that if bees got diseases or mites or pests that I had to be their doctor and treat them and

diagnose their problem, that was really interesting to me. And as you mentioned, when a lot of people get into beekeeping, the very first thing thrown at them is Varroa or small hive beetles or wax moths. So they're often very aware of the pest, but the pathogens get not much attention really at the end of the day. So I think it's cool that we're doing a segment on this topic.

Amy 36:43
Yeah. So again, like what you were saying with the Varroa and hive beetle and wax moth, those are our bigger pests, and some of them are even secondary pests. And so people know, they've heard Varroa, but they don't realize what Varroa does and what the problem actually is behind that. So let's go ahead and start with that then. So let's start with some viral diseases. And then we'll kind of go on to bacteria and fungal after that. So tell me a little bit about viral diseases, what that is, how they're spread. I mean, we're currently going through a virus situation right now, aren't we?

Jamie 37:14
It seems we are. It's November, it's actually Election Day 2020 in the United States, while we record this podcast, and we're knee-deep in this COVID issue that, of course, has been shaping our election and our country and the world, for that matter, for much of 2020. And just like humans can get various viral diseases or pathogens, honey bees can as well. So Amy, you asked me specifically to start off with the viral issues. Viruses frustrate the willies out of me with honey bees. We know a lot more about them than we did 15 or 20 years ago. We know that honey bees have a lot more than we ever knew they had. But the reason they're so frustrating to me is because there's so little that you can do about them. For example, when we talk about the bacteria in a moment, we'll talk about being able to treat with antibiotics, etc. But with viruses, there's not much you can do. So before I talk about what they are, I'll tell you that the general response to viruses is, number one, we know that some of them can be spread by Varroa so one of the best ways to keep their levels down, perhaps, is to control Varroa. That's what a lot of beekeepers do. If your colony is struggling with viruses, it's because they have a susceptible stock. So maybe requeening will help clean up some of the stock, but apart from that, Amy there's not a lot you can do because we don't have vaccinations for honey bees as it were. So let's talk a little bit about some of the more important honey bee viruses. The first one I ever learned about as a kid was sacbrood virus, and the reason I learned about it so quickly is because when I first started keeping bees, I was pretty convinced that my colonies had American foulbrood. If you know much about American foulbrood, which is a bacterial disease, and sacbrood, which is a viral disease, you'll know that they manifest similarly in the hive. So sacbrood, like the name implies, kills developing brood. Their bodies become sac-like and the inside of that sac, the inside of their body basically turns to juice. So you get this sac of insect skin holding this juice and you get very characteristic presentation like you would for American foulbrood. It kills the older developing brood, so you'll get sunken cappings, you'll get perforated cappings with holes etc. You see it. But a strong colony tends to clear it up. The other notable virus, Amy, that I'll mention is deformed wing virus. And this one is the one that gets all the press. Just like the name implies, bees that are heavily infected with it have deformed wings. It is absolutely, unequivocably carried by Varroa. It's transmitted by Varroa. When Varroa are feeding and reproducing and developing brood, they will transmit that virus to those developing larvae and then they'll be born with misshapen or deformed wings. But the DWV, deformed wing virus, doesn't only

misshapen the bees' wings, it also causes shorter lifespans, behavioral changes, etc. And Amy, on top of those two viruses, deformed wing virus and sacbrood virus, there's a ton of other viruses: Israeli acute paralysis virus, cashmere bee virus, bee virus X, bee virus Y, iridescent virus, cloudy wing virus, the chronic bee paralysis virus, acute bee paralysis virus, and there's even a ton of viruses, Amy, that bees have been found to have that have no known presentation. We know they're there, but we're not sure what it does to bees. I will say, as I wind down my spiel about viruses and ultimately, let you ask another question, is I will say that a lot of the viruses manifest similarly. So you'll get shortened lifespan, the adult bees that are heavily infected will often lose their hair, a lot of them will kind of have what I call a rigid paralysis where the bee just kind of stands still and it shakes. Its paralyzed in the sense that it's not walking, but it's still shaking a little bit. And colonies that have high virus loads, you'll often, when you approach the hive, the physical structure in which the colony lives, you'll see bees on the ground around that hive entrance, or you'll see bees wandering on the ground away from the hive, because we know that some of these viruses cause what we call altruistic self-sacrifice where the infected bee will allow itself to die away from the nest, potentially, in an effort to keep its sisters from being exposed to the virus. So that's viruses in a nutshell. But there's so many more being found all the time. And there's just so much work that virus scientists have to do in order to help us develop ways to protect our colonies from these things.

Amy 42:11
Interesting. So I assume that there's research going on in vaccination for honey bees.

Jamie 42:18
It's funny you asked that. I have heard of some people trying to develop antiviral agents for honey bees. I'm aware of some companies touting some of these products. I'm aware of some scientists who have been looking at it. But Amy, I will tell you of the three groups of pathogens, we'll end up discussing, viruses, fungal pathogens, and bacterial pathogens, viral pathogens are the ones for which there is an explosion of research. If you pull all of the pathogen talks out of the standard honey bee research meeting, well over 80% of them are going to be focused on viruses.

Amy 42:56
Just because we don't know that much about it,

Jamie 42:57
Because we don't know much and because new ones are being found, it seems like, every day.

Amy 43:03
Interesting. All right, so let's move on over to bacterial. Do you want to talk about the bacterial diseases?

Jamie 43:09
Sure. And you might not be surprised to hear that if you look on a honey bee, you're going to find a lot of bacteria, right? That's because there's just bacteria everywhere. Same is true for viruses and fungal

pathogens. This stuff is out there everywhere. And because it's out there everywhere, if you take the average adult or immature honey bee, do a pathogen analysis on it, you're going to find all kinds of things. In fact, you're going to find human pathogens associated with honey bees because they're easy to pick up. But in reality, there's usually only about two main bacterial pathogens that beekeepers are concerned about. And that's American foulbrood and European foulbrood. And the names American and European have nothing to do with where they're from originally. I think it has more to do with where the scientists were from when these things were discovered. So European foulbrood is a bacterial disease that infects young larvae and typically kills the bees in the larval stage. Now, you're going to hear me use the words typically and usually. This is biology and life is messy. So lots of different manifestations can occur. But usually, young honey bee larva will eat the European foulbrood bacteria, and as it's developing, it will die before it reaches the capped brood stage. And what you'll see is you'll see discolored larvae, yellow, brown, black, they tend to be twisted in their cells and they tend to never make it to even the capped stage. Now, you contrast this with American foulbrood, which always infects the young larvae, but it usually kills the capped stage of bee development. So while both European and American foulbroods are infecting the young individuals, generally speaking, European foulbrood will kill the individual before it's capped and American foulbrood will kill the individual, usually, after it's capped. So one of the ways the beekeepers tried to identify AFB and distinguish it from EFB is AFB usually occurs under capped cells, you'll start to see sunken cappings, you'll start to see holes in the cappings, you open those cells, the dying or dead individual will shrivel to the bottom of that cell and form what we call a scale on American foulbroods scale. One of the very popular tests for beekeepers is you can stick a small twig or stick into a cell of an American foulbrood infected individual, and as you slowly withdraw that stick, you'll get this ropiness associated with that little individual that died. So they're kind of snotty. I hate to use that analogy. I used to tell people, if it's not snotty, it's not American foulbrood. I know, I'm sorry, but it helps to remember it forever. But again, these are very loose presentations. So you have to look at more than just one thing. You can't just say, "Oh, it's sunken cappings, it must be AFB," or, "Oh, it's twisted larvae, it must be EFB." The real kicker, Amy, to point out for the two bacterial diseases is that American foulbrood forms spores, which is, for lack of a better way to explain it, a hardened state of the bacteria that is incredibly resistant to environmental stress. So because of that, if, for example, your colony has American foulbrood, and you feed it an antibiotic, or you give it an antibiotic, it will kill the vegetative stage of the American foulbrood bacteria. So it will look like it has cleared up. But the spores are left behind, and they're resistant to those kinds of environmental stresses. And it can manifest years, maybe even decades later, at any time in your colony. That's right. Whereas European foulbrood does not form a tough spore that is resistant to environmental stress, and when your colonies get European foulbrood, you can treat with an antibiotic and it tends to clear up. Now, I will say, we're in the United States. We have access to antibiotics because they're permitted to be used in honey bee colonies. But for most countries around the world, beekeepers are not allowed to put antibiotics into their colony. So they will often address European foulbrood by feeding colonies, by requeening colonies. And the most common way to address American foulbrood around the world is to burn the colonies. And the reason for that is because the spores are so persistent and can be spread so easily between colonies.

Amy 47:56

I wonder if they took the spore to outer space and brought it back whether that would --

Jamie 48:01
Honestly, Amy, I don't think it would be a problem for the spore at all. I know. I know, it's crazy. But the last paper I read on this years ago, and I hate to be quoted, but was something like five decades, the spores were still active. And I know in a lot of --

Amy 48:14
That's crazy.

Jamie 48:15
They'll do all kinds of things. They'll boil their equipment, they'll heat scorch the inside of their boxes if it's had American foulbrood, but really the safest thing to do is to burn it all just to get rid of the spores. Because you can pick it up on your gloves, on your hive tool, on your smoker, and it's so communicable and easy to spread. And it's just one of those things that you don't really want in your bees.

Amy 48:37
Yeah. And that's really what the inspectors, at least here in Florida, are looking for when they go out to do inspections.

Jamie 48:43
Yeah. And then one of the things I'm always amazed by is it's an Achilles heel. Basically, what we have is in the United States, we quickly were given the ability to treat with antibiotics. This tends to be true in the beekeeping operations. We're instantly able to switch to a compound that we used to kill Varroa, etc, etc. And so many places around the world, they don't have those opportunities. So I hate to even put this on the air, but I'm just gonna throw it out there for what it's worth, a lot of our commercial operations in the US have become heavily reliant on antibiotics for the control of these two bacterial diseases. Whereas both bacterial diseases tend to be incredibly well controlled by the other commercial beekeepers around the world because they've not had access to these antibiotics. So they've had to develop better management strategies to address it. So we need to look at that here in the US and certainly need to continue working out ways that we can get better handles on these two particular pathogens.

Amy 49:41
So speaking of spores, we'll move on to fungal issues. And would you like to talk about fungi? Fungi. We've already even talked about fungi. This is probably the third segment where we've said that.

Jamie 49:56
I'm not gonna let it go. There's a fungus among us. Which is also true.

Amy 50:03
So what kind of fungus do honey bees face?

Jamie 50:06
Well, if you look at the old literature, the books about beekeeping, certainly the older ones, they will always talk about two main fungal pathogens. One of those being chalkbrood, and incidentally, Amy, for all of these things I'm just giving you the common names. I'm not telling you, for example, that chalkbrood is Ascosphaera apis. But nevertheless --

Amy 50:24
We can remember chalkbrood much better.

Jamie 50:24
Yeah, but with chalkbrood, it's in all the books and if you ever look under the fungal pathogens sections of the diseases and pests for any beekeeping book, it's going to mention chalkbrood. But if you look in the older books, a couple decades ago and beyond, there's also some other fungal pathogen, Aspergillus flavus, Aspergillus niger, some of these things collectively referred to as stonebrood. In the US, this is not something we talk about a lot. But in Europe, they see stonebrood relatively regularly and these are just fungal pathogens, stonebrood, chalkbrood, that infect, kill and overwhelm so the larvae get infected. And in the case of chalkbrood, it kills the individual and since chalkbrood is a fungus, it produces that cotton-y fungus appearance that you kind of see as mold on your bread. The chalkbrood, the larvae, the pre-pupi in this case, will harden and it will start going from fungus pearly white and it will start this discolored appearance where it goes to a kind of an orange color than orangey brown, then a brown, and then almost a black color. And individuals that are dead to chalkbrood and again, chalkbrood kills brood, not the adult bees, individuals that are dead to chalkbrood form these dry pellets. And the old time beekeepers would always talk about knowing they had chalkbrood because they could pick up a frame and lightly shake it and you could hear the individuals in the cells that died to chalkbrood kind of rattling. And so chalkbrood is the fungal pathogen that most beekeepers read about. Stonebrood is one that other people mentioned. But what happened about 10 or 15 years ago, these two other pathogens that we've had forever, one of which we've known about for a very long time, were originally considered a separate group of organisms. These were microsporidia. And now microsporidia have been classified as fungal pathogens. And when that happened, the microsporidia from the genus Nosema ceased being their unique organisms and started being fungus. So Nosema disease never shows up in the fungus sections of the old bee books because, at the time, they weren't considered fungal pathogens. Microsporidia were not considered fungi. Today, they are. So Nosema apis is the one that we've known about for a very long time. Nosema cerana is the one that we discovered -- we, the scientific community -- in the mid 2000s, kind of in the early days of bee losses kind of elevating, and we now know there's at least another fungal pathogen or Nosema pathogen that infects honey bees. It's affectionately named after a colleague of mine from Europe, Nosema neumanni. So beekeepers, when they think Nosema, they're thinking Nosema apis and Nosema cerana. But of course, there are likely other Nosemas out there. So apis, Nosema apis, it's the one written about in all the old books, bees get it and it causes gut problems for them, digestion problems. Both Nosema apis and Nosema cerana get in the guts of bees and compete with bees for nutrition. And so bees will start manifesting what you would expect to see if they were

nutritionally deprived or they would manifest these nutritionally deprived phenotypes. So Nosema apis would cause dysentery in the bees, they would have diarrhea, they tended to be a problem more in winter when the bees were forced into close quarters. I call it the bee cholera. Where when you squeeze people together, and they all get this kind of dysentery disease, well, bees are kind of the same way. Nosema cerana, though, in the mid 2000s, was discovered to be the more dominant and prevalent species. We all believe we had Apis forever. Nosema cerana burst onto the scenes. We don't know if it was new or a reclassification of an existing one that we didn't know at the time was an apis. Nosema cerana is the new thing that people worried about for the last 15 years and it's one that people are studying in great detail now. Some scientists report that it impacts bees significantly. Other scientists report that it has minimal impact. Some beekeepers treat against it, some beekeepers ignore it and think it's minor. So the jury is still out. But under this fungal umbrella, we get the two Nosema diseases that we all know about, chalkbrood, and then some other minor fungal pathogens as well.

Amy 54:49
I remember, I do get that question quite a bit as far as Nosema goes and whether to treat or not to treat for it. I always remember asking Dr. Cameron Jack and he basically says, if your colonies are healthy, if they're strong that you shouldn't have to treat for Nosema. Right?

Jamie 55:08
Yeah, that's actually the take-home message. I have not treated for Nosema. So I've been keeping bees now for -- how old am I? -- about 31 years. And I've I think I treated for Nosema the first two years of my beekeeping career. So I think that treatments don't help in my history very much. We've done some research here in Florida and didn't see an impact of treatment at all. However, there are other scientists who've shown that some treatments can help and some beekeepers who swear that their operations wouldn't survive if they didn't try to address Nosema by treatment. So it's kind of a mixed bag at the moment with what to do about Nosema. But generally speaking, I think Dr. Jack's recommendation is really solid.

Amy 55:50
Sure. And earlier, when you were talking about bacteria, you were talking about how there's good bacteria and bad bacteria out there. Obviously, we kind of focus on the bad stuff, right? Because that's what we see. But what are some of the good things about any of the stuff that we just spoke about?

Jamie 56:05
Yeah. So anytime we talk about bacteria, fungi, and viruses, people automatically assume the worst. And I told you not so long ago that if I had to pick a group, bacteria, viruses, or fungi, if I had to pick a group, for which there's an explosion of research, it would be the viruses. That's of the pathogenic pathogens, as it were. It's not for all. If I had to pick the real area of research that is exploding in these kinds of microorganism domains, it would actually be research on the positive attributes of what we call the good bacteria or the good fungi. And these are the ones that reside in the guts of bees. You will almost always hear this talked about as endosymbionts or gut symbionts. So that's that suite of bacteria and fungi that are in bees that you want to be in bees. And there is a massive migration of science to

look at gut symbionts in bees. So not all bacteria and fungi are bad. So there are plenty of them that are beneficial to bees. In fact, I think there are eight big groups of bacteria, as an example, that are important for honey bee health, and these things are in the gut and aid with digestion and a number of other bodily functions in bees. So a lot of beekeepers are getting really excited about this type of research. You're starting to see people talk about probiotics and inoculating bees with these things where there's research showing that when bees are compromised, these bacterial communities are compromised and the guts of honey bees, they may be more susceptible to pesticides or other pathogens, etc. So if you go to a standard research meeting on bees, you're going to hear a mess load about viruses, and you're going to hear a mess load about the good gut symbionts. So you're right, not everything that's small like that is bad. There are many things that are important to bees, just like we have our own intestinal flora that are really, really beneficial for us.

Amy 58:10
All right, well, that segment was a little bit longer than we normally do. However, I thought it was really important to at least touch base on bacterial, viral and fungal diseases, especially the ones related to honey bees. So thank you for that.

Stump The Chump 58:25
It's everybody's favorite game show, Stump The Chump.

Amy 58:30
It is that question and answer time, and I have three questions from Denise, John and Mary for today. Thank you, all.

Jamie 58:49
I think it's so cool that people from all around the world are asking us some really good questions. And it's funny because you and I were talking behind the scenes, I don't know if you remember this, about a month or two ago, I think. We're like, "Gosh, I feel like we're gonna be answering the same questions coming up here, over and over. What more can be asked?" And then we get brand new questions, brand new topics that we've not even thought to discuss before. So, guys, that's awesome. Keep it coming. We want to have your questions.

Amy 59:16
Yeah, definitely. It's so funny. I'm just like, we couldn't have thought of these questions. This is just the beauty of working with people. Okay. So the first one is from someone in Wisconsin, and every year they overwinter their bees in Wisconsin, and for some reason, basically, they go through their mite treatments, they go through colonies, their hive, and then they take out a drone. By the end of October, apparently, the colony kind of dwindles. It goes from the size of a basketball to a baseball and then a handful of bees. The queen is still there, and she's basically running around unserved. So what is going on here?

Jamie 59:56

Amy, this question could not be more timely. For those of you who are listening out there, this is being asked of me on the third of November 2020. It happens to be our presidential election here in the United States. That's neither here nor there. But literally last week, I had a discussion with a beekeeper, I won't even say where this individual's from so as not to pinpoint it for the listeners. But this individual described the exact same phenomenon. This individual carries his bees to a specific state in the US, produces honey, brings his bees to a different spot to overwinter, and they come back incredibly strong, lots of honey produced, and then they come back and then there is a very quick depopulation of the hive. Usually, the colony doesn't die, although some of them do. But there's quite a quick depopulation, it's incredibly alarming, you'll end up with something about the size of a grapefruit, and I'm using grapefruit rather than softball because many, many of our international colleagues don't know what softballs are. So grapefruit. Ends up about the size of a grapefruit and some of them don't make it. But then miraculously, some of them pull out of it. I've had this discussion with this individual now for, I don't know, three, four or five years running. Okay, person from Wisconsin, the bad news is, I've got nothing. We have collectively talked about this. We have gone through it. Your condition sounds so similar. So let me just go through with you the same things I go through with this individual. The very first thing I ask about, and given the timing that you mentioned as well with your situation in Wisconsin, and for those of you around the world, Wisconsin is a northern state, so when August rolls around, the summer is good and over and they're fall-like weather, even though fall is still another month off. So the first thing I gravitate towards this time of year is Varroa. I know a lot of people will come at me, "Well, I treated, I treated." I used, in this case, formic acid, I believe, if I'm not mistaken. My first question is how do you know your treatment worked? Did you sample Varroa before treatment, so you knew where you were starting? And did you sample Varroa after treatment, so you know where you ended up? And with those two pieces of information, you can determine the efficacy of the treatment. So my question to you is, did your treatment work? Not did you treat, but did your treatment work? My gut instinct when people are having widespread, big colony issues, my first gut instinct is did you, beyond doubt, have Varroa under control? And if you don't know, then we can never take Varroa off the table. If you do know that Varroa unequivocably was controlled and you know that because you did before and after washes, you determined efficacy, it is clear to you that Varroa were dead, then given the time of year, I start going towards nutrition. You've got these incredibly strong colonies, you've harvested off a lot of honey, they've gone through an incredibly intense season. In most of the rest of the temperate world, the bees will be producing their winter bees in July, August, September, usually towards the end of that, whereas your bees were in heavy hardcore production. They're out there working their rear ends off making honey at a time of the year the rest of the bee honey bee populations wouldn't be doing that. Maybe they overexpanded, maybe they were nutritionally stressed and so on, the flows were over, the pollen was of low quality, maybe there wasn't enough carbohydrates available. So I think about nutrition. The next thing I go to if the beekeeper convinces me that nutrition was under control, well, let's talk about other pathogens. Do you see evidence of viruses? Are bees wandering away from your hive on the ground? Are bees hairless? Are they showing this kind of paralysis? Are they shaking on the comb? Do you see a lot of bees with deformed wing virus? Do you have reason to believe that Nosema is an issue for you? I ask the pathogen questions. Then, if we rule out Varroa and nutrition and pathogens, I might go down with some things like pesticide exposure, although if it happens year after year after year, I start to struggle to believe that it's that, but maybe so. And then if we get past that, I really start to

wonder what's left. And a lot of it becomes kind of mysterious, like this other beekeeper I'm referring to where we have these discussions nearly every year where I just don't know what to offer. So my recommendation is if you can confidently rule out the things I've talked about thus far, next year before it happens, while your bees are cruising alone doing well, take samples. Put them in alcohol and put them in a freezer while they're doing well. After you extract and all that stuff, immediately before you typically see the collapse, take some more samples. And then if you start seeing that collapse, take your third set of samples, and find a university or USDA or other diagnostic lab, who will check those bees for pests and pathogens, and maybe some other particular stressors that they're able to look for, and see if you can see what happened through those three sets of samples before, during, and after, that might shed some light on what's happening. And incidentally, for those of you out there who feel like you've seen similar things in your beekeeping operations, and you've pulled through it, and you think it's X, Y, or Z, and here's how you've addressed it. And once you started addressing it, you started seeing clear, positive results, if you'll just send us on Facebook, Twitter, Instagram, email, let us know if you're seeing these similar things and how you addressed it because honestly, it's these mysterious collapses that are very difficult for me to explain. I always feel bad being unable to give clear answers but that's kind of my thought process when I get questions just like this, Amy.

Amy 1:06:13
So I feel like we should put together some sort of fact sheet if there's not something already out there as far as the things that you can kind of cross out and cut out and know that you've looked at those things. Is there something like that out there?

Jamie 1:06:24
Yeah, how do you know it's not Varroa? How do you know it's not nutrition? How do you know it's not this? And so what are you left with? Amy, it gets to the point where it's reported enough to where you begin to wonder, is it something we don't even know to look for? When you don't know something exists, you don't know to look for it. So you start to wonder. But my first, my gut instinct always takes me to Varroa. Where are you with your Varroa?

Amy 1:06:51
Sure. Okay, so the second question we have is John has recently started building a Slovenian hive setup. He wants to hear a discussion on beehive construction. He's considered natural log, top bar, Slovenian. After managing a Langstroth, he feels like the brood inspections can be kind of detrimental to the colony. So he says that the Slovenian and top bars seem to have an advantage from an inspection viewpoint. Do you have any opinions on this?

Jamie 1:07:18
Yeah, I do have some opinions. I'm going to try not to be so cantankerous as I share them. In my opinion, hive does not matter. To me, hive style is always an opinion answer. Now, listen, I have seen thousands, maybe hundreds, I don't know, but it feels like thousands of presentations on bees and beekeeping from bee scientists and beekeepers all around the world. I've seen plenty of people stand up and tout Slovenian hives and top bar hives and log hives and long hives and Langstroth hives, etc.

And I've come to the conclusion that the bees don't care. I really appreciate one of the comments there that Langstroth hives tend to be maybe harder on brood management but I can't for the life of me think why Slovenian hives or top bar hives would be any better. You know what I'm saying? So rather than look at it from what's best for the bees' perspective because I honestly think bees are fine, you ask yourself instead what's best for the management situation? Honestly, in the US, that's why Langstroth is so popular. It's just the easiest hive style to manage. I know a lot of people who are out there, Warre hives, top bar hives, long hives, all that stuff might argue with me. That's fine. It's not a winnable argument. It's just an opinion. There's no compelling data that I've ever seen that bees really thrive in one hive style and not so much in another. A good beekeeper with a bad hive style is going to have a strong colony. A terrible beekeeper with a good hive style is going to have a terrible colony. So, to me, it has a lot more to do with how those bees are being managed and what opportunities you're giving them and not necessarily what your housing them in. So what I would say, essentially, to answer your question is if you want to do a Slovenian hive, I would never try to talk you out of that. If you want to do a top bar hive or a Warre hive or long box I would never try to talk you out of that. But I've seen so many biological reasons to go one way or the other and I just don't think that those hold much merit. I just don't. I've kept bees in Langstroth hives forever. So maybe I should be trying. Maybe it sounds like I'm endorsing them but I'm pretty thoroughly convinced that I can manage bees in a Langstroth hive, as well as anybody can in another hive style. So I would argue to you that the hive style really matters less to the bees and really more to what you want to do. And so you'll see a lot of commercial beekeepers gravitate towards uniformity, like things that the Langstroth hive offers are in the UK to the UK hive and all the different styles around the world. But I have no problem with people who want to keep bees or the style of keeping bees in Warres, top bars, etc. I think it's a cool novelty, it's fun. I even know a couple people, or at least one person, who keeps top bar hives in a commercial setting. So I know it can be done. If you're looking for biological reasons to use one hive style or the other, I have been unconvinced by the arguments that I've seen. So I really think it's just a personal preference.

Amy 1:10:27
Great. Okay, so for our last question for today, Mary was wondering about some robbing behavior that she has. Her apiary includes 40 hives, they're in rural Georgia, and the hives are spaced from one foot to as much as 20 feet apart from one another. All of the hives except for this one hive has an internal feeder, and she thinks that one hive is not doing very well. So she's wondering, after placing a robber screen on, and she kind of shut it down for about 18 hours is what it says, what does she need to do? Should she keep a robbing screen on? Should she feed and treat the hive? Should she combine this hive with another hive or should she just let the bees work themselves out?

Jamie 1:11:10
As new beekeepers or as beekeepers who start growing their operations, it is incredibly discouraging to see robbing. So all of you who are listening to us know that we broadcast from Gainesville, Florida, that's the home of the University of Florida. Our robbing season starts at the end of every September and goes through October and November. That is a very active research time for us and our colonies get the wazoo robbed out of them. I mean, my students and postdocs and technicians are always talking about working bees and having to take extra steps to prevent robbing in the apiary, just because

our colonies are open so much. So what we do, the first thing we do is we absolutely reduce the entrance on our hives. I've had to, in the past, reduce the entrance so much so that maybe only one or two bees was permitted to go through at a time, number one. Number two, I make sure that there are no other openings whatsoever in the hive. A lot of hive equipment gets worn at the corners. You work that hive tool in there and you start opening up a gap over time. I make sure there are no ways that bees can get into that hive, except through the entrance, so their entrance is reduced. There are no other gaps or crevices in the hive through which the bees can go. And then I'll make sure that there is zero sugar water outside of the hive. I don't feed them from the lid. I don't feed them from outside. Mary mentioned that she has internal feeders, that's good. Make sure your internal feeders aren't dripping and showing up on the bottom board. Or if you have screen bottom boards aren't dripping and going through the hive to the ground. That attracts bees. When you work your bees, when you work this particular colony, keep it open as little as possible, as short of a time as possible. Minimize working in it. Generally speaking, this isn't always true, but generally speaking, the stronger colonies will rob the weaker ones. So if there is one that is getting picked on, as it were, it is probably weak or stressed in some way. So if those things I've told you don't work -- reducing the entrance, making sure there are no other gaps, making sure there's no honey outside of the hive or sugar water etc. and working those colonies for as short a time period as possible -- if those aren't doing it, I would actually move the colony away, the hive, the physical hive away for a few weeks, try to nurse it back to health and then bring it back sometime later. Because I've had to do that. We've had robbing so bad that we've had to do that. And also, we've discovered that if one colony is getting robbed pretty heavily, we will often reduce the entrances of all the hives and make sure that the gaps are closed on all the hives because sometimes robbing at one hive promotes robbing at others. We happen to have, Amy, an EDIS document on robbing behavior with bees and we give some additional pointers in the EDIS document. We need to make sure to link that in the show notes. But great question.

Amy 1:14:10
Yeah, that is a really great question. And I know that right now we are recording this in November of 2020. And a lot of beekeepers are now kind of letting their colonies do their thing for the winter. I think some beekeepers are done going into their colonies. So keep that in mind, I guess, as we're going into the wintertime. Those were all great questions. So thanks, everyone. Of course, feel free to ask us questions on our Facebook, in our comments, on our Instagram, on Twitter or send us an email. Hey, everyone, thanks for listening. Today, we'd like to give an extra special thank you to our podcast coordinator Lauren Goldstein and to our audio engineer James Weaver. Without their hard work, Two Bees in a Podcast would not be possible.

Jamie 1:15:00
For more information and additional resources for today's episode, don't forget to visit the UF/IFAS Honey Bee Research Extension Laboratory's website ufhoneybee.com Do you have questions you want answered on air? If so, email them to honeybee@ifas.ufl.edu or message us on Twitter, Instagram or Facebook @UFhoneybeelab. While there don't forget to follow us. Thank you for listening to Two Bees in a Podcast!