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SPEAKERS

Guest, Jamie, Stump The Chump, Amy, Speaker 3

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. In this episode of Two Bees in a Podcast, we'll be joined by Professor Dirk de Graaff from the University of Ghent. He'll be talking with us about something that very few people probably have heard of suppressed in ovo virus infection. So you'll want to stay tuned and hear more about that and how it affects your beekeeping operation. And our Five Minute Management. We'll be talking about what equipment is absolutely necessary for getting started in beekeeping. And we'll end today's podcast by answering questions from you, our listeners. Hello, listeners, and welcome to another segment on Two Bees in a Podcast. Amy, I am superduper stoked about this segment. You can go and ask me why? Super duper? Why? Well, because we are joined by someone I admire a lot. I've been around him a few times. It's Professor Dirk de Graaff. And I was in Belgium a couple of years ago and Dirk, where he works, Ghent University, they were the host of Your Bee, which is a big international conference. And he was hosting at his university in beautiful Ghent, Belgium, and it was just the smoothest best run meeting I've ever been to. And Dirk was even able to visit us here at our lab some years ago before we built the new bee lab. He just is a pleasant guy, and he's really talking about a topic that I think our listeners are going to really find exciting.

Amy 02:16
Is it Belgian beer?

Jamie 02:17
Well, it's not beer, neither is it chocolate or waffles, which is probably what most Americans know about Belgium. But it is a topic that I actually knew very little about myself. It's suppressed in ovo virus infection, it is a really neat finding that he and his team made. And joining us all the way from Ghent Belgium is Professor Dirk de Graaff, who's in the Faculty of Sciences for the Department of

Biochemistry and Microbiology, Ghent University from Ghent, Belgium. Dirk, thank you so much for joining us. I'm excited to have you on this episode of Two Bees in a Podcast.

Guest 02:54
Hello, Jamie.

Jamie 02:55
It's super cool to have you on board. And I remember, Dirk, I'm going to tell this little story about you. You happened to be in the US some years ago, and I can't remember now, but you told me you were going to be in Florida and wanted to come visit. And I recall saying, well, when you get to your hotel, let me know and I'll pick you up. And all of a sudden later that day you show up at our office, and it was like in July or August or something. It must have been super duper hot outside. You were very dressed up in a sports coat, and I felt really bad for you because you had walked in Florida's uper summertime when you're from such a lovely place with much better weather. So Dirk, again, thank you for joining us. You've made a very important discovery, you and your team. So before we get into that, I just want to introduce our listeners to who you are. So could you tell us a little bit about yourself, what you do at Ghent University and how you found yourself attracted to honey bees in the first place?

Guest 03:46
Well, I am a professor at Ghent University, like you said. And I do have a research lab. But I also have, let's say a collaboration platform, that we call Honey Bee Valley. So you could say that I bridge between fundamental research on bees and applied beekeeping. So it's something that makes that connection between the two. So I was, for many years, very much involved in bee pathology. But let's say in recent years, we are working more on bee health in general, let's say, and also on selection. So I'm running the Flemish, which is the northern part of Belgium, selection program. And so in the context of that, we did some interesting discoveries. And how I came attracted to bees, well, I'm a molecular biologist, and it was, in fact, about the science. So it's not that my father or my grandfather or anybody of the family was a beekeeper, so it was purely because of the science.

Jamie 04:55
Yeah, that's really neat. A lot of bee scientists get into it for a lot of different reasons. Some of them were beekeepers like myself for a long time, others just fell into the beautiful science of it. We're talking about a topic that, listeners, is going to be pretty new to you. Again, this idea of suppressed in ovo virus infection. But before we get there, I think it's important for our listeners to understand a little bit of background with viruses and in Varroa. So Amy, I think you have a question about that that will sort of set the stage for what Dirk is going to be talking about in the main part of our interview.

Amy 05:29
Yeah, absolutely. So, Dr. De Graaff, we all know, I feel like anybody that does anything that has to do with honey bees knows about Varroa. Varroa is always the number one thing that people talk about. We all know that they're bad for bees, but sometimes we forget why they're bad for bees. They do have different viruses that they carry that can be bad. So can you help us, I guess, describe what the main viruses that are being transmitted to bees, what are the viruses that are being transmitted?

Guest 06:01
Well, probably the most important one is the one where we were quite confused in the very early days, and that was the deformed wing virus because the Varroa mite infection was associated with wing deformities. And we thought in the beginning that it was because of the mite only. But then it became evident that it was, in fact, because of the virus, the deformed wing virus that it transmits, but this is only one of the viruses that are transmitted. The Varroa... that Acute Bee Paralysis Virus is another one. We also have the Chronic Bee Paralysis Virus. And maybe one of the well-known viruses that is not transmitted by Varroa is sacbrood because this is a virus that bees had at an earlier stage in the larval stage and then, let's say, Varroa mites doesn't play a role yet.

Amy 07:02
I had no idea that sacbrood was one of the viruses. That's interesting.

Jamie 07:07
Amy, it is pretty amazing because the honey bees get a lot of viruses, and Dirk, this leads me really into my very next question for you. And I think this is important because it really sets the stage for what we're going to talk about moving forward in your discoveries, but we know Varroa can transmit viruses. We know that honey bees have a background of viruses in their nest, right? You can have viruses in the hive without having Varroa. So if you can answer this basic question for us, what stages of bees can actually be infected with viruses? We know the adult bees, you mentioned the brood, but how can these viruses be transmitted? Can eggs get these viruses? Can larvae get the viruses? Pupi? We know the adults can but what other stages of bees can be infected by viruses?

Guest 07:57
Well, every stage the bee can be infected because you have two types of transmission of viruses, you have the horizontal transmission, in which they are infected, the transmission between the bees of the same generation whereas the vertical transmission is the transmission from parents to offspring. And so this can be via the eggs or via the sperm. So it starts already from the egg stage and then the larvae, they can further develop this infection and in case of sacbrood, it's an important infection. But then at the moment that they start with pupation and they live in a sealed brood cell, then just before the brood cells are sealed and the Varroa mites comes in, then let's say a new transformation can start wherever the Varroa mites each and every time that it feeds. They can transmit the virus they have already from, let's say previous meals on the adults, for instance. So in fact, it's the whole developmental cycle of a bee that you can have, let's say, virus infections.

Amy 09:23
Can you tell us what SOV is? It's suppressed in ovo virus infection. That's very hard to say multiple times, by the way.

Guest 09:31
Okay, so that's why we simply use the abbreviation but I also already referred to you that you have this kind of vertical transmission. So we were already in 2012 and 14, looking at the virus infection of the eggs but it was in a completely other context. From 2015 on, we started our research to see whether the virus-negative status of an egg, and that is in fact, the SOV status, whether this is inherited over the

generations. So, SOV means, in fact, if you do a molecular analysis of the virus on the eggs, that you do not find any virus, and it is in fact, an analyzer that gives information about the health status of the queen. In fact, this was our purpose at the beginning that we wanted to see whether the queens were healthy, but doing it in a non-destructive way, because, of course, you cannot simply kill your queens because you have to know whether they are healthy or not, because then you lose your queens. So we sought for a non-destructive way. And so we came out that, let's simply do some analyzes on the eggs, and that became an important thing.

Jamie 11:02
Gosh, Dirk, there are so many things that are going through my head. That's the problem with me being a scientist when I do these interviews. Every time I interview a scientist about fascinating science, there's so much I want to talk about. So let me maybe back up a little bit for my small brain. So you've got this idea that you can determine the health status of a queen by looking at the virus infection of eggs that she lays. I suspect a lot of beekeepers don't know about vertical transmission. They probably don't know that viruses can actually be spread from parents to offspring. You mentioned a little earlier that when queens lay eggs, the eggs can have it, perhap, sperm can carry it. So you've got these queens, you want to determine what their health status is, you presumably collect their eggs and can screen those eggs for viruses. But this idea of suppressed in ovo virus infection, so that simply means suppressed virus infection in the egg, right? So could you tell us a little about this? How did you make this discovery? What is the discovery? How did you test it? You've already told us this idea that you were looking at queens in a non-destructive way. But I'm still struggling to understand what the trait is. Is it eggs that don't have a virus? Is it eggs that have a virus but those eggs are able to keep the virus from replicating? What does it mean to have suppressed in ovo virus infection?

Guest 12:31
So the suppressed in ovo virus infection means that the level of infection or contamination of the eggs is below the limits that we can detect. So it can be that the eggs are infected by viruses in ovo, meaning inside the egg cell itself. Or it might even be that it is on the outside of the egg and that they get contaminated while they are produced by the channel where the egg is born, let's say. In fact, we don't, at this moment, know exactly what is happening, whether it is inside the egg or outside the egg. But we do know that some of the eggs carry viruses and that some of them don't. But the fact that some of them are completely free of any virus infections seems to be genetically determined. And in the end, this means that probably the queen has a mechanism to clear herself or some of her tissues of this virus infection so that the ovo site, that egg cell itself, or let's say, the other tissues, like the oviduct, is free of any viruses so that they give birth to an egg free of viruses, and most probably, also the genes that are responsible for the status. And so this is the discovery that it is genetically determined, and that they did give also, let's say, it creates a level of infection within the whole colony that is much lower than what we see in those that produced virus contaminated or infected eggs.

Jamie 14:45
So, Dirk, I have a follow-up question based on what you just said. Can the same queen lay eggs that have viruses and lay eggs that don't have viruses?

Guest 14:58

Well, the sampling that we did was only on 10 eggs. I see this discovery as a very first step, and we even don't know whether it is the status of SOV, whether they change over time, over the age of the queen, whether it's more something for a newborn, or whether it is also something that they will lose when they get older. In fact, at this stage, we do not know. So, we did our discovery only on a pooled sample of 10 eggs. But you can imagine that we are quite excited to see really how it works and whether there is some seasonal fluctuation, or how these things really are. In fact, we don't know yet.

Amy 15:55
That's just amazing. I think that's the beauty of honey bee research. There's still so much that we're learning about on a daily basis. And I do know that your team, you all just published a manuscript in Nature Scientific Reports. And so we'll have to get that and put that with some of our additional resources on our website with this episode so that people can read it. But you you note in there that the present study suggests for the first time that the honey bee's potential to control virus infections is heritable. So how did you determine that it is heritable? I guess you're talking to us about your pool of 10 eggs, when did you sample that? And what did that all look like? I'm sure, you could probably talk about this for days. But generally speaking, how did you determine that it's heritable?

Guest 16:45
Well, so like I said already, all these beekeepers that joined us or participated in this study, they were taking part in a breeding program. So in fact, from all these queens, we had additional data and not only about their pedigree and the relationship, the genetic relationship between all the different years that we sampled, and the different queens that we sampled, but we also had, let's say, a lot of information about the performance of all these queens. So in fact, it was at first something that was done on the sideline of this breeding program. But the fact that at the end here, at least in the early stage, already the breeders, they told me, if we continue to breed from, let's say, a queen, that has a virus negative status, that they saw that chance that in the next generation of that bloodline, they kept that status was quite high. So we had quite a lot of beekeepers that came up with it. I have now for two or three subsequent generations, a virus-negative analyzes of the eggs, so we started with the short amount. We had more than 600 of these help analyze this, let's say, of the eggs, and I started to do some basic analyzing statistics on it. It was first just to see whether indeed, what was the chance that when it was a descendant of a virus-negative queen, whether they also have virus negative eggs. And what we saw, in fact, that in the subsequent years that the deformed wing virus infections of the eggs in the group that were the bloodlines that had this SOV state is that the deformed wing virus infection dropped significantly. So, I believe somewhere in the beginning, it was one part of the next day, they still had deformed wing virus. And at the end, we ended with 6% only of this subgroup. So at that moment, we saw there is something going on because in different generations, the ones that are bred from SOV positive queen's remain that status of being free of viruses. So we ended up in a collaboration with the University of Wageningen in Netherlands with Pim Brascamp. He is quite famous for his research on heritability determination of certain traits. And in fact, this was the point where we wanted to calculate whether this was truly the case, whether the genetics were here on the basis of the crate that we discovered. And then he came up with a calculation. It's quite complex in case of honey bees to determine heritability of a trait because you have this diploid haploid situation where drones are born from unfertilized eggs. And this is completely different than what you see in cows and pigs, in farm animals, let's say. You need to have a special knowledge of how it works in honey bees to be able to

do that calculation, and he did for us. And then he ended with a score of 0.25. And this was fantastic. It really demonstrated that it has the same genetic background as honey yield, for instance, of a colony. And therefore, we know that for many decades already that it is inherited. So that was, in fact, a confirmation that what we saw was because of the genetics and the start of something completely new, of course.

Jamie 21:28
Dirk, this is all fascinating. As I shared earlier, there's so many things I want to ask you. But let me make sure I understand it correctly, and that our listeners are following along. So essentially, you have this trait where there's a correlation between eggs that have viruses, and then colony viral loads. And there's some evidence that this is a heritable trait. So queens can pass on, perhaps, this suppressed in ovo virus infection to their eggs, which, over time can improve colony health because correspondingly viral loads are going down. Dirk, in the manuscript, as part of some of your research, you described queens that are SOV positive, and SOV negative. So let me ask you, what does that mean for colony health?

Guest 22:12
Well, this was also examined in this paper or described in the paper. But we took test 10 specimens of different stages. We took the stretch larvae, we took the pupae with the red eye and with the adults, and we took another sample of the eggs, but we did it both for the drone case and also for the worker case. And then we looked at how many of these stages were, in fact, virus infected. And when we simply set the threshold at 100,000 copies of the virus per bee, then we saw already that there wasn't a beneficial effect, especially on the male case where we saw the lowest number of infections. However, when we put the threshold level at 10 to the ninth, meaning it was 1 billion of virus copies per bees, then in fact, we saw that no dangerous high infection loads were seen in the SOV positive colonies for the different developmental stages, both of drones and pupae. So in short, it demonstrates that we have less virus infections in the colony, and we have a lot less strong infections of the colony. So it has really a beneficial effect on the colony as a whole.

Amy 23:58
A lot of what we do and I know a lot of what you do is applied research. And so in your abstract, you wrote that the implementation of this trait into this breeding program is recommended. And so I'm wondering, why is this trait important to beekeepers, and I know you kind of just mentioned it, but just again, why should beekeepers care?

Guest 24:19
I already in the beginning of the talk explained that we haven't taken dual infection and infection of the mite adults when infection of the virus that it transmits. And so far, our focus was only on the Varroa control and virus were all only controlled indirectly by lowering the viral web but we didn't have a direct to lower virus infections. There is, in literature, only one thing that I described and that is the use of double-stranded RNA but it is hardly used, as far as I know, especially in Europe. So, in fact, we only focused on Varroa. And now with this trait we can do selection in both direction, both to have bees that are Varroa resistant, but also that are virus resistant. And I think that by combining these two, we will be much more able to create a bee population, a bee colony that is resilient to this dual infection.

Jamie 25:33
Dirk, I think that's a perfect summary of exactly what you're saying here. And I think what makes me excited about your research is a couple of things. Number one, you guys discovered this trait in the first place, suppressed in ovo virus infectivity, which suggests that these colonies that have this trait are going to have lower viral loads. And I love what you just said. So often, and I find myself doing this all the time, when beekeepers come to me and say, "Jamie, we want you to run a virus screen on our colonies and tell us what viruses we have. But I know that if you tell us this, there's nothing we can do about it except control Varroa." That's true, right? Historically, we say if you want to control viruses, control Varroa. So it is, in fact, exciting, that in as much as you can breed colonies for tolerance of or resistance to Varroa, perhaps you can breed colonies for resistance to viruses. And one way that you can do that is to determine this SOV trait, see if your colonies have it and try to breed it into the population. I think that's great. It sounds like you're going to be very busy over the next few years researching this important topic. Is there anything else you want to share about the SOV trait?

Guest 26:47
Well, in fact, in the next years, it will be mandatory in our breeding program. So it means that the SOV status becomes an exclusion criterion in our own breeding program so that we can really drive our bees to a low virus status. That is the purpose of all this. We want to see, also, all over Europe, and maybe all over the world, whether this new trait is present in other bee populations because this was just so far only tested in Flanders, in Belgium, but I guess that they will be everywhere. And this is something that we would like to further explore and to see whether the status of the eggs is something that is seasonal and whether we have a moment where we better take our samples, and also so far, for genetic theory, for reasons of genetics, and we have so far only tested drone eggs or egg deposit in drone brood. Next year, we will start, of course, to compare what the value is of eggs collected from worker brood. All the fundamental research about tissue specificity, what it means for the queen itself, what the mechanism is, how they can clean themselves, or their tissues to become free of virus infection, all this is quite exciting. We have discovered one thing, but we have tens, maybe hundreds of new questions that are there to be asked.

Jamie 28:46
Well, Dirk, thank you so much. I really think beekeepers all around the world are going to be following this research closely. I'm really excited that you were able to join us on this episode of Two Bees in a Podcast because I think our beekeepers need to know what scientists all over the world are doing to try to battle the issues that they have. And I think this is a really good example of a well-established laboratory, a really good scientist, you yourself, and your team. You guys are working on this important problem. You're not just looking at it from the Varroa perspective, but you're also looking at it from the virus perspective. And we're going to make sure and link in our show notes the manuscript that you guys published on this topic, as well as links to your research laboratory so that people can read more about what you guys do. So, Dirk, thank you so much for joining us about this important discovery you've made.

Guest 29:34
It was a great pleasure for me to be here. Thank you.

Jamie 29:37
Absolutely. My pleasure. So everyone, that was Professor Dirk de Graaf, who's at the Faculty of Sciences, Department of Biochemistry and Microbiology at Ghent University in Ghent, Belgium.

Speaker 3 29:49
For more information about this podcast, check out our website at UFhoneybee.com.

Amy 29:59
Okay, we've got our Five Minute Management. Okay, so I'll start the five minute timer and the question is, so what equipment would you say is absolutely necessary to get started in beekeeping?

Jamie 30:16
These are easy answers for me because I've answered this my entire life. Number one, I think every beekeeper should have a hive tool. It's hard to work a colony without a hive tool and a butter knife and a screwdriver just aren't the same. So you've got to have a hive tool. Number two, you need a smoker. Even the best beekeepers keeping the best colonies are going to run into a grumpy colony every once in a while. So a smoker is useful, and I would argue, necessary. Number three, I think you need some sort of personal protective equipment. I know that there are people who kept bees for a long time and don't wear gloves and suits, I'm one of those. But I always keep veils with me. In fact, I always wear a veil. I don't like being stung in the face. But I always wear a veil. Even if you don't wear a veil, you need to have one with you. So I think a smoker, a hive tool, and a veil are necessary. Also, in order to be a beekeeper, you have to have bees. In order to have bees, you've got to have something in which to put them. So you've got to have the basic hive setup, a bottom board, some sort of box and frames that will compose the brood chamber, another super or two so that they can have enough food for winter and survival throughout the year. And you also want a lid. I think those are really the basic things. A lot of people will say, "What about extractors? What about this piece or that piece?" But things like that can often be purchased by local bee clubs, and you can check them out from your local bee club and use them. So there's a lot of this expensive stuff that you don't necessarily need to get into beekeeping. So just to kind of review, you need to have to smoker, some personal protective equipment, and you also need bees and a hive. And that makes you a beekeeper.

Amy 31:52
That's great. Well, you've done that in two minutes. So I have one more question for you.

Jamie 31:56
Shoot.

Amy 31:57
When people are getting ready for their equipment, do you recommend getting two colonies, two hives?

Jamie 32:04
I absolutely recommend starting with at least two colonies. And it's funny that you asked that question. When I first started educating about bees, I would tell everybody, "You've got to have two hives, you've

got to have two hives." Honestly, Amy, now I usually tell people they need at least three. And the reason for that is there are enough problems in the bee world that if you have only two colonies, there's a reasonable statistical chance that both of them will be suffering simultaneously. The reason you start with multiple colonies in the first place is that you've got some other colony or colonies to compare each colony to. So if I've got three and this one is suffering, I can know it's suffering because it's not doing what the other two are doing. Maybe it's not producing as much honey or is not as strong. That suggests to me that there is a problem. So I always tell people, you really need to start with at least three. Now, I know that's a big upfront investment. But, frankly, if you're going to be a beekeeper, you need to go all out and start this way anyway. So at least three will give you a pretty reasonable indication of what colonies are doing, the things that they're supposed to be doing, given the time of year that you're in at the moment.

Amy 33:12
That's great. I feel like I'll ask you again next year and you'll say four and then five, and then six. And then we'll get to the point where you need to start with 100.

Jamie 33:20
And let me just say, Amy, listeners, you are out there. This is not really a question and answer segment, but what we need you as listeners to do is we need you to suggest to us what exactly you want us to discuss in the Five Minute Management sections. We want to be able to talk about the management issues that you're having. And so please let us know through our Twitter, Instagram, and Facebook accounts, through email, however you can reach us. Let us know what you think would be a good Five Minute Management discussion.

Stump The Chump 33:53
It's everybody's favorite game show, Stump the Chump.

Amy 34:07
Alright, it's that question and answer time. I've got a couple of questions about honey bee eggs, Jamie.

Jamie 34:13
Yeah, and I was thinking to myself when you were asking me these questions in advance to see if I can answer them that this is going to be a troublesome Stump the Chump because I'm definitely a chump. And we'll see how easy it is to stump me with these. Probably some disappointing answers to listeners. But nevertheless, I'm going to give it a go.

Amy 34:31
All right. So the first question is, has there been any research to determine if moving an egg is a honey bee behavior?

Jamie 34:39
Okay, this is the toughest of the three questions that I'm going to get. So it's it's based on the idea that lots of beekeepers believe that worker honey bees can move eggs, maybe even some scientists do. So why would they want to move an egg? Well, perhaps a colony goes queenless. They move an egg to a

queen cup. Some of the greatest supporting evidence to suggest that they do move eggs comes from beekeepers who use queen excluders who will find eggs above the queen excluder while seeing the queen and the bulk of the brood in the bottom brood chamber below the excluder. So collectively, this has led to some anecdotal discussion over the years about worker honey bee ability to move eggs. I get asked this question probably every three or four years. I'm usually in front of a huge audience when I get asked that question. So I'm always the stumped chump. And no matter what my answer is to the audience, half of the people agree with me and half of them don't. And so in preparation for this question, since I knew the question was coming, I did a quick literature search both on general Google, looking for what people have said, and also on Google Scholar, which is really good at finding refereed manuscripts, research manuscripts where people have studied these tasks. And I've just found no compelling evidence at all to support the assertion that worker honey bees will take an egg out of a cell and move it and deposit it into another cell. Now, that doesn't mean that it doesn't happen. It just means that I've not seen any evidence to suggest that does with certainty. We've got lots of listeners from all around the world. If you listeners are aware of any studies to support that worker honey bees do move eggs, say from worker cells to queen cells, send us over a link of the refereed manuscript where this has been documented, the research manuscript where it's been documented, and in a future episode of Two Bees in a Podcast, we'll make sure and set the record straight. So, Amy, to answer your question, I don't know because I think it's not known. A lot of people believe that they know, I've just not seen the compelling evidence. It's just all based on anecdote. Go back to my queen story, for example, there are a few reasons that eggs can be above the excluder when the queen's below the excluder. Could be bent in a way where she's able to navigate and go back and forth. Right? Perhaps you get some misguided workers laying eggs even in a queen right colony, it happens in some subspecies of honey bee. So there are other reasons than workers moving the egg even though workers moving the egg tends to be the default answer for those people who believe that happens.

Amy 37:33
That's fair. So whenever worker bees are cleaning out cells, especially some of the larva that has gone bad or is just not healthier, you know how they pull them out and kind of toss them out the front? I guess, would that be the same scenario?

Jamie 37:50
That's a great comment, workers remove eggs, they don't move eggs, to my knowledge. So remove means if there's a problem, perhaps there's disease, they will remove young larvae and eject them from the hive, they will cannibalize eggs in periods of protein dearth. So for example, it takes a lot of pollen to be able to make more bees, and so there's no pollen coming in, and the queen's happily laying, they will abort those eggs because they know they don't have the resources to take care of them. So they will definitely remove eggs. I think there's no compelling evidence at the moment, at least evidence of which I am aware, that they will move them for continued use, they move them from one cell into another.

Amy 38:34
Got it. Okay, so for the second question then, honey bees rob each other for different resources, would it be possible for honey bees to rob eggs from different colonies?

Jamie 38:43
So, it's interesting, the way this question was asked. The question was, would it be possible for workers to rob eggs from other colonies? And so what I've discovered in biology is anything's possible. Just when I think I've heard the coolest thing I've ever heard about honey bees, they surprise me. And I get another behavior that I'm like, "What? They do that too?"

Amy 39:03
Yeah.

Jamie 39:04
So, I don't think that they move eggs between colonies. I've certainly never seen anything in the scientific literature about it. And I've not even really heard beekeepers talk about it. In fact, this is the first time I've ever had this question asked to me. So while I think it's possible that somebody could discover a behavior like this someday in bees, I think it's unlikely to be in the behavioral repertoire of honey bees. That's my guess.

Amy 39:29
Sure. And I guess it's just not a common thing for them to do. So that's why you haven't heard that question.

Jamie 39:34
Well, the struggle is why would they do it? I could see, to me, there's a stronger argument for moving an egg within a colony because, again, the queenless situation, you need to get an egg to an appropriate cell. But usually, bees address that by just making the cell bigger. I just can't see a compelling reason to take an egg from one colony into another. Of course, unless, maybe the question asker would say, "Well, what if a colony is hopelessly queenless and there's no brood? So their only chance is to bring in brood from another colony." And I could see that argument. I just don't think there's any evidence to support that happens. But would I be surprised if it was shown to happen somewhere over the next 10 years? No, I wouldn't be surprised. Honey bees are amazing. Let's face it. They're capable of crazy things. So who knows?

Amy 40:21
All right, so the last question has nothing to do with eggs.

Jamie 40:24
Thank goodness.

Amy 40:26
What do you think about using a blower, like a leaf blower to remove bees from honey supers? Is this harmful to bees? Or is there another method that you prefer to remove bees from honey supers?

Jamie 40:36
Well, there are a few questions wrapped up in that. When I was an undergraduate student at the University of Georgia, I worked in the laboratory of Dr. Keith Delaplane. And he and I, it was Dr.

Delaplane's lab, Dr. Delaplane collaborated with beekeepers in North Georgia, commercial beekeepers up there. And that was when I was 18 or so years old, I was introduced to Carl Webb, who was one of my favorite beekeepers of all time. We happen to be recording --

Amy 41:03
Was?

Jamie 41:03
Yeah, well, we happen to be recording this segment in January of 2021. He passed away in 2020. And just one of my favorite individuals, one of my favorite beekeepers, a great guy. But to make a long story short, when I started visiting his apiaries for research purposes as a technician at UGA, he was the first commercial beekeeper ever to introduce me to the art of using leaf blowers to rid supers of honey bees. I was utterly fascinated with it. I still love the process. Basically, you take a super off a hive, you take all your honey supers off a hive, you put the lid back on the hive, and you stand the honey supers up on their end, where the frames are running vertically, but basically, both the top side and the bottom side of the box are exposed. Then, you stand on the bottom side of the box and you use a leaf blower to blow bees out the top side of the box, then you swing around to the top side of the box and blow the bees that are still in there that way. And he showed me how quicklessly -- quickly, I was combining two words. I was going to say effortlessly and quickly, but I said quicklessly, which you've heard it here first guys, another word invented. How quickly and effortlessly he got the bees out of the honey supers. I was amazed. We were not getting stung. The bees instantly started flying and returned to their hive. And I really saw no evidence at all that it was harmful to the honey bees, and so, I happen to like the method. I don't use it, personally, just because I only have an electric leaf blower and that's a long extension cord. But I do feel that it's okay to do. I've seen lots of commercial beekeepers do it. I tend to use the more old-school way, which is a fume board, which is that piece of cloth mounted underneath. In some sort of wooden structure, you put some sort of bee repellent, which is usually a liquid on the cloth, you turn the fume board cloth side down onto the uppermost super of the colony, and the bees don't like that smell, and they'll run from it, and that's a good way to empty your supers as well. The old fume board method. But certainly, the leaf blower method seems to be okay. And I've yet to see compelling reasonably that it's overly harmful.

Amy 41:31
It's an art.

Jamie 41:32
Now, have you ever considered maybe you really -- You've got me nervous and here you are laughing. I have no idea what's coming up.

Amy 43:29
Have you ever considered maybe we're helping bees that were afraid to fly just like, you just --

Jamie 43:35
Kicking the bees out of the nest, yeah. That's funny and who knows? But one of the things I really found fascinating about the process is the bees don't seem to be upset at all. Now, every colony is

different. I don't recommend you do this, but what I would do after I saw that we weren't getting stung, I would go stand on the side of the super opposite of where Carl was standing and Carl would blow the bees from the super. They were all getting on me, I was the thing that they bumped into before they regained their composure and I still wasn't getting stung. So it was pretty amazing to see it happen. I mean, bees are pretty incredible creatures. Again, this is a good way to recognize Carl Webb, a fantastic beekeeper, but I learned a lot from him and the leaf blowing thing was certainly one of them.

Amy 44:24
Sure. Now, you didn't mention using a brush.

Jamie 44:27
Yeah, I did use the brush when I first started keeping bees. Usually, I don't use a brush while I'm at a hive removing supers. So I'll use the fume board to get most of the bees out, and then before I take those supers into my honey house, I usually stand outside of my honey house and brush the bees off and take a few frames in at a time. Of course, commercial beekeepers can't do this. They've got thousands of supers that they need to process, so brushing is a convenience. Even commercial beekeepers will have them by their extractor to remove the odd bee here and there. But when I was a hobbyist beekeeper, I would read supers of bees using bee brushes. It's a little bit more labor intensive. But those bee brushes are neat to have and neat to use.

Amy 45:11
That's fair. All right. Well, thank you so much. And everyone, don't forget to continue asking us your questions on Facebook, Instagram, Twitter, send us an email. We will be here to answer them as best as we can. I want to say though, Jamie, you probably got stumped today.

Jamie 45:26
Well, I only got stuck because I can't find literature to support it.

Amy 45:29
Okay, okay.

Jamie 45:31
So, I didn't not know the answer. I just think there is no answer, currently.

Amy 45:37
Alright. Whatever helps you sleep better at night. That's fine.

Jamie 45:41
But again, if the answer is out there, I'm sure our listeners will find the manuscripts and point them our way, and I'll be eaten crow here in a couple of Stump the Chumps when I have to set the record straight.

Amy 45:51

Absolutely. Thank you so much. 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 46:16
For more information and additional resources for today's episode, don't forget to visit the UF/IFAS Honey Bee Research Extension Laboratory's website ufhoneybee.com Do you have questions you want answered on air? If so, email them to honeybee@ifas.ufl.edu or message us on Twitter, Instagram or Facebook @UFhoneybeelab. While there don't forget to follow us. Thank you for listening to Two Bees in a Podcast!