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SPEAKERS

Amy, Stump The Chump, Jamie, Guest

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. Today, we are joined by Dr. Brett Bultemeier who is from the University of Florida Pesticide Information Office. He'll be talking with us about pesticide labels, how to understand them, their history, and, of course, how we can use them to minimize the impact of pesticides on bees. We'll follow that with a Five Minute Management on knowing your beekeeping goals. And, of course, we'll end today's podcast with our question and answer segment.

Amy 01:21
Hi, everyone. Welcome to this segment of Two Bees in a Podcast. Today, with us, we have Dr. Brett Bultemeier, an Extension Assistant Professor for the UF/IFAS Pesticide Information Office in the agronomy department with the University of Florida. So, I'm really excited for Brett to be here today with us to discuss pesticide labels. You know, Jamie, you and I, we talk about label being the law over and over and over again, and today, we wanted to kind of expand on that and discuss actually understanding the pesticide label, what that looks like, what we need to be looking for and why they even exist. So, Brett, can you tell us just a little bit about yourself and your position?

Guest 02:02
Sure. First of all, thank you both for having me on. It's great to be back here at the University of Florida. And I think the greatest perk of being here is getting to work with so many great people that work at this institution. So, getting a chance to expand out of our office and work with some other folks. So, a little bit on my background, maybe to give you some scope on to how I approach all of this, I've been working in and around, sort of, pesticides for 20 years. Started in undergrad as an applicator in the Midwest, so working for an aquatic applicator company doing invasive species management. And then

that brought me down here to Florida to do my Master's and PhD at UF. And then spent some time in private industry doing mosquito control, and again, aquatic control, and brings me back here. And during that time, having been an applicator, things like pesticide safety and having to read a label were just a part of my every day. So, having been in the field, I think maybe it brings a little bit different scope than what we typically hear. You know, a lot of people hear all the time, 'The label is the law.' And hopefully, today as we discuss, we can get into a little bit more. Yes, it's the law, but what does that really mean? Who's kind of covered under that? And where do they get the information that goes on to that label?

Amy 03:23
Yeah, absolutely. And I think, you know, it's, I'm guilty of it too, just not reading the label, right? I mean, I don't apply pesticides often. But I should get into a better habit. Sometimes I go to big box stores, you know, Lowe's or Home Depot, and I just look around. And now I've actually started looking at the label. I haven't read in depth on the label, but I hope to do that after this interview today. So, can you tell us the purpose of pesticide labels and how we can understand them better?

Guest 03:51
So, really, if we get into the label, and we're talking about 'the label is the law,' it's a law because it's a contract of sorts. And it's a contract between the company that makes the pesticide and the EPA, and then the company that makes the pesticide, the EPA, and the end user. And at the end of the day, according to the EPA, that if these products are used according to their label, they do not cause undue risk of harm to people or the environment. So, we're pulling in now, people would be me the applicator or our listeners as the applicator. But that also includes other people. It includes the applicator's family, the general public as a whole. So, EPA is already up front saying our goal is to provide safety where it is prudent to do so for people. And then the other big piece of that is the environment. If we go way back to the formation of EPA and the pulling in of pesticide labels into EPA, you know, you're talking about things like rivers that were catching fire, the amount of chemical pollutants that were in the environment was extreme, and it was time to put a handle on that. And that's where the EPA said, "Okay, no more just using things wherever we want," to the point where pesticides in the past, there was no label, per se. There was no instruction of where they could and couldn't be used. It simply said that whatever a company said was in the jug had to be in there. It was kind of the anti-snake oil stuff. Well, now it's a very different ballgame. You've got EPA saying, "Our goal is the safety of the environment and the people that are using this product." So, all of that is to say that the label is the contract with EPA, the end user, and the company that when you use it the way they tell you to use it, there's an element of safety involved in that. Now, you'll notice that I have said safety, you will never hear me say safe. And this is because we can't say safe. I would argue that there's very little in life that is 100% safe, the goal is safety. It is reducing the risk as much as possible. And that's where the label comes in, it's instructions on how to use a product, where to use the product, when to use the product, and then the things that you're not supposed to do. And if you can follow those instructions, the idea is that there is safety for the user, other people in the environment. And I'll add that when it comes to reading the label, people will say, "When do I need the read the label?" And I will always stress it is before you buy any product, you should read through that label, and then before you use it every time. And I will surprise a lot of people that I've been doing pesticide work for close to 20 years, and I still, every time, will read the label because labels are apt to change.

Jamie 06:46
There's so much useful information that I'm sure, Brett, we can get out of you, because this is such a huge topic in the honey bee world, the pollinator world in general, right? The potential impact of pesticides on bees, following the label, etc. So, given the background that you just shared, can you discuss the process of how a pesticide label comes to exist in the first place? You know, how is it made? What goes on behind the scenes to inform the label? And then, furthermore, how's that label organized?

Guest 07:16
So, the process of getting a label made is actually a very long process. It's not dissimilar from pharmaceuticals in a way. It takes many, many, many years. So, we'll start the beginning of the journey at the finding of some sort of chemical, be it a chemical that's found in nature or one that is manufactured artificially, that has an impact on a pest. So, companies, all the time, are looking at various chemicals and seeing what it will do to insects, weeds, fungus, rodents, you name it. Whatever your pest is, there are companies out there looking for a way to manage that. So, let's say they find a unique compound, we'll call it compound blammo, right? So, now that they have found this compound, they will very quickly determine, "Okay, can this have a use? Does it do something? And then, does it have an element that we think could get registered?" So, great, it kills a mosquito, but it kills absolutely everything else. That already is going to weed that chemical out. They already know that it's not going to get registered by EPA. So, kind of at the company level, you have already, I call it the pre-registration process. Do we think there's a chance that this unique compound that we've either discovered or created will do something and has the ability to get registered? From there, you're going to get patent filings. They want to protect that chemical obviously. And then the long process of gathering data. When you are talking about making a label, it is all about data. Data, data, data. And this data is what the EPA is requesting to make sure that it meets that goal of not causing an unreasonable risk of harm to people or the environment. There's a list of, I call them, data buckets. There's, in some cases, up to 200 different buckets of data that must be collected. So, this will be things like okay, what is the inherent toxicity of this compound? At what point is it lethal to rats, fish, birds, and there are certain species that will be tested. So, they want to know at what point in the environment does this thing start to cause damage? Then, they'll move from saying, okay, now we know at what point it will be lethal, at what point do we not see any impact at all? Because that's ultimately what we're looking for. It's not about we want to make sure that this doesn't kill things it's not supposed to. That's certainly a great starting point. But it's really digging deeper into at what point does this not have an impact that we can see? Right? So, once they kind of move through that, then it's looking at now what does that chemical do in the environment? How long does it stick around in soil? How long does it stick around in water? What does it break down to? Alright, so the chemical itself isn't a problem, but when it gets in the environment and it splits in half, yeah, each of those things is more toxic than the original compound was. So again, it's looking at where is it in the environment? What's it going to do once it's there? How long will it last? Looking at use patterns. So, where do you think you will use this product? Is this going to be used on corn, soybean, aquatics, right away, lawns? Where are you looking to use this product? Then you're going to be looking at, particularly, if it's used anywhere near food supply, does it show up in food? So if we spray it on wheat fields, does it concentrate into the bread that we, consumers, will eat? So, they're looking at, not just where is it in the environment, what about our food map? And then

to not dig too deep, the sort of final piece is the applicator themselves. So, what will this compound do if it gets into the eyes of an applicator? What if they breathe it in? What if it's on their skin? And all of this data will start to go into forming the directions for that label. So, from the applicator safety standpoint, it's going to be things like what PPE or personal protective equipment do you need to wear? This is the section on the label that talks about gloves, goggles, respirator, all the things that an applicator who is handling concentrated pesticide may need to use. First, okay, how long do people need to stay out of an area after it's treated now that it's gone out at a lower concentration? So, you get the idea that there are lots of pieces of data that are collected, and that ultimately starts to go into a label. So, let's say during the process of blammo, so, my theoretical compound, we're going to use it on corn, soy, and wheat only. Those are the three crops we're going to use. It does not have much toxicity to people, it does not bind up in the food itself, but it does stick around in the soil a little bit and can leach into water, where it's relatively toxic to fish. So, now the EPA is going to ask for a whole bunch of other data. How much of it will get into the water, what mitigation can be taken, and we find out, it's always going to make it into the water and it's always going to be toxic fish, now that product can't be used. Or, let's say it's only toxic if it were to directly get into water in very large amounts. Now we might put in the label, "do not apply near water," you need to have buffers, you get the idea. So, all of this data, this massive collection of information that costs somewhere in the neighborhood of $50 to $100 million, was the last estimate I saw will go into creating the instructions for use. So, how do you protect the applicator? Who can be around it when it's applied? And then, ultimately, where do you need to avoid to protect the environment? Now, that's a lot of information. And we could spend hours talking about each of the individual studies. But that gives you an idea that this isn't just a, "I discovered a chemical that kills a pest," and the EPA says, "Yeah, go ahead and use it wherever you want."

Amy 13:26
Yeah, it seems like there's a lot. And every time, you know, I give an IPM talk or anything that has to do with pesticides, we always talk about the label being the law. And it's kind of fun to hear the process actually, because I don't think I've ever fully heard the the entire process of what they look for, the different factors and characteristics and, you know, so it's -- thank you for that. That's awesome.

Guest 13:47
No, no problem. And it's, it's really -- I stick with the label is the law, because it's what you hear over and over and over.

Amy 13:54
Sure.

Guest 13:55
And then I will add to that it's really a contract. It is the company saying if you will use our product in the way we tell you, it's going to work, which obviously makes sense if a company is going to give you instructions on how their product works, you're much more likely to use that product in the future. But it's also that third party arbitrator, the EPA saying, "Hey, if you will use it, given all the data that we have, this is how you can use it in a way that's protecting yourself other people in the environment."

Amy 14:28

Alright, so let's talk about pollinators specifically. Most of our listeners are pollinator lovers, whether that'd be honey bees, native pollinators, what have you. So, what type of background work is done, you know, for a product to make sure that it's used in a way to protect pollinators, or, you know, how do we reduce that risk? What does that look like?

Guest 14:48
Well, and more and more, you're beginning to see this be an even bigger focus for the EPA. And a big chunk of that is we recognize the importance of pollinators. So, we'll start with things like honey bees are very economically important to agriculture, because without those pollinators, we don't have a food supply, we don't have food. So, inherently built into some of the products that are going to be used on ag products, they have to be thinking about pollinators, because no farmer wants to spray their field and not have pollinators be able to have food grow. So, already the companies themselves have started to put a premium on honey bee pollinators and protecting them as part of the entire food supply. But, to your point, we've really reached an awareness of the importance that the -- I'll say the not economically directly tied pollinators, so, things like butterflies, native bees. This is certainly a personal topic for me that I live up here around Gainesville on some land that we're restoring to native, sort of, prairie restoration with the goal of pollinator production, trying to get butterflies, native bees going. As public consciousness has become aware of pollinators, EPA has also become aware of just how important those pollinator species are to the environment as a whole, and particularly when it comes to endangered species. Many of our native pollinators are increasingly heading towards that endangered status, and that falls under EPA as well. They have a vested interest in protecting that. So, certainly, there's a renewed interest and focus on that, and that's becoming a part of the registration process. They want to know what impact will this have on pollinators, and if it has potential impact on pollinators, you are increasingly seeing, what I call, the bee box. So, on that label, in the instructions, there is a special box that is highlighted that has a bee on it that gives instructions for when not to use a product, where you can use a product and how to use a product that will protect those pollinators. So, it's not only in our consciousness, it is beginning to be baked into what companies are looking for in the product themselves, EPA is focused on it, and I think we are heading towards a lot more products being looked at for their pollinator safety as part of the re-registration process. And maybe that's one of the myths that we can dispel about products is that once they're registered, once they finally make it through, that's the end of the story. And it just isn't. Every product that is registered must go through re-registration, I believe it's every 15 years. We are in a massive re-registration process right now for every single product that's ever been registered. And that process can also be shorter if something were to come along that the EPA determines would need a looking at that product and pollinators is a perfect example. If a product was registered before they really thought about pollinator safety, and all of a sudden we're getting reports that there is damage to pollinators in ag fields or native pollinators, EPA has the right to relook at that and say, "We need to make changes," or pull a product from the outset. So, I think it's not just pollinators, EPA is constantly looking at everything. They are constantly collecting new data. But we're seeing a renewed push for pollinators for very good reasons.

Amy 18:27
So, Brett, I have a quick question for you. A lot of our listeners, we do have listeners from outside the United States, and I was wondering if you knew of any comparison, as far as the process goes, you know, between the EPA, and then, you know, any other equivalent around the world.

Guest 18:44
There are a lot of similarities. A lot of the European countries and the European Union itself, Canada, again, a lot of these countries that are producing their own food supply have a fairly robust registration process. Some will rely heavily on the EPA. The United States is certainly one of the hubs of pesticide creation, testing and registration. A lot of times that the data is being collected here, it will be shared to partner agencies across the, across the world. So, there's a lot of overlap. Now, there are differences, clearly. We see it all the time. There are some European countries that will ban products that can still be used here and in other countries. And that has a lot to do with what is being grown in a country, the population of that country and what their sort of mood and feeling might be, and that's up to each country to decide. So, there is no overarching international group that decides everything, but there is certainly a lot of data sharing that goes on between those institutions.

Jamie 20:01
Brett, I really liked the way that you describe the label as a contract. You know, as Amy's already shared, we oftentimes say the label is the law. In fact, a lot of our listeners have been joking with us about that. But, you know, given that there's all of this regulatory stuff going on behind pesticides, are there any more sheriffs in town?

Guest 20:19
So, there really are. You know, we just talked about the international community and how there's a lot of overlap. We'll go ahead and zoom in a little bit at the local level. And from a pollinator protection standpoint, you know, there are municipalities, counties, cities that are starting to do a lot more work in pollinator promotion and protection. And when we start talking about pesticides, it isn't just EPA. In fact, for a lot of what EPA enforces, they delegate responsibility to the states. So, yes, the label is the law, the EPA is the sheriff. But, they aren't the only one. In the state of Florida, for instance, we have the Florida Department of Agriculture and Consumer Services, and they also register products. The states are tasked with making sure that there is some sort of a training program for licensed applicators. So, yes, the EPA is the definitive Registration Authority. But, you also have a lot of freedom for states to start crafting training programs for applicators, and even saying, "Yeah, your product is a federal registration, but we don't think that's a good fit for our state." And then, if we zoom in even more from the state level, counties, municipalities and cities have some ability to do what they want to as well, within some limits, with pesticides. There are certain counties that have banned pesticides for a variety of reasons. And that is certainly within their purview. So, yes, EPA is the big bad Sheriff, but there's a whole bunch of deputies running around that have authority as well. And that's really important for those that are working in pesticide application to, not only make sure you're reading your label to be in compliance, but that you understand what the state regulations are, and then any local ordinances that may be in place as well.

Amy 22:15
So, Brett, you were talking about training pesticide applicators. I know a lot of extension agents also do that as part of their programming, and we really focus on Integrated Pest Management. And so, when we talk about Integrated Pest Management, you know, what does this mean? Does this mean that we're not using pesticides at all, or that we're only using pesticides as kind of a last resort?

Guest 22:35
So, a lot of times, you will hear Integrated Pest Management labeled as pesticides last, or the goal of no pesticides. I have always looked at IPM, and I think a lot of practitioners do as well, is it's about knowing all of the tools that are available to you and using them in combination to meet the goal that you have. In the aquatic realm, there's actually been a shift away a little bit from Integrated Pest Management to Adaptive Pest Management, because it starts to pull in some of the other pieces of that. You know, IPM really got started in agriculture, and it was the idea of, maybe let's shift from using only pesticides to leveraging all of these tools together to get the best long-term goal. If we're talking about something like invasive species management, we really have to be adaptive to, well, what is our goal, and what about public interaction and pulling that into this? So to me, IPM is about using all of the tools, of which pesticides is one, together to meet your goal. And it's knowing, with those pesticides, when to use them, where to use them, how to use them in a way that meets the goal of what you're trying to do. And that's going to vary. You know, for a corn farmer, the goal may be to maximize the amount of corn that is grown on that acreage at the lowest cost possible. For somebody that is growing a pollinator friendly garden at their house, the goal is different. So, it's knowing what tools are available to go ahead and get that job done.

Jamie 24:13
So, Brett, I'll just make a comment. The Pesticide Information Office here at UF/IFAS really has a ton of resources regarding pesticide labels, pesticide use, understanding pesticide labels. I do a lot of training on how to use pesticides safely around honey bees and other pollinators, and of course, the label is the law is always what we say. But, we're going to make sure and point out a lot of these resources that you guys have, because every time I go to the online electronic document site for your office, I see all these things that I think would be of such great benefit to beekeepers here and around the world understanding pesticide use. And the reason beekeepers are brought into this at all, right, is because there have been some issues between beekeepers and a lot of other groups, especially the pesticide companies, because of all the blame that's going back and forth about pesticide impacts on bees. Environmentalists have kind of jumped on board. I kind of say this tongue in cheek, I sort of mean it and sort of say it as a joke, a lot of environmental agencies or environmental advocacy groups, I should say, are using honey bee losses as a way to raise money for their groups and always linking these losses to pesticides, etc., which kind of brings me to this important point, right? We live in a world where pesticide applications are necessary for human health, human food production, etc. But then we've got warranted concerns, on the other hand, where these things might be impacting our environment, and so forth. So, how can pesticide applicators and environmentalists ultimately work together on this issue?

Guest 25:50
Well, and that's that's the big question, right? How do you get different groups that have, potentially, very differing goals that overlap to work together? And it starts with communication. It starts with being willing to engage in conversations, to do that in a way that says, you know, neither side is looking for something nefarious, necessarily, but let's begin that conversation. The time that I spent working in private industry, I actually worked for a mosquito control company. And I think there's a really good lesson that can be learned from their interactions with beekeepers. So, mosquito control is absolutely a

way in which you're going to get, potentially, a negative interaction between a pesticide application and bees. Some of these products are absolutely potentially toxic to bees. They are insecticides, a bee is an insect, they can absolutely cause negative impact. But in engaging in those conversations, they were able to start reaching out to the environmental groups, to the hobby beekeepers, to the professional beekeepers, and communicate on schedules, on techniques, on providing ways in which those beekeepers could protect their bees for the limited amount of time that mosquito control needed to take place. And where that conversation started, was, "Okay, if we do nothing, if there is no mosquito control done at all, what does that mean?" And both sides were able to say, "Okay, that clearly isn't something that can be." The mosquito borne illness, the amount of, just, nuisance that comes from mosquitoes biting wasn't palatable to either side. So, when you start with a shared, okay, something must be done about mosquitoes, it opens the conversation for, how do we meet the goal of managing mosquitoes, while also protecting your very important interest, keeping my beehive from being impacted by these, your potential spraying? So, I think it starts with communication. It is being willing to engage in that conversation in goodwill and starting with some level of common ground. And time and time again, and we see it in the invasive plant management world as well, start with what if we do nothing? Because so often, we don't see doing nothing as a choice that has consequences, and it absolutely does. So, not managing invasive species has a whole host of potentially negative outcomes. Now, a group of people may say we are fine with those negative outcomes, and that's fine. We just have to start with if we do nothing, what does that mean? And start laying out what is the common ground that everybody can agree on?

Amy 28:35
So, I completely agree with that. I mean, we've seen a lot of really great success between beekeepers and mosquito control, you know, building relationships, and having that conversation, I think is super helpful. And, you know, it has had positive effects, you know, within county, county levels as far as what I've seen. So, I think that's, that's really great.

Guest 28:58
Well, and again, speaking on the personal side, a lot of folks assume having worked with pesticides, there's sort of a stereotype that goes with this. And when I tell them that I'm growing a butterfly garden at our house, that we are restoring it to get native bees and butterflies, it catches a lot of people off guard. And then, you know, we don't live in a binary world where trying to train people on how to use pesticides in a manner that is more safe means that somehow I want to kill everything. So, I think the more we engage in those conversations, and we're willing to meet each other as people first, it opens up a whole different dialogue.

Amy 29:38
Absolutely. Well, thank you so much for your work, and I really hope we can collaborate in the future and work together on some of the programs that we have. So, we really appreciate it.

Guest 29:48
Absolutely. And you talked about those online documents, the EDIS documents. I'm really hoping to enhance what we're able to do working with groups such as yours and all the other wonderful groups here at the university to sort of take that from being our office, making a whole bunch of somewhat

useful information and really collaborating to make sure that it's reaching the widest audience possible to enhance pesticide safety.

Amy 30:18
Absolutely. All right, everyone. There we have Dr. Brett Bultemeier, the Extension Assistant Professor for the UF/IFAS Pesticide Information Office in the agronomy department with the University of Florida. Thanks for joining us on this segment of Two Bees in a Podcast.

Jamie 30:47
For more information about this podcast, check out our website at UFhoneybee.com.

Amy 31:06
So, usually, when we start keeping bees, actually here at the University of Florida, we have a class that's just called Why keep bees? And so, in today's Five Minute Management, Five Minute Management, we are going to talk about knowing your beekeeping goals. And so, what are your goals? Why are we -- why do we even need to know that? Jamie, I'm going to give you five minutes to tell our audience, you know, what we need to know about our own beekeeping goals.

Jamie 31:32
Thanks, Amy. So, I think this is an incredibly important topic. And the reason I do is that a lot of folks get bees without thinking about why they want them in the first place. A lot of folks, "Well, I just want to keep a few bee colonies in the backyard, maybe pollinate my garden," or something like that. And all of that's, you know, good intention. But beekeepers will often find themselves a year or two in, "Well, I wish my bees were making more honey, or I wish that I could do this or that or the other." And the reason knowing your beekeeping goals is important is because management will be different for those colonies depending on what you are trying to do with them. So, I'm going to outline about seven broad beekeeping goals and then, of course, others, but I just wanted to say these broadly. For example, are you keeping bees for honey production purposes? If you are, you've got to manage them to be strong during the major nectar flow in early to mid-spring. You have to -- that involves keeping them from swarming, disease and pest free, managing the queen, etc. But it also includes keeping bees in an area where you can produce lots of honey. Where I live, in Florida, you cannot produce a lot of honey. So, if I were managing bees for honey production, I'd have to move those bees in order to find a place where they can produce copious amounts of honey. So, honey production is one goal of a lot of beekeepers. Providers of pollination services is a second goal. If you're going to keep bees for this purpose, you need to be able to have lots of colonies because you get paid per colony. The colonies need to be strong, queen right, because they have to have lots of brood. Brood creates the demand for pollen, which is, of course, what sends the bees into the field to pollinate in the first place. Are you going to be a beekeeper who keeps bees for the production of alternative hive products? Royal jelly? Propolis? Wax? Pollen? Because if you are, these require unique management strategies. For example, if you want to produce bees for royal jelly, or sorry, for propolis purposes, you have to use a propolis trap. If you want to collect pollen, you've got to be in an area where lots of pollen is available and you have to use a pollen trap. For the fourth category, are you keeping bees to produce queens and packaged bees? In other words, are you producing bees to make more bees? Do you plan on selling packaged bees and queens if you're going to do so you've got to manage those callings entirely different than

honey flow. Maybe the honey flow is not important to you. Maybe you have to feed the bees a lot just to keep them conveniently close to you in an area where there's not much honey. You have to grow them strong so that you can make packages from them. If you're using colonies for queen production purposes, you've got to have unique equipment. So, that's a very unique niche in our beekeeping world, and you've got to know what you're doing in order to do that, perhaps, the most specialty of all the things that I'm going to talk about. How about the fifth category, nuc and split production? Are you keeping bees to make more colonies to sell? If so, you need to live in areas that have copious amounts of pollen, mild climates so that you can do this much of the year, you've got to have good access to queens. All of this is going to dictate your management style. Are you going to make and sell beekeeping equipment? That doesn't even require you to have bees in the first place. You can simply have a shop and some tools to make and sell beekeeping equipment. You can even be a honey packer, someone who purchases honey and packages it and sells it to other beekeepers. And a lot of people who get into honey production will produce honey with their own colonies first, but then realize quickly that they can buy honey in bulk from other beekeepers, package it, and sell it and make lots of money that way. So, the reason it's important to know your beekeeping goals is because it will dictate how you manage those colonies. So, don't just have bees, know why you have bees.

Amy 35:23
Alright, that was -- you did that in four minutes. Congratulations. You know, every time I -- congratulations, I'm here cheering you on. Every time I hear about the industry, it just amazes me, you know, that there's so many different parts of the industry. And so, I'm really glad that we're able to share this with our audience. And so, now, you all know, I guess, all the different goals that you could have in beekeeping. Tell us about your experience. Don't forget to write to us on Instagram, Facebook, or Twitter or send us an email. We would love to hear from you.

Stump The Chump 36:00
It's everybody's favorite game show, Stump the Chump.

Amy 36:17
All right, we are back at the question and answer segment. And, Jamie, you know, this first question that we have, I think not many people think about. But, the question is related to honey bee cocoons. I feel like we always talk about, like, butterfly cocoons, right, and chrysalis, but I feel like people don't really think about the honey bee brood cells and that part where, I guess, I don't even know when to ask -- where, what, I don't even know how to ask this question.

Jamie 36:43
So, Amy, it is absolutely one of those things that's completely glossed over. Even when I talk about honey bee development in some talks that I give, or worker bee behavior or things like that, I'll mention that bees might cocoons and just kind of gloss over it and keep running. And that's the truth because I just don't see a lot of people studying it. I'm sure there's some research out there. But, so maybe our listeners just want to know what's all, what's all this about anyway. So, larval honey bees actually have silk glands. Once they have finished consuming their food, the bees will cap over the larval cell, and the larva will stand up in that cell, that's a stage that we call a pre-pupa, and actually produce a silken cocoon. Now, it's not something like what malts do. When we say the word cocoon, everybody thinks,

just what you had mentioned, butterflies, chrysalis, cocoons produce these big silken bags in which they develop. Well, honey bee larvae do produce a type of silk. You can see it when you rear honey bees in vitro. So, in vitro means in the lab. And we do that a lot here at UF for lots of research purposes. You can actually see the silk that honey bee larvae produce, but it's not a thick cocoon like what you see with malts. Instead, it's just a silky shell that they place around themselves while they are developing in those waxen cells. And so, once the larvae have finished doing this, they begin to pupate and turn to a pupa, which looks like an adult bee that's instead white, rather than dark. And then they began to darken and emerge as an adult bee sometime later. So, worker bees, whose job it is to clean that cell and ready it for the next egg, then will go into that cell, they'll smooth the cell walls, they'll smooth the cell edges, they'll remove any of the exoskeleton that that larvae or pupa shed while it was developing in that cell, they'll clean the cell, etc. And they'll remove a little bit of that silken thread that the larva deposited while she was in there. But they won't remove all of it, it's very difficult to remove. And so what you'll see is, over time, as more and more offspring were raised in a particular cell, the cell gets darker and darker and darker and darker all the way until it turns black. You know, even in practice, if a cell is used for years and years and years and years, the diameter of that cell actually begins to shrink a little bit because the worker bees who are responsible for cleaning that cell don't get -- aren't able to remove all the debris and all the silt that's deposited from all the generations of larvae that had been developing in those cells. So, that is in part what contributes to the darkening of the cells and the brood nest. And that's it. That's kind of the limit of what I know about it. I would love to know why they produce this silken cocoon in the first place, what the composition of this cocoon is, and and why it's not a thick, like malts do, so then why do they need to do it at all? There's a lot of those questions, and I also don't know the answer to. But, in general, the larvae will produce it, you know at their late stages of development. Worker bees have a hard time cleaning that out, so it contributes to the darkening of the cell, and in theory, even the lessening of the diameter of the cell as those bees develop.

Amy 40:08
Interesting. I feel like anytime you see, like, a time lapse of bees emerging or just the timeline of their development, you'd normally, I guess, wouldn't even look for that then cocoon, right?

Jamie 40:20
Exactly, yeah.

Amy 40:20
Yeah, so, would they -- so would the honey bees ever put -- do you think, like, store any nectar or any other resources in those cells?

Jamie 40:28
They do store nectar and pollen in cells that have been used to rear brood. So, a lot of people, you know, when I was a first time beekeeper, this threw me off as well. When you give bees foundation, they're going to produce white wax is what we would call it, right? Pure beeswax. And we see that a lot in our supers where a honey is because no brood has reared up there. But in the brood nest, when they start rearing brood, you know, those combs turn black. I mean, by the time those combs are a couple years old and have had lots of generations of brood reared in them, they're nearly black. But, even

though that's where brood typically is reared, they will also store honey and pollen in those cells as well.

Amy 41:07
Awesome. Alright, so for the second question, it has to do with VSH queens, and this person is asking if it is effective to allow VSH queens to raise as many drones as possible with the idea of contributing to the local honey bee gene pool. So, you know, basically having the queens lay drone eggs so that they can go out and mate with other queens in the area that may not be VSH.

Jamie 41:33
Amy, the short answer to that question is yes. If you are going to invest in a tolerant stock of any type, VSH, Minnesota hygenic, etc., obviously, it is a benefit to allow those colonies to produce drones from those queens as well, because that's flooding the area with the stock trait that you want. In fact, the reverse is detrimental. If you think about it, one of the reasons that a lot of folks get discouraged with these hygenic or resistance stocks is they'll buy it, they'll allow their colonies to requeen themselves, but they're surrounded by other beekeepers who don't use the stock or there's a lot of feral colonies, and very quickly, in their own operation, they lose the traits because any offspring queens they produce are going out and mating with drones from the area from these unselected stocks, either from the neighboring beekeeper or the feral colonies, what have you. So, one of the keys to the success of using tolerant stocks is flooding the area, you know, you are committed to using it, you requeen your colonies every year with queens that are purchased directly from the producers of these stocks, you allow drones to be produced because these drones will not only influence your future queens, but they will also influence the queens being produced in the beekeepers' colonies nearby or the feral colonies. And even better than that, if you're going to invest in the use of resistant stock, you need to talk your neighboring beekeepers into doing the same, so that you basically build an environment of this stock. So, in my opinion, one of the keys to the success of combating Varroa in the long-term is going to be the movement of honey -- beekeepers away from, just, regular run of the mill unselected stock to hygenic stock. And it's going to have to be an industry wide adoption so that we can get, you know, entire areas flooded with these resistant drones that, again, benefit us in our own colonies when they produce queens, but also those feral colonies that don't, that don't have that same benefit. So, absolutely. If you're, if you're going to invest in a stock, you know, invest in it through and through. Allow the drones to be produced and make sure that you're a beacon of light in the area for resistance stock.

Amy 43:48
Sounds fair. Alright, so the third question we have, it's a kind of a management question. What do you do with honey supers after you extract honey? And how do you store honey supers?

Jamie 44:00
Yeah, so there's a lot of thoughts on this, since it's like what do you do? I'm going to answer it from the Jamie Ellis perspective.

Amy 44:07
You are Jamie Ellis, so that would make sense.

Jamie 44:07
Well, I suppose I am. When I extract supers of honey, I will, so I'll extract all day. And then I will put those supers in the apiary, well, for lack of a better term, to be robbed. If you think about it, you never get all the honey off of these these combs, right? So, these combs are wet, in the beekeeper terms, we call them wet. And so what I'll do is I'll set those supers out in my apiary and allow the bees to rob the slight residues of honey that are on those combs, and once those supers are dry, in other words, all that residual honey has been removed by the bees in the apiary, I then will store those supers until next year's use. So, just a couple of quick words on that. Some people do not all -- do not like to allow bees to rob supers the way that I discussed because it can be an opportunity to spread diseases. So, let me give you an example. Let's say that I have five colonies, and one of them has American foul brood, and I don't know that. And so then I take all the supers of honey from all five of those colonies, I extract it, which is fine, it's okay if humans eat American foul brood, not a problem at all. But then, I put those supers out in the apiary to be cleaned up by the bees through robbing behavior. Well, I just spread the American foul brood from that one or two supers that had it to all of the colonies in those apiaries. But I, personally, from a hobbyist perspective, consider that less of a problem. So, I will gladly allow my bees to rob those supers. Another alternative to doing that is you can put those supers directly back on the colonies from which you harvested them, and the bees will clean them up in the colonies as well. I just don't like to do that because it's an extra step, right? You have to go into a hive, you have to put their supers back on, and once the bees have licked all that honey out of there, you've got to go back and DB those supers if you want to store them, or worse yet, the bees might have stored some more honey in those cells. And so, you're back to square one. So, once you have the supers dry, then you have to figure out how to store them. And there's, kind of, well, four ways that you can accomplish this. Way number one is you can freeze those supers, that's my preferred way, because it stops wax moths from destroying it. And it's the non-chemical way. The downside of this way is most of us don't have enough space.

Amy 45:56
Nobody has a freezer that big.

Jamie 46:20
Bingo, Amy, perfect. Yeah, so most of us don't have enough freezer space to throw in one super's worth of comb, let alone 10 supers or 100 supers or 1000 supers. Incidently, some commercial beekeepers around the world do this. They will actually have huge freezer rooms that they throw in all their supers of comb. But, assuming most of us don't have that option, there's option number two, which is where you can use something like wax moth crystals to store your supers. And so, what you'll do is you'll put so many supers down, then you'll put some crystals on the supers and then so many supers on top of that and more crystals, etc. The label on the wax moth crystal canister will tell you how to use that. The benefit is it keeps out the wax moth crystals, the downside is, for some folks, if they're using chemicals and the supers have to be aired out, again, follow the label for all that information. So, that's kind of the second option. The third option is you can store the supers in an open air shed in a crisscross pattern. So, imagine putting one super down and then you turn the other super on top of it at a 90 degree angle, and then the other super on top of that at a 90 degree angle and so forth. If you do this crisscross pattern in an open air shed, this promotes light and airflow through those supers. Wax

moths tend not to like that. And so it minimizes the chances that wax moths are going to move into those supers and destroy the combs if you store them in this crisscross pattern. If you do this in a carport that is closed, wax moths are going to go destroy that comb. If you do this with dark comb, comb in which brood has been reared, wax moths are going to destroy that comb. So, if you elect to do this third method, then you're going to need to check it with some regularity and make sure that the wax moths haven't moved into it and started producing webbing and destroying the comb. It absolutely works best with pure beeswax, that wider comb, if it's dark comb wax moths are guaranteed to go in, which leads me to the fourth and final way to store combs, which is to put it back on to colonies. And I do this a lot myself. If I have two or three supers per colony that I use during the honey flow, sometimes I'll just put those two or three supers back on the colonies after they are extracted. And as long as the colonies are strong and healthy, they can keep wax moths out of those supers throughout the year. The benefit of this is it doesn't take up any freezer space, doesn't use chemicals and doesn't take up space in an open air shed. The downside of this is that if bees can't protect it, wax moths can move in, and your colonies are large and cumbersome throughout the year, right? So, anytime you work them, you have to remove three empty supers before you get to the brood nest. So, I've kind of put out those four options. We actually have a document on how to control wax moths in colonies. I'm sure, we'll link that in the show notes for our listeners who might be interested in seeing how this works.

Amy 49:34
All right, thank you, and thank you to the audience for sending us these questions. I feel like, Jamie, I feel like they get harder and harder because we just get more specific, you know, as time goes on.

Jamie 49:44
They do, absolutely. We have the benefit, Amy, of being able to look at all the questions that our listeners have asked us, and some of them, we have to send out to be answered by the experts before they come back to us to share the information, but that's okay. Keep those questions coming, folks.

Amy 50:09
Hi, everyone. Thanks for listening today, we'd like to give an extra special thank you to our podcast coordinator, Megan Winfrey and to our audio engineer James Weaver. Without their hard work, Two Bees in a Podcast would not be possible.

Jamie 50:34
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!