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EPISODE 188 TRANSCRIPT

Jamie

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.

Jamie

Hello, everyone, and welcome to another segment of Two Bees in a Podcast. Today, we are joined by Doctor Geoff Williams, who's an associate professor in the Department of Entomology and Plant Pathology at Auburn University. Jeff, thank you so much for joining us on this episode.

Dr. Geoff Williams

Thanks so much for having me. It's been a couple years, and of course, I always enjoy chatting with you and Amy.

Jamie

Well, Geoff, it's great to have you. Thanks for coming back. You are a repeat guest. And we are bringing you on to talk about probably one of the hottest topics in the honey bee world, and that's Tropilaelaps. There's been some spread of Tropilaelaps. Tropilaelaps is an increasingly popular research topic, as you know. So, we're going to talk with you all about Tropilaelaps. Before we do that, we know you've been on our podcast before, but there are listeners who are just joining us and may not listen to the episodes in order. So, could you do a little bit to introduce yourself and how you got into honey bee research for those folks who might be new to the podcast?

Dr. Geoff Williams

Sure. So, yeah, as you said, I'm at Auburn, which is, I don't know, about a six-hour drive north of both of you all in Florida. So, I'm enjoying the very hot and humid weather this summer. I'm originally from Canada that has a nice proper winter, you know, six months of winter, which I don't necessarily miss, although I do like a little bit of snow from time to time. So, I did a undergraduate degree at the University of Alberta, and then I popped across the country and did my PhD at Dalhousie University. That's when I first kind of got my stab at working with bees, despite probably most of the bees in the country, in Canada, being in the prairies, including like Alberta and Saskatchewan. I worked on Nosema as my doctoral dissertation, and then I moved

over to Switzerland, enjoyed a lot of cheese and chocolate and bees over there. I worked at the equivalent of their USDA-ARS called Agroscope, and then also worked at the University of Bern and their Institute of Bee Health. Did a lot of work with a network called COLOSS that, Jamie, you've been pretty active with over the years.

That was really an awesome experience just meeting people, particularly all over Europe, both professors and scientists. But even more important for me was meeting graduate students in different labs and kind of working alongside them and building relationships with that kind of bee research cohort that I still work with today. So, I kind of stumbled on bees to be honest, liked parasites, liked insects, and somehow the two fused. Really enjoyed the applied nature and trying to come up with some solutions for beekeepers. So, that's how I landed in Auburn.

Amy

That's great. I love the beekeeping community. Not only the beekeeping community, but the smaller community of bee researchers in the world as well. It's a lot of fun to be able to meet people around the world, so I enjoy the camaraderie of that.

Dr. Geoff Williams

Yeah, yeah, I really love that too. Of course, I love working with bees. But yeah, those bee researchers and beekeepers are also awesome.

Amy

Definitely. So, we brought you on today to talk about your research with Tropilaelaps. As Jamie mentioned, sometimes our podcast listeners will listen to these podcasts in order from the very first episode or they will see a title and say, oh, that sounds really interesting. Let's go ahead and listen to it. So, there may be some listeners out there who may not have heard of Tropilaelaps before or even what it is. So, I guess let's start there. Can you tell us a little bit about Tropilaelaps and what's the point? Why are we talking about it?

Dr. Geoff Williams

Yeah. So, at a very high level, it's quite analogous or akin to Varroa. So, it's a parasitic mite. It feeds on honey bees, predominantly developing honey bees. In Tropilaelaps' case, it can vector viruses, and it's currently residing over in Asia, also kind of northern Australasia, like Papua New Guinea. But it seems to be spreading, or it has recently spread into more temperate kind of climates. So, there's been reports in kind of like Central Asia. Of course, those mites could have been there for several years before researchers or beekeepers detected it. And then, most recently that really sounded the alarm bells was that it was showing up or has shown up in southwestern Russia, sort of getting into the geographic European realm. So, that's really sparked a lot of interest because, for a long time, we thought it was really just kind of in these more tropical or

subtropical regions and maybe that somehow protected Europe and North America from that mite.

Jamie

So, Geoff, you had mentioned its similarities to Varroa. I think the world's beekeepers all know Varroa destructor. I think there's probably not a beekeeper who's naive about Varroa. And so, we understand Varroa, we understand Varroa physiology, behavior, generally speaking, so what are some key differences then between Varroa and Tropilaelaps? How can we know Tropilaelaps separately from knowing Varroa?

Dr. Geoff Williams

Again, at a high level, I would say that we can have like a similar name for Tropilaelaps. You know, we could call it Tropilaelaps destructor too, because it does unfortunately wreak havoc on naive hosts, which are Apis mellifera, our Western honey bee is. A couple of key differences is the size. So, if all beekeepers listening out there are having a little tough time identifying Varroa distractor, that tiny little sesame seed at the bottom of their alcohol wash on that sticky board, we're in for a real treat when it comes to Tropilaelaps because it's about a third the size of Varroa, so quite a bit smaller. Also, it tends to be a little bit lighter in color. So, if you're looking at sticky boards, it's pretty difficult to differentiate between just kind of debris from the hive or wax. It is small and harder to see. It moves a little bit differently than Varroa on the frame. First, it kind of scurries around and is a lot quicker. From kind of like an economic point of view or biological point of view, in terms of bee health, the mite seems to cause quite a bit of damage because it's just got a quicker reproductive cycle. For example, when the mite emerges from a capped brood cell alongside a developing bee, that Tropilaelaps mite might only spend one or two days outside of the cells, maybe on the frame, maybe on an adult bee before it pops back into a cell to lay eggs. Compared to Varroa, which I think on average is probably 7 days or about a week. So, it's popping back into those cells to lay eggs a lot quicker. The females don't need to take another meal before laying eggs and their egg laying rate is also quite a bit faster.

So, I think on average, Tropilaelaps females lay eggs about every 24 hours, whereas Varroa is more like 30 or 35 hours. So, reproductive cycle is faster, we can't see it as well, and those populations can really skyrocket pretty quickly, as we saw in one of our experiments just last year.

One notable difference about the biology is that we don't think it can feed on adults, and that's probably why it doesn't last outside of brood cells for very long. So, maybe that's a little bit of its Achilles heel that we can kind of target as we think about how to manage and control this mite if it were to ever come to United States and North America.

Amy

Yeah, so that was a question that I had was just the feeding. Do we know if it feeds? I guess you're saying we don't know if it necessarily feeds on adults or whether it's feeding on the hemolymph or the fat bodies?

Dr. Geoff Williams

Yeah, all indications are that it does not feed on adults, although I'm sure that some more studies can take place to really investigate that. There have been several kind of cage studies that just noticed that those mites just don't last very long on adult bees in cups, whereas, like Varroa, they do last a lot longer. So, there's a big question mark over, especially in these like temperate areas, how is the mite possibly surviving if they get some kind of broodless period? Well, we know from our brood project that we're working on with you and several other universities, there's often a little softball sized amount of capped brood in there that maybe the mite is persisting on. Who knows, maybe there's some alternative host. The mite was first detected in association with rats. Maybe it's feeding on some kind of larva from wax moth. Yeah, so there's still a lot of work to be done to try to understand possibly these alternative hosts to the honey bee and kind of what's going on there.

One other difference is the feeding sites on the pupae. So, the Tropilaelaps mite won't stick to one feeding site like I think Varroa typically does. So, it'll make tiny little punctures all over the body versus the Varroa that I think tends to feed on one predominant site. And yeah, you might have to bring on Olaf from Universe of Alberta, but I think that the Tropilaelaps mite feeds on both hemolymph and fat body just like Varroa.

Amy

Interesting. So, Tropilaelaps is not here in the United States. It's not been seen or confirmed here in the United States, which means that if you're going to be doing research on it, I assume you're travelling for that and going to where Tropilaelaps is native. I know that you have a student, and you've traveled to other countries to work on Tropilaelaps to kind of learn about it a little bit more. So, can you just share with us the experience that you've had with some of the travels and what you're doing as far as just learning and looking at Tropilaelaps?

Dr. Geoff Williams

Yeah, sure. I want to start with a couple of shout-outs. So, we've got two students, Dan Aurell and Rogan Tokach, both awesome individuals, awesome bee researchers. Dan recently graduated, so he's a postdoc, and they've been doing the day-to-day research in these, like, international locations. So, for example, Rogan is in Chiang Mai University with my colleague Bajaree Chuttong right now, so that's northern Thailand. He's working on a project, and Dan is over at Andong National University in Korea for a couple more weeks with my colleague Chuleui Jung. Yeah, we really, really had to travel across the world to continue this work. I used

to work with the mite when I was in Switzerland and kind of took a break for a little while. But ever since really this demand and, again, the spread of the mite, we've really kind of picked up our research efforts again. So, travelling across the world takes a lot of added effort compared to if you're just doing a research project, as you can imagine, outside your door in Gainesville. So, first off, all the flights and infrastructure, we need to move equipment. So my second shout-out is just all the awesome sponsors that we've got. USDA APHIS has really supported us, Project Apis M, and also, North Dakota Department of Ag, so they've really helped support our work in these locations.

Yeah, awesome experiences when you go to these locations. We talked about amazing bee researchers, extension specialists. The same applies to over in Thailand and Korea. They're super helpful, welcoming and I know you both have been over to Thailand for your student course and hopefully would agree with me. But it also can be pretty challenging, again, because we forget this one supply, or one piece of equipment, and you can't just pop over to Walmart or there's a different language or different equipment. So, both Dan and Rogan have had to work in pretty challenging circumstances, but really, yeah, really rewarding.

And they've both been working with Apis mellifera. So, in many senses, it's the same organism, but beekeeping is always a little bit different. For example, the colonies tend to be a little bit smaller in Thailand, so they have to deal with using less brood for their experiments. Sometimes, they get a lot of rain. So, Rogan's over there in the rainy season, and he sent me some pictures this morning of him moving colonies because they're just completely flooded out because of that, their monsoons that they're getting. So, yeah, lots of lots of awesome experiences, but also pretty, pretty challenging work environment.

Jamie

Well, Geoff, it builds character. I also have a PhD student who does international research, and the stories are very similar, just from a different country. So, back to Tropilaelaps. So, this isn't a new mite that fell out of the sky. Beekeepers in Asia have seen this thing for decades and decades and decades. So how do they manage it? I guess, in some cases, they might be using Apis species that are tolerant of this Tropilaelaps in the first place. But where Asian beekeepers are keeping European derived honey bees, Apis mellifera, in this case, how do they manage it? What are the treatment options for them?

Dr. Geoff Williams

They manage it quite similar to how they would manage Varroa destructor with a bit of tweaks. So, for example, in Thailand, they do use a lot of chemicals. Formic acid is well known to be quite effective against Tropilaelaps because it penetrates those cell cappings, which is where the mite is predominantly residing. However, this is something that I think our North American

beekeeper, particularly like our commercial beekeepers, might need to start thinking about a little bit more is introducing more cultural controls because they are not afraid to throw away capped brood if they suspect they have really high mite levels. So, they do use a lot of chemicals in Thailand from what I've seen, as well as Korea. Formic acid is a really important one that they rely on, but again, they're not afraid to take advantage of brood breaks or to drive brood breaks to remove that mite.

They don't monitor the mite how we suggest beekeepers do for Varroa here, like the alcohol wash, because the alcohol wash is not sensitive at all. Again, the mites are not on the adults very long. So, we've done a little test, and I think Jeff Pettis, when he was at the USDA, also published something a few years ago that the most sensitive tests are uncapping brood or looking at a sticky board. Unfortunately, those are the two most resource intensive monitoring efforts we can even imagine. So, yeah, they really rely on looking for bald brood or like signs of what we would call parasitic mite syndrome, like uncapped brood, sickly looking brood. And that's when they really do an intervention, if they thought it was necessary. And, of course, that's probably not ideal, probably a bit too late. When you see a Varroa walking around on an adult bee, that's already probably too late and way past that treatment threshold. And that's probably even more so for Tropilaelaps because, again, they love going into those capped brood cells. Yeah, really embracing those kinds of cultural controls is I think what we're going to have to do and what they do in in Asia. Apivar or Amitraz based products do not really work.

Amy

That's really interesting. So, you mentioned that the research is done on managed colonies, mostly Apis mellifera. When we went to Thailand, that was when I had learned all about all the other species of Apis, and I fell in love with all of them. So, I was just kind of wondering, is there any research that's being done? Do we know if Tropilaelaps is also a concern for other Apis species outside Apis mellifera?

Dr. Geoff Williams

Yeah, I would agree, especially Thailand. I mean, going there and seeing, at least, in Chiang Mai where I usually go, there's four types of Apis species. So, it's just, yeah, phenomenal to see the giant honey bee or the dwarf honey bees and their nests and stuff. So, we believe that Tropilaelaps' original host is that giant honey bee. So, that picture of the cliffs of Nepal and those giant nests, that's where we think that Tropilaelaps, that's its original host, mainly because of the historic ranges really overlapped. And so that's what's causing alarm is that the Tropilaelaps mite is like kind of breaching that native honey bee kind of range, like in Korea, northern Thailand, Uzbekistan and now, in like Georgia and Southwest Russia. So, it would make sense to investigate what's going on in Apis dorsata. And my colleague in Mae Fah Luang University in Northern Thailand, he's done some work with Tropilaelaps and Apis dorsata. It's just a heck of a

lot harder to work with that species because it's not really managed. I mean, that's one of the big benefits of working with honey bees is that they're, I'll air quote myself, relatively easy to manage. You can have large numbers, but if you've got to like chase Apis dorsata nests up on the chins of Buddha statues or on the cliff faces, it's just a lot more challenging.

So there has been work done, not that much. As we would suspect with a parasite and host that have co-evolved, we don't see like major issues with Tropilaelaps in that kind of native Apis dorsata. So, there's four Tropilaelaps species and only two are known to parasitize our Apis mellifera. So that's Tropilaelaps clareae and Tropilaelaps mercedesae. And we're really interested, again, in mercedesae because it's reaching outside of that native range of Apis dorsata. So that's what's making everyone nervous is, okay, if it survives in Korea, which has pretty temperate climates, chances are it's going to survive in Maine, maybe, or California.

Jamie

So, Geoff, you've been alluding to this kind of throughout some of your answers, but if this mite is native to Asia, obviously it's really important to study it before it moves outside of that. So, we know what to do with it if it ever comes here, spreads to Europe, etc. But has it escaped its native range? Does it occur in honey bee colonies outside of Asia currently?

Dr. Geoff Williams

So, that's what's really piqued the interest of a lot of people, especially beekeepers and the government in the United States because it has done that. We don't exactly know when, at least I'm not aware of that. But probably in the recent past it has kind of reached its sort of native range. We believe the historic host is Apis dorsata, and we've seen, now, Tropilaelaps in places like Korea, Northern China. My colleague from Andong National University was participating in the identification of it over in Uzbekistan, which is Central Asia, and now, Vicky Sroker and her colleagues who we know, they found it in Georgia, and I think Southwest Russia. So, it seems to have expanded or be expanding. And what's most critical about that from our perspective is that it seems to be surviving in more temperate climates that have somewhat of a winter. Again, the Tropilaelaps mite really relies on brood and capped brood. So, the question is like how does it survive if these locations do have winter? Maybe it's because it only needs about a softball or baseball-sized kind of brood nest with capped brood to function. Maybe there's some alternative host. Or maybe it's just the movement of colonies all over the country, a region not so different than the United States. So maybe in a place like Korea, the Tropilaelaps mite sort of dies away in kind of interior parts of the country that experience a winter. But any colony maintained on the coast or maybe in the South that then is moved around for pollination kind of helps spread that mite and reinfest those areas again in the spring and summer. So, it does seem to be spreading or has spread recently. That’s what’s piquing the interest in many people outside of Asia now.

Amy

Yeah, that leads me to my next question. What sorts of initiatives are happening nationally here in the United States and internationally to learn more about Tropilaelaps, to spread the word, what's kind of going on?

Dr. Geoff Williams

I guess I'll start with things that that we're involved in. For example, Project Apis M, USDA APHIS, and the Alabama Department of Ag has supported us hosting a workshop for state bee inspectors. So, everyone's going to come to Auburn in November and get kind of like first-hand experience with Tropilaelaps in terms of biology and from presentations. We've got some really great videos that have been made by Wonderstone, a production company. And then, we're going to do some mock demonstrations of monitoring alcohol washes and sticky boards using very, very dead Tropilaelaps. We've been doing those educational endeavors myself. I'm going to be at the Honey Producers meeting in December and then I'll be at ABF in January, and I know both groups are kind of organizing symposia to kind of engage the beekeeper with Tropilaelaps. Again, Project Apis M is really involved, so is the Pollinator partnership. And then, we're doing quite a bit of research over there, particularly in Korea and Thailand concerning management and understanding the dispersal of the mite. How does it move between colonies?

I've come across other individuals in my travels. For example, I ran into Jeff Pettis over in Korea. He's president of Apimondia, and I know they've got a few initiatives going on. He's doing some research, and I've also come across some of our bee inspector friends in the UK, and they've been visiting Chiang Mai University, also doing some work on monitoring efforts. So, particularly people in North America and Europe are really, again, gaining a lot of interest. As a result, there's some kind of development in terms of looking into how we can communicate what we know about Tropilaelaps to beekeepers and other stakeholders, and also just how do we generate some other key knowledge that we're not aware of? So, yeah, I did a little filming of myself over in Korea just last week when I was there visiting Dan and my colleague. And I guess by the time this airs, hopefully that little vlog will be up on our Auburn YouTube channel. So hopefully, people can check that out if they want to see what it's like to see Tropilaelaps first-hand in its somewhat native area of South Korea.

Jamie

So, Geoff, I know a lot of beekeepers listening to this podcast episode don't have Tropilaelaps. They need to maybe be on the lookout for following regulatory authorities in their areas who are looking for it. But for those beekeepers who already have it, what do you recommend to them? And while we're on this, for beekeepers who don't have it, what do you recommend to them?

Dr. Geoff Williams

So, if you don't have it, but you suspect you have it, call your state or country, department of Ag, whatever your Rep is, immediately get them over there to potentially confirm that mite species. So yeah, don't delay. Call whatever regulatory body that you've got, and if you don't have it and you happen to travel to some amazing place in Asia, don't bring any bees back in your pocket because, again, it seems like a long ways away, my flight from Atlanta to Seoul was 16 hours, and I really try not to stare at the clock because I would really not enjoy my flight. But it's a small world, so just be careful. When I come back from Chiang Mai, I kind of conveniently isolate myself in the comforts of my air-conditioned office at home and don't go near bees for a good week just because we don't want to bring that mite back. So just be extra vigilant. If you do have it, I mean, no doubt that you're probably have a lot more experience than me. No doubt you're working with IPM in terms of like chemical controls, cultural controls. So, I think that's what the beekeepers here in North America, Europe really need to start thinking about, if they're not already implementing more than just chemical controls or diversifying away from maybe relying on like things like amitraz and getting used to working with formic acid, for example, or oxalic acid with brood breaks. So, yeah, I think we're going to have to pretty quickly, rapidly expand our tool box if the mite shows up in Central Europe or North America.

Amy

So, Geoff, we had, in the last episode that we released in this podcast, we had one of your students who used to be one of our students, Jennifer Standley, talk a little bit about her research and what she's doing with you right now. But could you elaborate on other projects that your lab is also currently working on?

Dr. Geoff Williams

Sure. Yeah, so I mean, we're doing a lot of other mite work with Varroa destructor. Looking at chemical treatments, predominantly, is what we're focused on for the next few years because we've got a pretty big grant that Cameron Jack, your colleague, is also participating in. So doing a lot of work with different possibilities to manage the mite using chemicals, but also in addition to cultural controls like the brood breaks and things like that. Jennifer's working on some nutrition work with Chinese tallow alongside our colleagues over in Stoneville at the USDA like Pierre Lao. One thing that I wanted to highlight is our US beekeeping survey. So, Auburn worked alongside the Bee Informed Partnership to run its annual survey for probably the past five or six years. Well, unfortunately, as most people know by now, BIP is not really operating anymore. So, we partnered with the Apiary Inspectors of America to keep a similar survey going so that we can keep this long-term tracking of losses and management actions by beekeepers going and got really great support from the industry. ABF has helped financial support us, Honey Producers as well as the One High Foundation, and hopefully a few other organizations will help support us as we kind of move forward here. So, great support from the industry. We had a really

good response rate this past year, despite us having to really start from scratch and losing that BIP reach.

Just yesterday, our post doc who's running that, Agostina Giacobino, she's a visiting scientist from Argentina, but she's here for a few years. She's been working alongside Natalie Steinhauer now at Oregon State, and they just presented the preliminary results. So, I'd be very happy to share for the first time with anyone on the planet that unfortunately the losses were pretty bad last year and probably rivalled the worst losses that we've seen in the BIP history of the survey for the last 15 years. So, the annual losses were up 50%. One thing that I think we need to dive into, and I need to probably speak with some commercial beekeepers moving forward, is seeing like one of the rare cases where the commercial beekeepers lost more colonies in the winter than backyard beekeepers. Historically, backyard beekeepers lose a lot more colonies, especially in winter, sometimes even in summer. But for whatever reason, this past year, commercial beekeepers seemed to have a rough winter. Yeah, I need to need to dive into that a little bit more. So, again, really wanted to thank all the groups that help support us initiating that survey and Bee Culture, ABJ, Project Apis M. They all help communicate our survey and get participants.

Jamie

Geoff, thank you so much for joining us and talking about this very important issue. I think this is one of those things we're just going to need to hear more and more about. Fortunately, we don't have Tropilaelaps in the US, and I know you've talked about it spreading outside of Asia, but it's still, if I understand correctly, somewhat limited. So, it's helpful to have all of this background research and knowledge to be ready for it, should it continue to spread, first of all, but also end up in places that are outside of where it can ordinarily travel just through bee movement, if it goes overseas. So, again, thank you for your time. I appreciate you joining us, Geoff. It's been great to have you.

Dr. Geoff Williams

Yeah, thanks so much for having me. Always nice to talk with you and Amy. I really, again, appreciate the foresight with especially like APHIS and Project Apis M to really try to put us on that kind of front foot with this mite because, of course, we don't want it to show up here and then we're completely clueless. So, let's hope it never comes here, and somewhat all this work is in vain when it comes to the North American perspective. But hopefully history does not repeat itself in this case. Again, thanks for having me.

Jamie

Great, Geoff. Thank you.

Amy

So, Jamie, it was really nice having Geoff on to talk about Tropilaelaps and some of the work that he and his lab are doing. I know we had another episode -- I guess it's been a couple of years since we've had someone in to talk about Tropilaelaps. We had Dr. Samuel Ramsey who was talking about it. But I think it's important to bring it up again. I think beekeepers are also hearing about it at different conferences as they travel throughout the nation and the United States and beyond.

Jamie

Yeah, I mean, absolutely. This particular pest represents one of the potential next great emerging threats. And I said potential because while it has spread outside of Asia, it's still got a limited distribution outside of Asia, in most of Europe, it's not, to our knowledge, in Africa, Australia, you know North and South America. So, it still has a limited distribution outside of its native range. But should it ever fully escape and take the same route of Varroa or small hive beetles or things like that and absolutely spread everywhere, then it could be significant problem. So, this is one of those cases that knowing about the enemy well in advance of the enemy making a move is very advantageous. It's very important to do work on this. It's very important to think about it, to hear about it, just to be aware. We don't want our beekeepers to be paranoid and scared to death. We just want them to be knowledgeable and equipped should they ever see it.

Amy

Yeah, definitely. And as these resources start coming out, I think it'll be really good for us just to know what it looks like. I think it was a nice description of the differences between Tropilaelaps and Varroa, right? So, to, I guess, be able to identify, even though hopefully in the United States, none of our beekeepers will ever see it.

Jamie

Absolutely. But like I said, it could be a significant problem. You and I have the advantage that we've been to Thailand, and we've seen it in Thailand. On this recent trip, in fact, I even collected quite a bit from some colonies we were looking at while we were there. So, it's difficult to see, it's incredibly small, but potentially impactful. And not just worry about it for beekeepers here in North America, but really anywhere that Apis mellifera is kept outside of Tropilaelaps' current distribution. So, it could be a potential global threat if it were to continue to spread or spread in other areas, especially across the oceans from where it currently is.

Amy

OK, but when you say that you collected samples, you didn't collect live ones, stick them in your pocket and come over to the United States. Right?

Jamie

Of course not. We collected them in the vase. In fact, we didn't even bring them back. They're still in our collaborator's freezer back in Thailand. So, we'll be sending some of our own team members there to do work with those samples. So, yes, we did not bring any back, neither dead nor alive, for that matter.

Amy

Just to clarify! Sounds good.

Stump the Chump 31:14

It's everybody's favorite game show, Stump the Chump.

Amy

All right, everybody, welcome back to that question and answer segment. Jamie, the first question we have has to do with wax moths. So, this individual, their bees absconded. They discovered wax moths everywhere. It was a disgusting mess. They scraped everything they could. They put everything in the freezer, and they basically put it in the freezer until spring. The question is, there was some honey left behind. It had some larvae in it. It was a little wet, kind of brown. So, what are your recommendations on how to handle this? Should this person feed it back to the bees in the spring? Should they just clean it? Should they get rid of the foundations? Essentially, what they're trying to figure out is what they need to do after they take these frames out of the freezer.

Jamie

Yeah, so there's a couple things to think about here. I would not feed fermented honey or honey that I suspect had a pathogen in it, so, for example, American foulbrood, back to bees, but wax moths don't cause fermented honey, and you're not stating that your colony was dying to American foulbrood. So, my guess is, is that your honey's OK enough to where when you take those frames out of the freezer, you can thaw them out and give it to the bees, and the bees can decide if they want it or not. If it's good honey, they'll use it. If it's not, they'll avoid it. But I can't think of many scenarios that would cause them to avoid it. So, really you just need to use the smell test. Once you thaw it out, does it smell fermented? If it doesn't, you can give it back to the bees. The bees will clean up the combs and they'll use the honey as they see fit. That would be the option that I would take.

Amy

Now, when you say give it back to the bees, do you mean put the frame into a honey super or do you mean leave it out for them to forage? What do you mean by this?

Jamie

You can do either one. What I'll tend to do is judge the damage on the comb to determine if it's worth putting that comb back into the hive. For example, if wax moths have reduced all of it to webbing and frass except where there was honey, I might not put that frame back into the hive. I might just leave it out in the environment and let bees rob out the honey and then throw away the foundation and start again. If, however, there was enough comb left on that frame that the bees could rebuild it, with the quick caveat that bees can rebuild a lot of problem frames, then I would put that frame back in the hive and let the bees rebuild it while also taking advantage of giving them a little bit of honey. Again, if the frame's not overly damaged, if the comb's not overly damaged, I will often let the bees just overcome the problem on their own. They're great cleaners, they're great repairers of combs, as long as that comb is not too far gone.

Amy

So, there's a second part to this question. And the second part, I feel like when I'm talking to someone who's getting into bees, I try to be realistic about it. You're probably going to lose bees. At one point, you kind of just wonder, like, what did I do wrong? Why did my bees leave? How do these wax moths come in? So, the second part of the question, the questioner is asking what did they do wrong?

Jamie

Well, here's the deal. Wax moths are present probably in most colonies in the US. And wherever wax moths exist around the world, they're probably in most of the colonies there as well. They're an incredibly common species. So, even in a strong colony, you can get wax moth present in cryptic reproduction -- reproduction that you're not quite seeing, you're not seeing larvae yourselves, but they're in there doing their thing kind of cryptically. You don't notice it, the bees are fine, life is good. You tend to only notice these wax moths overrunning hives when the colony is suffering in another way. That's why we constantly hear bee people talk about wax moths as secondary pests, not really primary pests. They are not the reason your colony was weak in the first place. They are simply taking advantage of a weak colony. What happens is whatever weakens that colony, as that colony shrinks within the hive, they are leaving exposed combs that wax moths go in and take advantage of.

So, when I hear someone say wax moths killed my colony, well that's not really possible. Something else was taking those colonies out in the first place. So, what is that something else? I just kind of have a standard checklist. I start with Varroa always, always, always. What were your Varroa treatments? What were your Varroa levels? When did you last treat? What were you seeing? And if I rule that out, I might go down to queen. Was it queenright? Was the colony functioning OK? And then I might move down to nutrition. Did they have enough food? And then move down to other diseases and pests. Were they being overrun by small hive beetles? Was Nosema a problem? Did they have a lot of viruses? I kind of go down this checklist to identify

what might have been the problem, because if you really do have these wax moths overrunning your colony, there was probably another problem weakening that colony first to make it susceptible to the damage that wax moths can cause.

Amy

All right. For the second question that we have today, the person is asking what are some interesting places that keep honey bees? For example, the White House, Notre Dame or Notre Dame Cathedral, however you want to say it, David and Victoria Beckham's home. What are some interesting places that keep honey bees that you know of?

Jamie

Well, I feel like they answered the question. I mean, what's more interesting than the White House and Notre Dame, right? So, I don't know how to get any more interesting than that. You mentioned David and Victoria Beckham because that's not on the list, so that's just something you knew yourself.

Amy

Outer space,

Jamie

Yeah.

Amy

You didn't know that the Beckhams are beekeepers?

Jamie

Yeah, I did know the Beckhams. They just didn't pop into my mind. I'm not as culturally savvy as you are with that kind of stuff. But I will say honey bees are absolutely everywhere. I know people who keep bees on their roofs. I've heard of hotel chains having bees on their roofs. There's a lot of famous people who keep bees. I go to the UK a lot and Prince Charles, or, I guess, King Charles now, is known as a beekeeper. He's apparently had bees in the past. So, my point is that beekeeping is really everywhere. There's a lot of people who do it. Morgan Freeman, for example, here in the US does, and I believe he lives in Mississippi and keeps a lot of bees. So, there's just a lot of famous people who are involved in bees. And consequently, when bees became, for lack of a better term, in vogue, which they did, starting 2006 onward, when everybody heard about bees dying, when they became in vogue, a lot of people wanted to jump into it. And so, you started seeing bees show up at places like the White House and other famous places around the world. And so most places aren't very far from beekeeping. Six degrees of

beekeeping, as it were. Almost everywhere I go around the world, somebody tells me, well, you know, that person's a beekeeper and they keep bees in their private gardens or, you know, this royal family member is a beekeeper, they keep bees over there. So, honestly, everybody's really close to bees and beekeeping. So, if you can dream up a place, it's likely had bees there at some point in the past.

Amy

Gosh, the question is almost like where are there not honey bees, right?

Jamie

That would be true. I've read all of the stories related to Sherlock Holmes, the complete works there, and I know Sherlock Holmes is a fictitious character, but I will say he was even a beekeeper. So, I mean, they're everywhere. Even in literature, the coolest people are beekeepers, right?

Amy

There you go. That's what makes us so cool. All right, so for the third question that we have, in Dr. Seeley's new book, we interviewed him this year in 2024, so he came out with a new book, and the questioner is saying that in the new book there is an early chapter about thermoregulation. Dr. Seeley comments and says, he quotes, “That's why I always insulate my hives.” This person, the individual who was reading, had only read about top insulated cover in cold climates. So, the question is, would you insulate hives in hot climates to keep them cooler?

Jamie

Yeah. So, I've got an easy answer to that question. Would you, Jamie, insulate hives in hot climates to keep them cooler? Keep colonies within cooler. So, I've got an easy answer and then I've got, of course, the elaboration. So, the easy answer is I don't know. And let me tell you why I don't know in this longer monologue. All right, I'm a data guy, so I like to do things to colonies that make sense because lots of research and data have been generated on the topic. OK, so historically, beekeepers who keep bees in colder climates, northern Europe, northern North America, Canada, in parts of the US, things like that, places like that, beekeepers in those climates routinely will wrap or insulate their colonies over winter, thinking that it helps as the bees over winter.

And in warmer climates like where I've always lived, Florida as an example, where I live now, beekeepers advocate, well, maybe screen bottom boards, completely open entrances, maybe top entrances. I remember in my first decade of educating people about bees, I follow the standard recommendation. You've got to always have upper ventilation in winter because as bees consume the honey in their cluster, it creates condensation and moisture. That moisture collects on the

ceiling of the beehive, which creates condensation, which then rains back on the bees. So, you've got to have that open upper entrance, so you get this chimney effect that takes out that moisture. Well, there's new data to suggest maybe all of that's wrong. And Amy, we've interviewed two different people on our podcast who look at this question related to insulation, one in the Northeastern US and one in the UK. And one of them came on to talk about insulating hives during winter, which in most of our minds is somewhat intuitive, right? When it gets cold, you provide insulation. But the second came on to advocate insulating hives in summer. Both of those individuals collectively made the point that if you let bees choose the cavity they want to in the wild, they're going to choose a tree trunk that's got walls that are a few inches thick with a very thick ceiling and a very thick bottom, right? The tree trunk that goes up and the tree trunk that goes down below the colony. And they make the point that it's no accident that bees are choosing these cavities not just because they want to be insulated in winter, but also because it's easier here to keep their cluster at the right temperature in summer if they are in an insulated hive, which we think the opposite. Thin walls, you got to open up their hive and give them lots of entrance. Remember I referred earlier to this idea of even upper entrance during winter to let the moisture escape. One of the gentlemen said it's because you have an upper entrance in winter that causes this condensation. So, Tom Seeley's work has shown that bees will choose cavities that are about 40 liters in volume, that are 5 meters or more up in the air with entrances that are quite small, only a couple inches open facing South. And he's making the point that bees want these thick-walled hives so that they can thermoregulate both during cold and during hot better. And when you asked me the question and my short answer was, I don't know, it's because the research is still maturing on this topic. I'm slowly being won over by the idea that we probably need thicker walled hives and more insulation. But I just need to see more data on this before I start making those recommendations. But I will tell you, I wouldn't be surprised if that pendulum doesn't swing to the point where, yes, it would be beneficial to insulate hives during summer. Think about our own houses, right? We don't say, hey, it's summertime now, let's make our walls as thin as possible. We still try to maintain adequate insulation so that whatever temperature we create in our house, we can hold in our house. So, the argument's kind of similar for bees trying to thermoregulate even in summer.

So, a lot of research on this topic. I can't wait to see where it goes. I don't know how to address this easily. Let's suggest, Amy, that the recommendation is that you need to insulate during summer. Let's say that comes out of the next 5 or 10 years of research. How do you do that? Because the thicker that you make the hives, the fewer hives that you could stack on a pallet or on the back of a truck. So, now we're talking about is it worth the benefit when you lose the number of hives that you can do things with? Are we talking about thicker walled hives or just different material hives that have thinner material but still has a great insulatory value? So, there's just a lot of work to be done on this but my mind is starting to be convinced that insulation is very important.

Amy

Yeah, absolutely. I hope that this comes out as Goldilocks and the Three Bears method, right? I mean, we're going to have the perfect thing at some point, but there's a lot of work to be done, just like everything else that we talk about on this show. All right, listeners, thank you for your questions. If you have other questions for us, you know what to do. Don't forget to send us an e-mail or send us a message on one of our social media pages.

Thanks for listening to today's episode. This episode was edited and produced by our podcast coordinator, Mitra Hamzavi. Thanks, Mitra.

Jamie

Visit the UF/IFAS Honey Bee Research and Extension Laboratory's website, UFhoneybee.com, for additional information and resources for today's episode. Email any questions that you want answered on air to honeybee@ifas.ufl.edu. You can also submit questions to us on X, Instagram, or Facebook @UFhoneybeelab. Don't forget to follow us while you're visiting our social media sites. Thank you for listening to Two Bees in a Podcast.