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SPEAKERS

Amy, Stump The Chump, Jamie, Guest, Guest 2

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, everyone, and welcome to another episode of Two Bees in a Podcast. In this episode, we are joined by Dr. Heather Grab, who's a Senior Lecturer at Cornell University who will be talking to us about cannabis and bee health. That's not what you think. And in our Five Minute Management segment, we'll be talking about mammals, how they impact your colonies, and how you can protect your colonies from them. And we'll finish our episode today with our question and answer segment, Stump the Chump.

Amy 01:50

Welcome to this segment of Two Bees in a Podcast. Today, we have Dr. Heather Grab, who is a senior lecturer in hemp science at the School of Integrative Plant Science at Cornell University. We're really excited to have Dr. Grab on our podcast today, and we're going to talk about hemp. This is something that I've been receiving a lot of emails about. And hopefully, we'll kind of delve into how bees use hemp and whether they use hemp at all. So thank you so much, Dr. Grab, for joining us today.

Guest 02:20

It's a pleasure to be here. Thanks for having me.

Amy 02:22

So we usually, when we bring in new guests, we have them introduce themselves. And if you could just tell us a little bit about yourself how you got into honey bee related work and we'll get into your project in just a bit.

Guest 02:35

Absolutely. So I actually did my PhD work at Cornell, in entomology. And I came in to that degree program at Cornell thinking that I would actually work on biological control, specifically conservation biological control, which is where you use the existing natural enemies or predators of your pests to control pest populations on farms. And right around that time, there was a lot of concern about potentially declining pollinator populations and whether or not some of the management strategies that we might be using like planting wildflowers on farms that we think are good for promoting predators of pests might also be beneficial for pollinators. So I decided instead of just focusing on my work on biological control that I would expand a bit to think about how we can promote pollinators on farms. And so I designed some of the projects in my PhD work to look at that question, specifically around using wildflower plantings in combination with the availability of floral resources for beneficial insects like bees around farms, to see if that might be a good management strategy that growers up here in the Northeast might be able to use.

Jamie 04:03

So you got hooked with bees and wanted to work with pollinators but you work with hemp as well. We'll get into that in a second. But the bees caught you, you just got stuck with them?

Guest 04:12

That's exactly what it is, Jamie. As soon as I moved into my first year of doing work with bees and doing bee surveys and learning about, not just the honey bees, but the incredible diversity of native bees that are out there, I really got hooked and there was no turning back.

Jamie 04:32

So Heather, you're actually studying a topic that's actually of interest to me and Amy because just like what Amy said, she's getting a lot of phone calls about this. And in the state of Florida, there's this big push to be able to grow industrial hemp, really as there is kind of all around the US at this point, maybe even around the world in many places. So a lot of beekeepers are wanting to know about industrial hemp. Is it something bees can use, etc.? So as we start kind of going down that road, why is it something everyone's talking about? Why is this plant grown?

Guest 05:05

Yeah, so there are a lot of reasons that industrial hemp and hemp more broadly is expanding in its production across the landscape. I mean, markets have been relatively dynamic. So there's a lot of early growth right after industrial hemp was federally legalized. There's a couple of different market classes for hemp. So some of us might think about the hemp seeds that we buy at the grocery store to put on our yogurt or maybe are in our granola. You can also get hemp seed oil from those and protein powders. In addition to that, there's also a lot of fiber production from the plant. So really tall plants that are producing in the outside of the stem region, really long, super strong, high-quality fibers, which might be a nice replacement for a lot of the cotton or even synthetic textiles that we're using frequently these days. And then even more commonly these days, there's a lot of interest in growing hemp for some of the secondary metabolites that are found within the plant, like cannabinoids and terpenes.

Amy 06:23

So I have a really silly question, and you're gonna laugh at me. So it's in the cannabis family, right? So we've got industrial hemp. What is the difference between that and I guess, I don't even know like the

formal way to say it, I'm just going to say weed. Like the stuff that people use. I don't really know what to call it.

Guest 06:43

I would say hemp is such an interesting crop because it is so diverse and dynamic. So there are cultivars that are specifically bred for fiber production and for grain production and even for cannabinoids. The main thing that differentiates what we would call recreational cannabis or weed is just that it has a high level of THC production. So that's one of those cannabinoids that is potentially produced by the plant. However, there's also federally legal, so THC production is illegal, but production of other cannabinoids, like CBD are allowed at the federal level. And it's just a few enzymes that are different among plants that produce a high THC content versus plants that produce a high CBD content. And so the really interesting thing is that these are actually all the same species, *Cannabis sativa*. So you can think of it the same way that we think about a crop like brassicas, where we have kale and broccoli and kohlrabi and collards, those are all being grown from the same species of plant, but we've just selected them to amplify some particular traits that are really good for one use versus another.

Amy 08:05

Interesting. Is it also true that it depends on the time of harvest, does that kind of affect the different THC or CBD levels as well? That's kind of like the plant nerd coming out of me.

Guest 08:16

Yeah, exactly. That's super important timing for your plants. So what we know, what the science is telling us now is actually, even in plants, where their genetics are for CBD production, that enzyme that is converting the parent molecules into CBD is not quite perfect in the way that it's doing that conversion. So occasionally, and actually, about one out of every 24 times it will make a THC molecule. So the legal threshold in the United States for a plant that is considered hemp and is compliant with federal regulations is having not more than 0.3% THC. So what growers are really trying to do is maximize the amount of CBD that their plants are producing, but still keep them compliant with federal regulations. And because that enzyme is producing both CBD and a little bit of THC, that can be really tricky in terms of when you want to time your harvest because plants are accumulating more and more cannabinoids as they grow and senesce.

Amy 09:28

Very cool. Okay, I think I just have to throw it out that, in Florida, it's still illegal to grow any of this recreationally. So, I guess we should probably say that as a caveat.

Guest 09:40

And even here in New York, we have recently passed some regulation allowing THC for adult consumption, but still, as a university, we are complying with what is federally legal. So even though we have a master's program that I teach here, I'm not teaching my students how to grow plants that are high in THC.

Amy 10:05

That's fair. Alright, so we invited you on because you just published some research evaluating the diversity of bee species that visits different hemp varieties. So, I mean, my question is pretty broad, but can you explain your study, what you found with that, and maybe kind of the process of what you looked at?

Jamie 10:24

So Heather, I actually have a couple of questions to bounce off that. So I was going to actually ask you, are they going to the male flowers because that implies they're going for the pollen. But you've answered that. So that's great. So two of my questions that were a little bit off script. Number one, when does hemp bloom and number two is hemp pollen high quality for bees?

Guest 10:24

Sure, yeah, I'll start at the very beginning on that question, which is what got us thinking about bees and hemp in the first place. And that was really motivated by some observations from early growers, as well as one of the researchers and extension educators that got on the ground early helping farmers to produce this crop. And one thing that they were noticing was that in cultivars and production systems for grain and fiber, where there are a large amount of male plants, not something that you would want if you're aiming for cannabinoid production, they were seeing a lot of bees. I mean, in some cases it was described to me that they were seeing fields that were buzzing with bees. So we started wondering. Hemp is a wind-pollinated crop, it doesn't benefit from insect pollination. But we do know that wind-pollinated plants can be important food sources for bees. So we wanted to get out there and document who are the bees, how abundant are they on farms, and what factors might lead to some farms having a lot of bees and other farms not having so many? So, in collaboration with our really amazing hemp research team here at Cornell, we identified a set of farms, mostly grain and fiber, where hemp was being produced. And we set up surveys on those farms, so just going out with your classic insect net survey and collecting insects that were foraging on the flowers of mostly the male plants, in this case. I brought them back to the lab to identify them to the species level to see what was out there. So we mostly focused our efforts, in this case, on bees, and there are many other insects that are out there in hemp fields but the idea for us was just to look at what was going on with the bees that were there. So we identified a big diversity of different pollinators that were visiting hemp, mostly honey bees, but also bumble bees, all the way up to the largest bees that we have in our region, which is the carpenter bee, all the way down to some of the very tiniest bees, like the sweat bees, little *Lasioglossums*, are all using the pollen that is produced by the male flowers of the hemp plant. Importantly, hemp plants do not produce nectar. So although the bees are going to the plants, they are going there exclusively to collect that pollen. I'm so glad you asked those questions, Jamie. When hemp blooms was another reason that we were kind of excited about doing this study. So I had been collaborating, actually, with one of Scott McArts' postdocs, Aaron Iverson, who's been working on mapping floral resources both over space and also through time within our region of New York State. And one of the things that he had identified, really right before we started this project, was that there was sort of a mid-summer gap in floral resources for pollinators within our region. I think that's true in other regions as well. And hemp is actually blooming during that same mid-summer period. So it might actually provide this resource during a time when there are a few other things available for bees around to collect. And actually, the protein question is interesting, because it does seem that bees prefer hemp. In fact, I was out at hemp field yesterday, which was planted right next to a large stand of buckwheat and all the bees were on the hemp. And there were very few bees over on that buckwheat field. So potentially, there are things

about the quality of that pollen, whether it's protein, or maybe even some other features like the secondary metabolites that are in the pollen that might lead bees to prefer that pollen over others, but we really don't know much about that. So that's speculation.

Jamie 15:04

So at this point, then, is it too early to guess if it's good or bad for bees? And let me preface that question this way. In Florida, where I live, I'm gone, I travel a lot in June and July. And so my grass doesn't get cut as much as it should, and bahia starts to send up those long shoots. And honey bees will actually collect pollen from the bahia. And that's only because there's nothing else available. So I see them on bahia. So, in my case, it'd be easy to get excited. "Oh, they're on bahia. Bahia is good." But maybe that's what's available. In your case, it seems like a really neat observation, at least anecdotally, right? You saw them going to hemp rather than buckwheat. Do you think it's too early to call? Do you think it's too early to say, "Yeah, this is actually truly beneficial for honey bees." Or, what research do you guys know is going in that direction? Right?

Guest 15:54

Yeah, I mean, if it's compared to there being no resources around at all, I would say, sure, hemp is probably beneficial for the bees to have some source of pollen around during that period. But a grower might plant something different instead, maybe they would do Cloverfield. I actually don't know what the relative benefit of hemp is compared to some of the other pollens. I think that would be a really interesting area of research to pursue in the future.

Amy 16:28

Alright, so we've talked about how hemp produces pollen for honey bees, and that's what they forage for, and so they don't produce any nectar. But I've heard people say that they have cannabis honey, or they have CBD honey. So tell us what that means.

Guest 16:45

So that could happen for any number of reasons. There is actually a very low level of cannabinoids present in the pollen and some studies have shown that when you provide access to a large area of industrial hemp as a forage area for your honey bees, that they will bring back quite a bit of that pollen and those cannabinoids will show up at testable levels within the honey, within the propolis, within the wax. So apiculturists may want to be careful about how they handle those hive products if they do end up with cannabinoids in them. Another more likely method for folks who are actually wanting to produce a CBD honey that has biologically relevant levels of cannabinoids in it, in terms of human consumption, is they probably just added some cannabinoid extract into it.

Amy 17:48

Like an infusion. Like an infused honey.

Guest 17:50

Exactly. Yeah.

Amy 17:52

Very cool. So what recommendations do you have for beekeepers who want to collaborate with hemp growers? I mean, I have a colleague who works with food producers and lots of growers, farmers out in the field and in greenhouses, and a lot of them are switching over to hemp production. So what do you see as far as where the future of this is? Or what recommendations do you have for beekeepers?

Guest 18:16

That's a really important point. I think there's recommendations both for growers as well as for beekeepers. One important point to reiterate again is that hemp plants do not provide a nectar resource. So that's one thing that beekeepers are going to want to keep in mind if they're thinking about bringing their hives to an area that has a large cover of industrial hemp, they need to also think about sources of nectar because colonies will not do well if there are very few other floral resources available to them. So that's one thing to think about is having at least a little bit of complementary crops around that are producing nectar or even enough natural habitat that bees would have access to that forage around. The nice thing about industrial hemp is that it's relatively low intensity in terms of applications of pesticides to the crop. So that's one thing that beekeepers would need to worry about a little bit less compared to some other crops that they may be moving into for pollination contracts. So that's one benefit, but at the same time, as we start to identify more pest problems in hemp and products become approved to be applied on hemp, growers need to keep in mind that there are a lot of bees present. So male hemp flowers don't look like a traditional showy flower. And many pesticides do have labels that indicate that they cannot be applied during a flowering period or when bees are actively foraging in that area. They don't look like traditional flowers, but there are certainly bees there that are present that we would want to protect, because many of the bees that we saw visiting hemp are also really important pollinators of other high-value crops that may be grown within the region like tomatoes, or strawberries, blueberries, apples, those kinds of crops.

Amy 20:25

Now I want to go Google what a cannabis male flower looks like. I've grown hops before. And I know that they just look like little balls with, I don't know, they look like little balls with sticks coming out of them.

Guest 20:36

I would say they're sort of beautiful in their own right. They're very subtle, they're a subtle flower. They're all about, of course, the presentation of the anthers because they want to get that pollen out there, exposed and be ready to be picked up by the wind. So that's another thing I've actually had hemp growers be concerned about is whether or not the bees that are in their field are affecting any kind of pollination. So, of course, in a grain production system, we actually would like there to be good pollination, because we want to set a really nice grain crop. And so most of that pollen is being transmitted by the wind. But if bees are out there collecting a lot of pollen, or they are moving pollen, that might be reducing levels of pollination. And on the flip side, if you're a cannabinoid grower, you do not want to have pollination, because pollinated flowers that are producing seeds tend to reduce their cannabinoid production. And in that case, I would say, if you do see bees that are out in your field visiting a male plant, the damage is already done. So so we know bees are very intelligent, and they're going to focus their foraging effort in areas that are producing those pollen rewards for them. So they tend not to visit female flowers, they're probably not moving pollen from male flowers to female flowers.

And it's more likely that if you have a male plant in your field that bees are visiting that the wind has already moved that pollen around.

Jamie 22:08

So Heather, you're always two steps ahead of me because one of the questions that I was about to ask is, while it's wind-pollinated, are there any benefits at all from bee pollination, but you just shared that they're unlikely to go to the female flowers anyway, given there's no rewards. So that's really interesting. So I want to go back to this idea of pollen production and no nectar etc. So you'd mentioned that there are multiple varieties of hemp being grown. I know it's really premature, maybe early to be asking this question, but a lot of crops, certain varieties may be more attractive to or beneficial to bees than others. And so rather than making a blanket statement, you know, all watermelon is good or bad for bees, it'd be easy to say, "Well, there's some varieties that attract bees, some that don't." Are we there yet with hemp? Do we know if bees prefer pollen from the fiber producing hemp versus the oil, the seed oil producing hemp? Is there any, at least, anecdotal evidence there? Is research heading in that direction?

Guest 23:10

So to answer the first part of your question about maybe there being potential benefits, while most hemp has separate male and female plants, there are some cultivars for grain production that have both male and female flowers on the same plant. And I would say if there is any potential pollination benefit, it might be there where actual physical movement and the buzzing behavior that bees do might actually enhance the pollination levels, but I don't think that's been well studied yet. And in terms of differences between varieties, that actually is one thing that we did pick up on in our study. We couldn't identify if there were particular cultivars per se, that were more attractive versus others. But one thing we really noticed was that the tall cultivars, so those that are likely being grown for fiber production, were much more attractive to bees compared to the shorter varieties that tend to be geared towards grain production.

Amy 24:15

Alright, Dr. Grab, so is there anything else that you would like to add? Anything that you want to share with our listeners? Any words of wisdom?

Guest 24:26

So I think one thing that we haven't really touched on yet that's a result we found in the paper, I think, that's just important to reiterate for all folks who are interested in promoting pollinators, is the effect of the landscape around the farm. So that's one factor in addition to differences in plant height that explained why some farms had many more bees visiting the hemp crop versus others. We've seen the same pattern in many other cropping systems where it's farms that have really high cover of agriculture around, and few other natural habitats that just tend to have an overall lower population of bees. So we saw fewer bees visiting hemp at sites that had high agriculture compared to those that were surrounded by more natural habitat or even other mixed land uses, like suburban and residential areas.

Amy 25:32

Yeah, I think you make a really great point. That's definitely something that beekeepers are trying to look at is just the diversity of plants whether you're in an urban landscape or in an agricultural area,

what can be planted besides what is actually in production? So I think that's definitely a hot topic that we'll see a lot of research happening in the near future. I'm almost sure of it. So thank you so much. I've learned a lot in this podcast. I was really excited to have you on because I think that we are transitioning from some of the food systems. Again, they're converting to hemp growers, they're becoming hemp growers. And my colleague was laughing and she's like, "I've been working for extension for 25-30 years, never in my life did I think I was going to be working with weed." And so I think that's just really interesting to see how the industry is really changing these days.

Guest 26:25

Yeah, for sure. I think it's going to be exciting to see hemp, especially as it becomes incorporated more into rotational cropping systems, in addition to growers who are really focused on the cannabinoid production.

Amy 26:41

Thank you so much, Heather. We really, really appreciate having you on the show today.

Guest 26:47

It was a pleasure to be here and chat with you guys. I hope we can do it again.

Amy 26:51

Absolutely. We'll definitely have to have you on again with your future research. We're excited to see some of the research that you have in the future. Alright, everyone that was Dr. Heather Grab. She is the Senior Lecturer in hemp science at the School of Integrative Plant Science at Cornell University. Thank you so much for joining us on this segment of Two Bees in a Podcast.

Guest 2 27:24

Have questions or comments? Don't forget to like and follow us on Facebook, Instagram, and Twitter at UF honey bee lab.

Amy 27:51

Welcome to our last of the Five Minute Management. Today, we are going to discuss mammals. I'm wondering, Jamie, are we as humans honey bee pests? I'm not going to use this as your time but --

Jamie 28:05

You are trying to get me in trouble. I will say that there's no doubt that humans do things that don't help bees survive. So I'll let our listeners fill in the blanks, whether they consider that a pest or not.

Amy 28:21

Okay, all right. So I'm going to start the timer. But today, let's talk about honey bee pests and different mammals that are honey bee pests.

Jamie 28:29

Sure, Amy. So mammals as honey bee pests. In preparation for this Five Minute Management segment, I was thinking to myself, what are all the mammals that bother bees. Then, I carried it a step further and went, "Now wait a minute, Jamie, you've got lots of folks who listen to this podcast outside

of the southeastern US and outside the US in general." So we don't all have the same mammals bothering our hives. So then what I did is I quickly categorized how mammals might interact with bees. And this is the way, Amy, I thought about it. You've got three broad categories. You've got mammals, usually small mammals, that want to use the honey bee nest as their home. Then, you've got usually medium-sized mammals that come to the nest often to just eat adult bees. And then you've got large mammals that are there to break open the nest and consume brood, bees and honey. So if you think about it from that perspective, it may not matter if you've got bears or not, you might have some other large mammal that's a problem for you. So let me kind of go through those categories and help our listeners think about it. So that first category, smaller mammals who tend to use hives as homes, these would be mice and other rodents. I know that folks that have to overwinter colonies in colder climates, it is very common for mice or other small rodents to move into a honey bee colony, or into a honey bee hive late in fall, kind of excavate an area of comb not occupied by the bees, fill it full of fluff and make it the nest that they use to overwinter. First of all, the hive is protected from the elements. Secondly, it's just a really good place to hibernate. And it can be mice, it can be small rats, it can be other types of mammals. I've seen other mammals in other countries show up in beehives as well. The best way to deal with this is keep colonies off of the ground, maybe on hive stands that you can modify to keep rodents out. But more importantly, there is a way that you can get a hardware cloth, kind of a hard wire mesh, that bees can go through the squares, but the squares are too small for mammals, and you can fold that hardware cloth or mesh, put it into the entrance of a hive and make it where bees can go back and forth, but where small mammals can't get into that hive to nest. That second category, those kind of medium-sized mammals that are often there at night time to eat adult bees, we would consider things like skunks here in the southeastern US. But there are lots of other medium-sized mammals scattered around the world that might show up to beehives. Often these have one thing in common, they'll often show up at night, they'll often scratch the entrance of the hive, which causes bees to come out. And they'll just sit there and eat bees all night long. And how you can know that you've got this as a problem is you'll often see that the bees often tend to be quite defensive, as if they're worked up but for no good reason. They're not necessarily a mean hive, it's just that they're on the defensive. And it's just like they're always on edge, and that's because they're constantly getting attacked night after night after night. You can also see mammal feces around the hives that might have bee parts in them, scratching on the face of the hive, things like that. So a way to deal with this is keep hives on stands, like before, up off the ground so the average medium-sized mammal wouldn't be able to prop up on the face of the hive. You can also have screened shaped enclosures that go around the entrance of the hive so that even when bees come out to check and see what's going on, they're not easy to pick off, because the medium-sized mammal can't reach them. And that's how folks often deal with it. They may even trap the mammal and put out these mammal traps, if trapping is allowed in your area, and then just relocate the mammal, that way it's not a constant threat. And then the third category, and I know I'm probably running low on time, but it's these larger mammals. Where we live in the southeastern US it's bears. There's a lot of bears in North America, they will eat beehives. I remember when I lived in South Africa, honey badgers were a consistent problem for bee colonies. They're just large mammals that are interested in eating brood, honey, bees, etc. And in this case, to protect apiaries from large mammals, really, your best bet is to fence the apiary, and not just fence the apiary but use an electric fence. Bears, honey badgers, etc., they will go right through fences. They'll dig under fences, they'll go over the top of fences. So more commonly, you have to protect these apiaries with electric fences so that if the bear or the larger mammal touches it, they know that this is not a place that they want to invade. And you really want to fence these apiaries in advance, because once bears or honey badgers have

tasted that colony and then you fence up the apiary, it's almost too late. They will often go through those issues just to come back and get those resources. So, Amy, broadly, those are the three categories of mammal problems that you might have and broadly, how you'll have to deal with those.

Amy 33:44

Yeah, I think that's fair. You went a little bit over five minutes, but that's okay. For our listeners who are actually listening to all of our podcasts out of order, we have an entire segment on how to keep bears and other mammals out of the apiary so I'd really encourage you to go back to some of our previous episodes. You can find it on our website or on whatever listening platform you're listening to our podcast on. But that was our Five Minute Management. That was the end of our honey bee pest series, and starting in the next episode we will be talking about honey. So thank you for listening to our Five Minute Management.

Stump The Chump 34:29

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

Amy 34:44

Alright, we are at that question and answer time. So, Jamie, the first question we have: this person had emailed me, and they said that they were about to harvest honey, they pulled their frames, and then there was drone brood at the bottom of one of the honey frames. And so what he did was he scraped the bottom, and there was the larva juice that got all over and he's wondering if he can harvest the honey still. Is that gross? Or I mean, I don't know, what are your thoughts on that? Is it okay if he has drone, gross larva juice on the honey?

Jamie 35:19

The short, direct answer, Amy, is it's absolutely okay. So let me give you a longer answer. Now, I've worked with lots and lots of commercial beekeepers throughout the years. And a lot of the beekeepers with whom I've worked, don't use excluders. That's just an extra piece of equipment to buy, so they don't invest in it. So their queens might go into any of their supers and lay eggs. And I have routinely seen these commercial beekeepers bring back supers of honey that contain small patches of brood or drone brood at the bottom that you scrape away. And when they extract, the brood comes out of the cells, the juices come out of the cells, if they've been squished. Everything runs through a filter, and what shows up in the honey is mostly honey. But I will tell you, inevitably, in a commercial extraction high throughput system, these things end up in honey. Even this individual who's asking you this question. This ends up in honey. You can filter out particles, but you can't filter out liquid. And so it would just get diluted significantly when mixed into a settling tank with other honey. So I understand the reasoning behind the question. I understand getting kind of the heebie-jeebies when you think about it. But it is incredibly commonplace, and I would just run the honey through a standard filter to make sure there's no actual bodies in it, no larval bodies or pupil bodies and then just go from there. You just can't stop that. And as long as it's not like 50% of what the liquid is, you won't notice it at all. So it sounds weird. It sounds gross. But you have my permission.

Amy 37:04

Yeah, aren't there cultures that eat larva?

Jamie 37:07

Absolutely. In fact, bears aren't a culture, but one of the common myths about bears -- they have their own culture, bear culture.

Amy 37:18

Yeah, sure.

Jamie 37:19

Anyway, one of the common myths about bears is that they're in hives for honey, but they're often going for brood. Well, humans around the world will also collect bees for brood. This is incredibly --

Amy 37:30

For the protein.

Jamie 37:30

This is incredibly common in Asia. When I was in Thailand some years ago, I went to some local markets, and there were combs of *Apis florea* hanging out in big baskets and being sold specifically for the brood. Folks will just grab that comb and chew the brood for the protein. When I lived in South Africa, the local Xhosa people and incidentally, the Xhosa people, they're an African group that speaks with clicks. So I'm not actually pronouncing their name correctly, it's got a click in it. So I just want to throw that out there because I'm terrible at trying to pronounce the name but the Xhosa people actually make an alcoholic beverage using brood. They will squeeze brood and ferment the brood guts and mix it with honey and other things to make this alcohol called iQhilika, and it's a very common drink. So people eat it, they drink fermented extracts of it. I mean, people around the world use brood for all kinds of purposes. And the last story about brood, when I was an undergraduate student at the University of Georgia, Dr. Delaplane, Keith Delaplane there, he made me wash larvae out of combs so that his wife could make a bee larva quiche for the students in the beekeeping class. Absolutely. So we ate a bee larva quiche. If you stir fry them and put some cheese and some other things in there, you don't even notice.

Amy 38:53

Oh, well now I know what to make for the next honey show.

Jamie 38:56

Bee larva quiche, there you go.

Amy 38:57

Yeah, exactly. Alright. Okay, so moving on to the next question. The question is what would be the perfect time of year to cage the queen and use trapping comb to reduce Varroa numbers?

Jamie 39:10

I have never seen a project done where they looked at seasonal efficacy of this particular treatment. I know that I first became aware of this treatment because an Italian colleague of mine told me that a lot of commercial beekeepers in Italy do it, and when they do it, it's usually June - July. And this is their reason for doing it. So their reason for doing it this time of year is because they're through their honey

flow, their main nectar flow, they are before the fall season when they might otherwise want to split colonies or feed colonies to get ready for winter. They're basically in a time of the year in July when there's nothing else happening. So their idea is that that's a reasonable time of year to cage queens, and they will often cage queens for 28 days, some 21 days to create that brood break, and when there's no brood in the colony, they will often treat with something like oxalic acid, which is really good at getting mites off adult bees but not so good or pretty much not good at all with getting mites off of brood. So what is this process in the first place? Well, the idea is that you will cage the queen in your colony. There are special cages you can purchase for this purpose that keeps her, of course, away from the comb, therefore, not producing brood. And if you do this for a few weeks, there will be no brood in the hive, all the bees will emerge from the combs and all of the mites, then, in the colony will be on adult bees, making them easily treatable. And so there are some beekeepers around the world who do this. Dr. Cameron Jack from the University of Florida actually did a research project on this, coupling it with oxalic acid treatment. And when he did it, he found the caging of the queen was actually detrimental to the health of the colony under the conditions we tested. I'm not saying it never works or it doesn't work for a lot of people in a lot of places. I'm just saying, under the scenario that we tested, it was actually detrimental to our colonies even though we were able to reduce some Varroa population. We can make sure, Amy, to link to that paper in the show notes so folks can see more about that. So to answer this individual's question, I don't think its use seasonally has been optimized. But usually, when I hear it done, it is between the standard spring nectar flow and the start of late summer, early fall. So that usually puts it for most people around that July-ish month when people will do it. But, of course, there's a lot of heat stress, a lot of other things that can be problems that time of year. So if you elect to try it, I encourage you to be careful and vigilant, make sure that you're watching what's going on just in case there are problems.

Amy 41:54

Yeah, definitely. Okay. So the third question we have. Okay, I'm just going to read it, and then I want our listeners to actually go to our web page, go to our additional notes, and click on this link that we're going to link on our website. But this person was hearing strange sounds coming from inside their hive, and then they found a YouTube video of basically the same sound. So what's funny is that, at lunch, I brought it to all of our coworkers here at the lab, and I'm like, "What do you guys think this is?" And so, Jamie, I'm not even going to try to -- hold on.

Jamie 42:32

Make the sound, Amy. Make the sound.

Amy 42:34

I'm not even going to try to make a sound but is that what it sounds like to you?

Jamie 42:36

I don't know. Best I could do.

Amy 42:41

Okay, well, I will say that some of our coworkers said, one, someone was like, "Oh, it sounds like a frog." That was my first thing. I was like, "Oh, it sounds like a frog." And then, of course, our lab manager, he's a very funny person, and he said it sounded like it was someone's stomach growling.

And so what do you think is going on in this video? What is that sound that these beekeepers are hearing? It's like a mystery. And it's kind of eerie, a little scary, but what is it?

Jamie 43:09

Okay, so, the answer is I don't know. And I can't know. It's just impossible for me to know. But, I will tell you what I think it is. Although, I mean, I wouldn't place wagers on this in Vegas that this is what we're hearing. So, to set the stage, you've got to remember that the honey bee hives in which we keep our colonies are basically big, hollow boxes. So if you think about it, from the perspective of a drum, drums are big hollow boxes with this thin membrane over the top that you beat. Well, within the hive body, you can get sounds that are amplified as well as altered just because it's reverberating off the walls. I really sound like I know what I'm talking about, don't I, Amy?

Amy 43:59

Yeah, sure, okay.

Jamie 44:02

Now, when I work a colony, it is common for me, as I move a frame or move a box, etc., it is common for me to trap a bee, a bee leg, a piece of a bee abdomen or something in a frame or in something as I'm moving it around. And almost always, these bees will respond by fanning their wings and vibrating, almost like trying to get away from what they feel has caught them. To me, it sounds like that sound that bees make when they're trapped, their foot is trapped in a frame, or they're squeezed just a little bit too much between two frames. And it sounds like they're caught in a quarter of a hive that's not like up on the top of the hive. So they're getting kind of that deep rumble because it's just reverberating off the hive wall. So it just sounds like a trapped bee that's trapped in an area that's just amplifying the strange sound. Now, that is strictly just the guess. I really have no idea. But if I heard that, that is what I would think it was happening in my hive, only because when I see bees trapped, depending on where they're trapped, I've heard varying levels of pitch kind of resonating from them as they just kind of vibrate in an attempt to get loose from what captures and that's just my best guess. But, who knows?

Amy 45:27

So do you think it's just one bee? Or do you think it's multiple bees?

Jamie 45:30

I think it's one bee. It sounds to me like one bee vibrating. I mean, to me, that's a very characteristic pattern that they make when they get trapped. I think it's just, it's almost like somebody getting caught in the corner of the house and screaming for help versus them standing right beside you and screaming for help. It's going to sound like two different things, even though from the screamer's perspective, it's the same force and the same amount of sound coming out of their mouth. So that sounds really intelligent.

Amy 45:56

I was about to say, you sound pretty convincing, but I'm still not quite sure.

Jamie 46:01

It is just a guess. But man, maybe I've just convinced myself.

Amy 46:05

Alright, well, I hope, listeners, that you go to our website, listen to this sound and send us an email. What do you think it is? I'm excited to hear what you all think. Hi, everyone, thanks for listening today. We'd like to give an extra special thank you to our podcast coordinator, Chelsea Baca, and to our audio engineer James Weaver. Without their hard work, Two Bees in a Podcast would not be possible.