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SPEAKERS

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

Jamie 00:10

Welcome to Two Bees in a Podcast brought to you by the Honey Bee Research Extension Laboratory at the University of Florida's Institute of Food and Agricultural Sciences. It is our goal to advance the understanding of honey bees and beekeeping, grow the beekeeping community and improve the health of honey bees everywhere. In this podcast, you'll hear research updates, beekeeping management practices discussed and advice on beekeeping from our resident experts, beekeepers, scientists and other program guests. Join us for today's program. And thank you for listening to Two Bees in a Podcast. Hello, and welcome to another episode of Two Bees in a Podcast. In this episode, we will be interviewing Dr. Cameron Jack from the University of Florida. He is our resident expert on oxalic acid, and there's a lot of news about oxalic acid today in the United States. So he's going to be helping us address some of these latest and greatest things related to OA. We're going to follow that with a Five Minute Management on marking and clipping queens. Why should we do it? And how do we do it? And of course, we'll finish today's episode with our Stump the Chump segment where Amy asks your questions, and I try to answer them. Hello, and welcome to another episode of Two Bees in a Podcast. We have a very timely topic to discuss today for beekeepers. There's been a lot of information in the US, at least regarding potential rule changes, EPA statements, FDA statements about the use of oxalic acid honey bee colonies. And Amy, I know you said that you've been getting lots of questions about this. I know people have been asking me as well. And so rather than kind of guess about all of this, one of the things we wanted to do is just have a special segment where we discuss some of the federal government stances on the future of the use of oxalic acid in honey bee colonies. And the way that we decided to do this was bring in our very own Dr. Cameron Jack, who's an assistant professor in the Entomology and Nematology Department at the University of Florida. Cameron, I consider you our resident expert on oxalic acid. I know you've studied the statements released by the EPA and FDA and USDA and others about oxalic acid. So thank you for joining us on this segment. And Amy and I really look forward to chatting with you about this topic.

Cameron 02:35

Great. I'm glad to be back.

Jamie 02:38

All right, so let's just cut straight to it. Very recently, and for you listeners out there, we're recording this episode in early April 2021. And so very recently, the EPA, the Environmental Protection Agency here in the US, mentioned a new ruling that the FDA made, the Food and Drug Administration, regarding tolerance levels for oxalic acid in honey and wax. So, I just want to kick off this discussion by asking you, what was that ruling? What statements were made? What's got all the beekeepers abuzz at the moment regarding this?

Cameron 03:16

All right. So, to kind of boil this down really simply, because to be very honest, I mean, I think a lot of things that are these federal rules and regulations, they're pretty difficult to read. So I will admit that it took me maybe a couple times to read through it before I felt like I had a good idea of what was going on. But here's what we know. So the FDA has finalized a rule that basically establishes an exemption from the requirement of what the FDA would call a tolerance for measuring residues of oxalic acid in honey and honeycomb. So basically what that means is the FDA, if you think about what their rule or what their focus is as an organization within the United States government is, they're focused primarily on looking at protecting human health and animal health, basically through food and drugs, right? So they are, with this new change, basically, this is saying that they're not specifically measuring or looking for oxalic acid residues in honey and in honeycomb. So, that's really it. That's the only change that has happened so far with this ruling.

Jamie 04:41

So Cameron, do you happen to know any of the motivation behind the EPA or FDA stance on this, I guess, specifically, why they would not look for tolerance levels of oxalic acid in honey?

Cameron 04:52

Well, so basically, I mean, this has been something that's been talked about since the early days of oxalic acid, probably about four years ago, as you know. A lot of beekeepers and researchers were making the claim that oxalic acid, while concentrated, which when we would apply it to honey bee colonies, it would be in a very concentrated form, it itself is in a lot of the foods that we eat in already contact. So again, I mean, this is a classic example of the dose makes the poison, right? It's all about dose. Water can be very toxic to people, to humans at a certain dose, right? But, oxalic acid, in very low doses, is perfectly safe for human consumption. I mean, it's in, as I mentioned, a lot of the foods that we already eat. And so I think there was a lot of impetus to make this less stringent and less difficult for beekeepers who would be the applicators of this. And so, to be honest with you, I don't know enough about the background about who was pushing for this change specifically, but I mean, just from conversations with beekeepers for years, I know that people have really been talking about this and hoping for a change such as this.

Amy 06:16

Thanks so much, Cameron, for that. A lot of beekeepers -- I was receiving so many emails and beekeepers were wondering, what does this mean for me? What does this mean for my beekeeping practices? The new rule. So can you tell me what this means for beekeepers?

Cameron 06:33

Yeah, sure. So, to be very honest, at the moment, there's really not much that is different for beekeepers. This ruling does not change in any way, the way that you currently are allowed to apply oxalic acid to your your hives. So there's no real change for the beekeeper at the moment. Basically, what this ruling does is it kind of is paving the way for a possible change in the future for beekeepers to be legally allowed to use oxalic acid with honey supers in place. And so I need to make sure that I'm being very clear about this right now. At the moment, in the United States, it is illegal to apply oxalic acid which would only be through the current registered product, Api-Bioxal, with honey supers removed. So this ruling does not change the fact that you have to have your honey supers removed. Basically, the change is that the FDA is not going to sample or randomly look for oxalic acid that is present in the honey or honey comb.

Jamie 07:12

I think that's a very important statement, Cameron, because what I saw happen when this kind of this statement came out from the EPA, USDA, FDA, is that instantly a lot of beekeepers thought that it meant well, "Hey, we can go use higher rates of OA in our colonies." But just for point of clarity, it does not mean that they can use higher rates of OA in their colonies, it only means there is now no longer a tolerance level for OA and honey. In other words, they're not looking to see how much is in there because they claim, if I'm not mistaken, that if used according to label, there will never be levels that would exceed what we originally set at tolerance levels. Therefore, there's no need to have tolerance levels moving forward. It doesn't mean beekeepers can use higher rates. Is that correct?

Cameron 08:51

That's correct. Yeah. Well said, Jamie.

Amy 08:55

So when this change happened, did the OA label change at all?

Cameron 09:00

Yeah, great question. Amy. So no, the OA label has not changed in any way at this point. So I what I will say is just from some conversations that I've had with the USDA, but also, the USDA has put out, I guess, just a short little bit of information on their website just called Oxalic Acid Frequently Asked Questions, and they are talking about basically, as you mentioned, Jamie, the amount of confusion that came out when this first ruling was released. It got picked up by all the beekeeping forums, there was lots of buzz about it, people were talking about it and unfortunately, there was lots of misinformation that started getting spread out there about what people can and can't do with oxalic acid. So the USDA put out this frequently asked questions sheet, and I would really recommend, maybe, we can link to that in the show notes, if you would like, because I think this would be useful for listeners to actually read and see so they can get a lot of these questions that they might have answered directly from the USDA.

Jamie 10:15

You're right, Cameron. I've even had a look at those frequently asked questions, and it helped me understand it as well. So, Amy, I know we are very keen to have this and some of the other information that we discuss today linked in the show notes.

Amy 10:26

Absolutely.

Jamie 10:27

So I think it's important, maybe, to pause for just a second and hit the reset button. Maybe a lot of new beekeepers are listening to us as well. Well, why does all this matter? What is oxalic acid? What's it used to control? Is it effective? Are there resistance concerns? I mean, could you give us a little background of why beekeepers care about this in the first place?

Cameron 10:46

Yeah, yeah, that's really, I think, a good idea, Jamie. We'll take a step back here. So oxalic acid is an organic compound. So organic, I always put this little caveat in a lot of my talks -- just because something is organic, doesn't necessarily mean it's safe, right? Arsenic is organic, and it's very toxic and could easily kill someone. So oxalic acid, as we mentioned earlier, it is found in plants, it's found naturally in a lot of foods that we eat, but again, the dose makes the poison. So once concentrated, it can be effective at killing Varroa. So one of the really nice benefits of a product like Api-Bioxal, whose active ingredient is oxalic acid, what's really nice here is that we don't see, at least at this point, we have not seen the issues with resistance that we get with a lot of other synthetic chemicals. And the primary reason is that most organic chemicals are relatively short-lived. Once applied inside the hive, they get picked up and they tend to degrade pretty rapidly, whereas some of the other compounds, the synthetic chemicals, such as fluvalinate or amitraz, those tend to break down really slowly, or their breakdown products remain in the wax for years and years and years. Oxalic acid, as with most organic chemicals is water soluble, and so it's usually not stored in the wax and doesn't just stay within the hive and build up over time. So the good news with that is you kind of get just like a flash treatment. So when you apply it inside of a hive, you're getting that flash treatment, you're hopefully knocking down those mites that would be exposed to the chemical without it remaining for long periods of time, and that's a bit safer for the environment, but also a bit safer in terms of reducing chances of Varroa becoming resistant to it. Now, I need to be very, very sure that everybody understands, if we all started using oxalic acid over and over and over and over and over, I mean, we're very likely going to run into resistance issues. So, this should be a tool that is used as part of an integrated pest management program, an approach where you are rotating your different chemical treatments. So oxalic acid can be very effective when applied correctly and at the proper dosages, but as I said, there's no silver bullet for Varroa control. I mean, it's going to require just to be part of a different management program.

Amy 13:55

So you were talking about how oxalic acid was an active ingredient for Api-Bioxal. You were also talking about how you've been working with the USDA. And so I know that the USDA is interested in changing the label on Api-Bioxal, and so I'm wondering if you could tell us what this means.

Cameron 14:14

So what the USDA has said in that frequently asked questions sheet that I was mentioning before, what they have publicly announced is, due to a lot of beekeeper interest and due to this FDA ruling that is being changed, regarding the FDA looking for the compound, looking for oxalic acid within honey and honeycomb, the USDA is likely to change the Api-Bioxal label in the future to allow for year-round

usage. It would basically mean that beekeepers can use Api-Bioxal with honey supers on. So, again, currently that is not the case. Honey supers must be removed to apply Api-Bioxal. But the label change in the future is likely to allow for honey supers to be present on the hive when the product is applied. To that point, too, I mean, there are different ways that Api-Bioxal, so the active ingredient, again, being oxalic acid, different ways that this can be applied to the hive. I mean, you can legally apply it as a trickling method where you are dissolving the oxalic acid into a liquid that you're then trickling on the bodies of the bees, it can be sprayed onto new packages, and then, the third method, which I'm most familiar, in which I focused my research efforts so far has really been with vaporization methods. So vaporization is basically when you're taking a solid to a liquid, then to a gas, which is what we would do when we are vaporizing the oxalic gas or vaporizing Api-Bioxal inside of a hive. The Api-Bioxal is going to come in a powder, you are putting that powder on, basically, a really hot plate, which then melts into a liquid, and then it turns it into a vapor. So a gas that kind of spreads and, basically, you're fumigating inside of the hive.

Amy 16:40

Thanks so much. Yeah, I feel like even though we're putting this podcast out, we're talking about the updated rules or different labels and different changes, ultimately, it comes down to following the label, right? So no matter what we tell you, if you read the label, the label is the law. And so I think that's something that's super important for our listeners to remember is that the label is always the law. Cameron, I know that you were kind of talking about advocating for a rate increase from your studies. And so is that part of changing the Api-Bioxal label at all?

Cameron 17:20

I've spoken to beekeepers around the country, I guess, the last few years and talked a bit about some of our work that Jamie and I had done regarding oxalic acid vaporization. We observed, in our research, the current legal labeled rate of one gram of oxalic acid per brood chamber, is just not enough to control Varroa. It's not effective. As we've all been preaching this whole little segment here is that the labels the law, but that really leaves the beekeepers with a product that's just not effective for them. And then, at that point, what's the point of using it? But beekeepers, we're so desperate for a good effective Varroa control, that, once we find something like amitraz that seems to be providing good control, then we all use it over and over and over until we have resistance problems. So, we really want to have multiple products available to us so that we can rotate our treatments effectively. So yeah, so some of the work that we did showed that one gram of oxalic acid was not effective. And then we had another kind of follow-up study. I guess I was on last year when we talked about the first study where we were using one gram, where we're vaporizing one gram of oxalic acid combined with queen caging to cause an artificial brood break to make it a little bit more effective. And so we talked about that in a previous episode. But, some of the work that we've had that's been published recently was about our dose experiment where, in response to that first project when we saw that one gram per brood chamber just wasn't cutting it, we decided, well, maybe it would be really important to know what the effective dose actually would be. And so we did a study where we increased the dose by doubling it to two grams per brood chamber and then doubling it again to four grams per brood chamber, and then looked at the efficacy of how we were controlling Varroa and, of course, equally as important, is it safe for honey bees? Since we're going beyond that label, is it safe for the bees that we're trying to actually protect? What we observed was that, with the increase dose of oxalic acid, we were reducing Varroa

more significantly. So by doubling it, two grams was significantly different, gave us a better control than basically doing nothing, right? So it actually showed that we were making some progress with that two gram limit. We did see increased efficacy at four grams, but it really wasn't significantly different than the two gram treatment. But I also think it's worth noting that even at the four gram treatment, we didn't see really negative effects on the health of the colony within the study parameters that we did. But that two grams, we did reduce that amount, and so, that was encouraging. With that information, once we were able to have that work published, we were then able to start some conversations with the USDA, and just trying to understand the process of what kind of data is needed for them to change the label, and then working with the registrant, so basically, the company that owns Api-Bioxal and talking with them to see what is needed, what's it going to cost to change the label, and basically start the process from our research advocating for that increase in the oxalic acid dose only for vaporization. I mean, we didn't test the trickle method or spraying packages or anything like that. So, I'm speaking to only the vaporization method. But that is something that we're interested in. I mean, we've started those conversations and are hopeful that that might lead to a change in the future.

Jamie 22:12

So Cameron, I have a question that I've been thinking about. Now, a lot of beekeepers will buy up product in advance. And let's say that I'm that beekeeper, and today I buy Api-Bioxal and it tells me I can do this treatment. But let's say the federal government allows a label change a week from now. So if I bought the product a week from now, it will have an entirely different label. Is it true that I am bound by the label of the product that I own, regardless of what any new label changes are?

Cameron 22:49

Yeah, that's true, Jamie. Yeah, that's a good point, and thanks for bringing it up. So yes, the users of the particular product, so Api-Bioxal, that label, that label is the law, right? So then, if you already have that product, you're legally bound to adhering to that label that was supplied with that product. So you do have to, basically, use the product in terms of the label that is supplied with that product.

Jamie 23:25

And that's assuming that the product label actually changes, which it has not yet. And that's very key. So that's why it's easiest for all of us to just say over and over and over and over again, the label is the law. You have to follow the label on the package that you are using at that moment.

Cameron 23:42

Yes, exactly.

Jamie 23:45

So Cameron, you've said it now, Amy, you've said it now. Now, let me add my voice to it. You've got to follow the label, Cameron, just like what you said, Amy, etc. It doesn't matter what we say in this interview; it's the label that's the law. We're going to make sure and link all of these releases in our show notes, the one that the EPA put out, FDA, USDA, we'll make sure all of that's in the show notes. So, frequently asked questions are really good for you guys to go and take a look at. Make sure that you do that because I think it'll answer a lot of the questions that you have. Cameron, I really appreciate you joining us in talking about this oxalic acid issue and where it's headed in the future. Ultimately, I'm

excited that beekeepers, hopefully, soon will have more options for them on the table when it comes to effective control of Varroa. So thank you for joining us on this episode.

Cameron 24:34

Yeah, thanks again.

Jamie 24:35

Everybody, that was Dr. Cameron Jack, an Assistant Professor in the Entomology and Nematology Department at the University of Florida talking with us about some of the news around oxalic acid and what it means for beekeepers.

Honey Bee 24:50

Have questions or comments? Don't forget to like and follow us on Facebook, Instagram, and Twitter @UFhoneybeelab.

Amy 25:03

Today, in our Five Minute Management series, I know I really like playing the game "Where's Waldo," and I love looking for queens in my colonies. I think it's such a fun game. I know that our social media presence, or social media followers really love finding the queens, and today's topic for our Five Minute Management is marking queens. Why and how? Jamie, let me know when you want me to start the timer.

Jamie 25:28

I was going to say, before we start, are all of your queens named Waldo?

Amy 25:33

Yes. Why do you ask?

Jamie 25:36

Just playing off of what you said. I just assumed they were all named Waldo. That's a word I can't even say. That's what happens when I've got this thick southern accent. Waldo.

Amy 25:44

That's hilarious.

Jamie 25:45

There we go.

Amy 25:46

All right. Okay, are you ready for the Five Minute Management?

Jamie 25:49

I think I am. I'm not quite sure, now.

Amy 25:50

Let's do this. I'm starting it now.

Jamie 25:55

All right, so I like to clip and mark my queens. Here at the lab, I always ask our beekeeper to at least clip queens. Marking, of course, makes them easier to find. Very quickly, what is what is clipping and what is marking? Well, clipping a queen means simply cutting off half of one of the large wings that queens have. Queens have four wings, one large one on both sides of the body, followed by one small one on both sides of the body. If you clip in half one large one on one side of the body, it makes it where she's unable to fly. And it's basically swarm insurance. When your colony tries to swarm with her, they cannot leave because she cannot fly. Alright, what is marking? Marking is applying paint to the top of the thorax of a queen so that you can find her easily in the future. Now, before I tell you how to do it, I always get these questions. Isn't it bad to clip a queen? I mean, you're damaging her. Will the bees kill her? Does it hurt her in any way? A lot of beekeepers will not clip queens because they believe that it's problematic for the queens. I will tell you, I have never seen any evidence of this at all. I've clipped queens for three decades, and all of them seem to perform just as well as queens that are not clipped. And I'll secondly feel the same way about marking. I like to mark my queens because I like it to be easier to find them, and frankly, I've never seen shortened lifespan, lowered egg output, or lower productivity in colonies that are headed by clipped and marked queens. So to me, the benefits outweigh the negatives. If you're a new beekeeper, when you purchase queens, you can actually have the queen breeder do that for you. So it's usually only a couple of dollars to have them clipped and marked, and it keeps you from having to do it. But if you want to save those couple of dollars and you feel like you can do it really well, I need you all to put on your imagination caps because I'm gonna walk you through how to do this without being able to show you.

Amy 27:56

I left mine at home.

Jamie 27:57

No, then you're in trouble. We'll have to circle the wagons and show you pictures later. All right. I like to, when a queen is on a comb, pick her up with my right hand. I am right-handed. I tend to pick my queens up by their wings. I just grab both sets of wings and lightly pull her away from the comb. If you grab her wings and pull hard, you might damage her. A lot of folks like to pick her up by squeezing her on either side of her thorax. My fingers just aren't steady enough to do that. So I like to pick her up by her wings and slowly pick her off. If you're uncomfortable doing that, practice on drones first, until you get the process right. Now, I pick her up with her wings with my right hand, and then, with my left thumb and pointer finger, I grab her on either side of her thorax so that her abdomen is facing away from my hand. So my left hand is now holding the queen on either side of her thorax, thumb and pointer finger with her abdomen facing away from my hand, and in this pose, I can use a pair of scissors, those kinds of small scissors that you use to clip fingernails, I use a pair of scissors to weave my way through the wings until only the large wing on one side of the body is in that pair of scissors. I move it about halfway down the wing and clip. Really simple. Again, if you're uncomfortable doing this the first time, practice on dozens of drones or even hundreds of drones. It's really good practice. It's a good way to do it. Then, while holding the queen that way, I like to spin her around to where her head is now facing away

from my hand. If I leave it the other way, I tend to end up painting my fingers by accident when I paint the queen. But if her face is facing away from my fingers, I tend to do a better job putting that dot on her thorax. You can actually purchase paint markers from equipment supply companies that exist for the purpose of marking queens. Shake it and apply a light dot of paint on the queen's thorax between her wings. I usually hold her for another 10 or 20 seconds, let her dry, might blow on her a little bit, and then place her gently on the comb. It's a really easy process to do. Again, if your colony's full of drones, it's great to practice clipping and marking drones before you get to the queen. Just one word of caution: Whatever color you want to clip your queen, when you get the skill set necessary to do it, don't paint your drones the same color because you'll be finding lots of bees that you don't want to find. And the last thing I'll say is that believe it or not, there is an international queen marking color system. There are five colors that you mark queens with based on the year, and it helps you always know what year that queen originated in a colony, helps you keep up with that very closely. So check that out online. Look for honey bee queen color marking system, and you'll see what year is what color. It's a good system to keep you on track.

Amy 31:07

You know what, Jamie? You didn't get that in five minutes. But I gave you a little bit of extra time.

Jamie 31:12

Well, thank you. You're very generous.

Amy 31:13

You get the participation award. All right. Well, thanks for that Five Minute Management.

Stump The Chump 31:22

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

Amy 31:35

Okay, welcome to the question and answer segment. Jamie, we've got three great questions, and I'm excited for your answers.

Jamie 31:42

Me too. I hope I know what I'm talking about.

Amy 31:45

So we are recording this in the end of March of 2021, and it is definitely swarm season here in Florida. And so we have been receiving a lot of questions about swarms, and a lot of people are catching swarms. So the first question we have is this person caught a swarm, and they're wondering how long do you wait from that time where you kept a swarm to putting them in their actual colony?

Jamie 32:08

Amy, I think you do that instantly. In fact, I often capture swarms straight into the box that's going to be their box, but sometimes people will have that kind of intermediate box. So they might actually capture them into a bucket or a cardboard box. And once you have them, yeah, you need to get them to an

actual hive as quickly as possible. The quicker they can get in, the more settled they can become and ready to go. So I would do it instantly the same day.

Amy 32:35

So let's say this person catches their swarm in a bucket, and then they go ahead and put it in their hive, maybe a couple of feet away from the bucket, are all the rest of the workers going to follow into that new home?

Jamie 32:49

Yeah, so generally, Amy what they would do, maybe in that instance is they'd go into that bottom box. Let's just say that it's this new hive that they're going to put them into, they would take out a frame, and then pour the bees from the bucket into that empty space, almost like installing a package. And then once the bees kind of disperse on the bottom board, you'd return those frames and put the lid back on the hive. I will say that a lot of folks, just for fun, will dump the swarm out right in front of the new hive because swarms have this really neat behavior, where when the first few bees move into that hive, they'll turn around and start fanning over their Nasonov gland, which produces and releases this pheromone that the rest of the bees -- it causes them to melt into the hive. It's like a river of bees going back into the hive.

Amy 33:38

Yeah, that's super cool.

Jamie 33:39

Yeah, it is neat to watch. The only risk there, though, is if you dump bees in front of the hive for that purpose, in theory, they could not like what's happened to them and take flight and recluster somewhere else rather than melt into that hive. But nine times out of 10, they're gonna walk themselves straight into that empty hive. But it usually is better to physically put them straight into that hive.

Amy 34:05

These are all really great questions. I really enjoyed this next question that I'm about to ask. This person had made sugar water and immediately put it in the refrigerator. So it's been there for five days or so. Is this still good to use? Or should this person dump it out and start again?

Jamie 34:20

It's fine to use. If you put it in the refrigerator, it should be absolutely okay to store. Yep, that was, hopefully, an easy one for me to answer. I will say, when I don't use sugar water, it's usually because it's not been kept in a refrigerator, when it's been kept at room temperature for a few days. And you can actually start getting a black film that kind of develops in it. Or if you pop off the lid and it smells like it's beginning to ferment, those would be triggers to me not to reuse it. But if it's been made and put straight into the refrigerator fresh, I don't see that as a problem if you use it five days later.

Amy 34:54

All right. How long would you say that you could keep it in the refrigerator?

Jamie 34:58

So, Amy, I've left sugar water in the refrigerator for a couple of weeks. If you're making it fresh and putting it straight in the refrigerator, then it really can last for quite a while. Really, what you're looking for with damage to sugar water is any sugar liquid can start to ferment after some time. And that usually happens if it's kept at room temperature or warmer. So I kind of look for that black film, or if I take the lid off the jar, I smell for fermentation. There is one thing that can happen to sugar water for sure that can be detrimental to bees. Sugars, when they are heated, can form a byproduct called, and I'm going to butcher this because my very southern tongue doesn't allow me to use words like this, but it's hydroxymethylfurfural or HMF. This can actually be harmful to bees, and that usually occurs when it's heated at high temperatures and that can be a problem. But as long as you didn't heat the stuff in the first place at high temperatures, like super high temperatures, like you didn't put the sugar in boiling water, if you melted it with just warm water and dissolved it the way that you normally would and put it straight in the refrigerator, it would last quite a while in there.

Amy 36:09

Great. Thank you. The last question is what is board washing?

Jamie 36:13

Yeah, that's a crazy behavior. So honey bee workers, during certain times of the year, will congregate on the face of the hive. So, on the white boxes we manage, it's pretty easy to see. But you can even see it when they do it in tree cavities as well. They will congregate in these areas. They usually are above the entrance, facing down towards the entrance. So that's not always the case, they can look up as well. And what they're doing is their back four legs are stationary, and they're kind of rocking back and forth, using their mouthparts, their antennae, and their front legs to rub the face of the hive. And when you get a lot of bees doing it at one time, it's just really weird. A lot of the things that we see worker bees do, we have a simple, quick explanation. We see them feeding young, we see them making honey, we see them foraging for pollen. But board washing is just this really weird behavior where hundreds of bees on the entrance of the face of the hive are just rocking on their hind legs, but they're rubbing the surface. It just doesn't look like something that makes sense. And so a lot of different hypotheses have been set forth for this behavior. The two leading hypotheses, the two that were most convincing to me, number one is that in a natural hive, bees are kind of rounding off or smoothing off some of the rough edges on the face of the hive. Now this makes sense, like on a tree trunk, but it doesn't make nearly as much sense on something like the face of a painted hive that's already smooth. I mean, why would they do that? So a second and perhaps better explanation is that bees are actually dispersing the hive odor on the face of the hive to mark this hive as their home. This is the place that the other bees from this same hive need to fly back to. It's almost like making sure the runway of Atlanta Hartsfield International is properly lit and everything's okay. So that's the explanation that I've heard, and then I've read a research paper on that made the most sense to me.

Amy 38:25

Well, that kind of brings up another question. How would you even go about research on board washing? It's just like, you can't force them to do it. So how would a scientist even go in and try to do research on it?

Jamie 38:38

Yeah, Amy those are so tricky. Those are good points. And I think one of the reasons that it's not been studied well is because people have struggled. I've actually read two papers on it. One group of scientists did just that. They tried to study and figure out the cause. And I forget the experimental design that they used. The tricky thing about board washing is it really, at least what I notice, is it only tends to occur in the warmer months, when bees are congregating on the entrance at all. And so if you really wanted to know, for example, if bees were doing it for the purpose of marking their home to make it easier for foragers to find in the future, is you can actually go back, you can have a set of colonies that you permit to engage in this behavior, and you don't modify those hives in any way, and then you have a set of colonies that you permit to engage in this behavior, but when they go in at nighttime, you can actually take ethanol and soak it in like cotton balls and rub it on the face of the colony, which would remove whatever they're doing to the surface. So the behavior is still the same in both sets of hives. But there's a removal of, potentially, whatever they're doing, and then you see if it has some downstream impact. Are foragers less able to find their hive when the activity is engaged in but the pheromones aren't spread around? Something like that. But, it all really depends on what you think the function of it is. If it's to smooth off surfaces, you would avoid the pheromones strategy altogether and maybe you'd rough up the the surface of some hives but not the other and see if the ones that have rougher surfaces on the face of their hive, of bees from those hives engaged in the behavior more than bees from the other hives. It really all depends on what you think is the motivating factor behind washboarding, which would impact how you set up that study.

Amy 38:46

I totally just heard you say washboarding and I asked the question as board washing. So which one is it? Is it washboarding?

Jamie 40:40

I've always called it washboarding. Yeah, I think that's how I normally read it.

Amy 40:45

All right. Well, there we go. We've also learned that terminology today.

Jamie 40:49

You might start a trend, though. It might be boardwashing from this point forward. A surfing term, I'm sure.

Amy 40:54

Exactly. All right. Thank you so much. That was a great Q&A. And for our listeners out there, keep those questions coming. Thank you. Hey, everyone, thanks for listening. Today we'd like to give an extra special thank you to our podcast coordinator Lauren Goldstein and to our audio engineer James Weaver. Without their hard work, Two Bees in a Podcast would not be possible.

Jamie 41:25

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

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