Episode 88 Mixdown PROOFED

Mon, Apr 04, 2022 10:02AM • 41:16

SUMMARY KEYWORDS

beekeepers, honey bees, bees, honey bee, hives, bumble bees, bee, farm, stocking density, cockroaches, patties, grease, blueberry, visitation, colonies, grafting, rates, question, florida, growers

SPEAKERS

Stump The Chump, Jamie, Guest, Amy

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 segment of Two Bees in a Podcast today. For this segment, we are joined by Dr. Rachel Mallinger. Rachel is an Assistant Professor of Entomology in the Pollinator Ecology and Conservation Laboratory in the Entomology and Nematology Department here at the University of Florida. Rachel, thank you so much for joining us on Two Bees in a Podcast.

Guest 01:14
You are very welcome. Always happy to be here.

Jamie 01:16
Well, great. So Rachel, it's good to have you. First of all, you and your team have recently published a study on colony stocking densities and bee visitation rates and blueberries here in Florida. So we're going to talk a lot about that and what it means for crop pollination systems in general. Before we do that, though, we always like to introduce our listeners to our guests. We know that we've had you on in the past, so maybe you don't have to give too much background information. But Rachel, if you could just share with our listeners a little bit about what you do here, specifically at the University of Florida.

Guest 01:49
Well, I'm an assistant professor, as you mentioned, and my responsibilities include research, teaching, and extension. So I do a little bit of all three of those in the research realm, which is probably what we'll talk most about today, my lab works on the pollination biology of rare and crop plants. And so we do a lot of work in cropping systems, primarily blueberry in Florida. But we also do work on the pollination of

rare and endangered plants. And then the other half of what we do is more in the area of pollinator conservation. And we look at efforts particularly in managed landscapes in urban, suburban, and agricultural landscapes to enhance pollinator abundance and diversity and subsequent pollination services. So that's a brief overview of my research. And then I do extension, both with growers and also primarily with homeowners and gardeners on the pollinator conservation front and teach a course on pollination ecology and pollinator conservation.

Amy 02:49
I feel like something that we're very fortunate to have here at the University of Florida is that when people email me asking questions about native pollinators, I'm like, "Well, guess what, we actually have a native pollinator specialist." And so I'm always happy to be able to send those forward to Rachel, and I hope you don't mind.

Guest 03:08
Not at all, always happy to identify pollinators or answer questions about bumble bees or other native pollinators.

Amy 03:16
So you actually, you and your colleagues published a study this past year in 2021. You were looking at blueberry pollination. And as you mentioned earlier, you have a couple of grants working with blueberry pollination. So you were looking at how pollination is affected by the stocking density of managed bees and wild bee populations, right? I feel like this is a question that I receive pretty often from commercial beekeepers, how many managed colonies do I need to put per-acre of blueberries or other different cropping systems? So could you just go ahead and provide a general overview of the study?

Guest 03:54
Yeah, the study really came out of both that apply need as you were mentioning, Amy, beekeepers want to know what recommended stocking density rates are and growers, certainly blueberry growers and growers of other pollinator-dependent crops want to know how many colonies they should be bringing in. And when you look in the literature, there are some studies on this in blueberry, not specific to Florida or to southern highbush. But there have been studies done elsewhere. And there are a few studies on other cropping systems, but it's surprisingly limited. And I think that's because of the challenges inherent in answering this question. It's a hard variable to manipulate. And in some areas, there's not much of a gradient, the growers are all doing the same thing. So here in Florida, we actually do have a pretty big gradient that we can kind of take advantage of. So for this study, we used an existing gradient in managed honey bee densities. We also found that there was a gradient in managed bumble bee densities. And interestingly, these two were not correlated. So the growers that were bringing in high densities of honey bees weren't bringing in more or fewer bumble bees. So we have these two independent gradients to work with. And we selected 20 farms that spanned a pretty large gradient in both honey bees and bumble bees. So we used this existing gradient, we tried to make sure that density of honey bees and bumble bees was not correlated to other management or environmental factors, making sure farms that weren't using high density were all clustered in one area of the state, making sure they weren't all intensively managed, versus organically, making sure they weren't all

surrounded by other blueberry farms or other ag as opposed to forest. And so we spent a lot of time in the site selection phase because we really had to make sure we were looking at gradients in stocking density separate from all of these other variables that could affect visitation rates in pollination. And then basically, we looked at how bee visitation rates, both honey bee, bumble bee, and other bee varied across these farms. We took measures of pollination success in yield. And then we also took some assessments of the quality of honey bee colonies at these farms.

Jamie 06:02
So we're gonna make a point to link in our show notes directly to this manuscript. The manuscript is entitled "Blueberry Yields Increase With Bee Visitation Rates, but Bee Visitation Rates are not Consistently Predicted by Colony Stocking Densities." So there's a lot to unpack here. So I mean, I have quite a few questions related to this, you just provided a really good general overview of the study. So the first question I'm going to kind of lob your way is how can increasing stocking densities affect bee visitation rates?

Guest 06:32
Bee visitation rates are, we think of it as one of two components that can affect pollination. So for successful pollination, you need the pollinators to visit and you also need them to be successful on a per-visit basis. So visitation rates are important, the more pollinators you have visiting, the more frequently they're visiting, if they are effective on a per-visit basis, you should have greater pollination and yields. Bringing in more bees, increasing stocking density, essentially, you're bringing in more hives per acre or per hectare to the property. And that can increase bee visitation rates simply by having a greater density of bees in the area. Of course, we know that bees don't necessarily stay within the area they're brought into. So there is the question of whether when you bring in more honey bees to a farm, whether that does, in fact, increase the visitation rates to the crop flowers, because they may go elsewhere outside of the farm. But essentially, the assumption that most growers make is that when they pay for more bees and bring in more bees on a per acre or per hectare basis, they'll have more individual worker bees, and they may have then greater visitation rates to the crop flowers.

Amy 07:44
So when you're talking about visitation rates, how do you actually identify that? Do you go out and just follow a bee?

Guest 07:52
Great question. Yeah, there are a few different ways you can look at visitation rates. What you referred to is more the rates an individual bee might make to the flowers. And in that sense, that can vary with the tax that you're looking at, whether it's a honey bee or a bumble bee, or a different kind of bee, they'll make a variable number of visits per unit time. But in the case of stocking densities, what we're really interested in is whether when you have more bees on a per acre or per hectare basis, you're going to get more visits to a certain set of flowers in a certain unit of time. And so what we do is we define that area over which we sample and we define the general time over which we sample. And we look to see if we have more bees visiting flowers in that area in that unit of time on farms that have greater stocking densities. And specifically, we do this by walking 100-meter transects. And we walk that 100-meter

transect, and we record, using clickers, every single honey bee we see on a flower. It has to actually be on the flower. It could be side working, meaning it's on the side of the flower, or it could be kind of coming in from the entrance to the flower but it has to be on the flower itself. So we click every time we see one of those, and then, in addition, we go back through and we estimate the density of flowers in that 100-meter transect. So we can sort of calculate bees per flower, bees per 100 flowers. And we make sure that we do this around the same time of day, and we also vary the order in which we visit farms. And we make sure we do it during good weather because all of that can affect the visitation rates. So we try to account for the time of day and weather and by measuring a set area of space and accounting for the flowers in that area, we get a measure of how many visits we're seeing on farms with a lower density and a higher density.

Amy 09:51
That's awesome. So I know that you were talking about how you look at managed honey bees. You were also talking about bumble bees, and I think some people don't know, are bumble bees managed? I guess just with your general overview, what types of bees did you actually observe visiting blueberries? So I know for sure honey bees, but then what were the other types of bees and which ones were managed versus wild bee populations? And then how did the results differ or did they differ between each bee?

Guest 10:19
Yeah, good questions. The bumble bees that we have on these farms are both managed and while there is one species of managed bumble bee available in the United States, Bombus impatiens, and that's a native bumble bee, and that's used for the pollination of various crops both in the field as well as in greenhouses. The growers in Florida, about half of them from what I've seen, and from the surveys we've done, about half of the growers in Florida bring in managed bumble bees, this single species Bombus impatiens. And then in addition, there are five native species, including Bombus impatiens, native wild species of bumble bees here in Florida. The bumble bees we record are this mixture of these managed ones and the wild species. In addition to bumble bees, of course, you have managed honey bees, and potentially feral honey bees as well in Florida, and then the other common visitor is the southeastern blueberry bee, which is a native wild solitary bee. And it is a purported specialist of Vaccinium and other ericaceous plants. Those are really the main visitors. We don't see a lot beyond those three taxa. You'll see the occasional carpenter bee, you'll see the occasional non-bee. Maybe at the very end of bloom, you'll see a mining bee or a plaster bee. These are other solitary bees. But really, it's honey bees, bumble bees, which include managed bumble bees, and then the southeastern blueberry bee. So your next question was about whether the results differ based on those three primary taxa. And again, we're looking at whether stocking density increases visitation rates, and then whether that has an effect on yield. And what we found for honey bees was that overall, increasing stocking densities alone did not increase honey bee visitation rates. That relationship improved when we took into account the quality of the honey bee hives. And there we did find a slight positive relationship between the density and quality combined on the honey bee visitation rates. But in both cases, whether you take quality into account or not, the trend varied over time. In the beginning of bloom, as well as the middle of bloom, stocking density really did not increase honey bee visitation rates. But towards the end of bloom, we did see that farms with a higher stocking density had higher

honey bee visitation rates. For bumble bees, we found that the stocking densities of the managed bumble bees significantly improved bumble bee visitation rates. That was a really significant relationship, and it was consistent over time. So when you bring in more managed bumble bees, you're going to have more bumble bee visits to the blueberry flowers. And then for the southeastern blueberry bee, our other main visitor, they do not come in a managed domesticated form. So you can't really increase stocking densities. At least you can't do that by purchasing colonies. There, we found that organic farms had much higher visitation rates by southeastern blueberry bees. And that was really the only variable that affected their visitation rates.

Jamie 13:24
So, Rachel, that leads perfectly into our next question. There was a farm management component of your research project where you were looking at organic farms versus the more conventional farms. And so I wanted to ask specifically, how did the activity differ on organic crop farms compared to the more conventional farming systems?

Guest 13:43
As I mentioned, the organic farms did have greater southeastern blueberry bee visitation rates. We separately looked at farm size. So this was not due to farm size. And we also included flower density in our models. And so the effect that these organic farms are having on southeastern blueberry bees is somewhat separate from any effect that management might have on flower density, and also is separate from farm size. And therefore, we think that the factors that are really driving that relationship are probably pesticide use, but could also be the presence of weeds and alternative floral hosts, for example. In the case of the southeastern blueberry bee, because it is a specialist on Vaccinium and it has a pretty short adult foraging period, I don't think that the presence of flowering weeds, which you might think would be greater on organic farms, would have as much of an effect. So given that it's not farm size, it's probably not related to alternative floral hosts, I think the most likely explanation is the differences in insecticide and broadly speaking, pesticide use between these organic and conventional farms, but it can be challenging to really pinpoint what aspect of management is really driving those differences.

Jamie 15:02
And did you only find differences for organic versus conventional farms for the southeastern blueberry bee? Did you see no results for honey bees and bumble bees?

Guest 15:11
Great question. We didn't find any difference in management on bumble bee visitation rates. For bumble bees, we only found that stocking density mattered. And then we also did find that the amount of surrounding natural habitat, non-agricultural, non-urban, surrounding the farm positively influenced bumble bee visitation rates. And there, I think that's a really nice story in the sense that you have stocking density positively influencing bumble bee visitation rates, but you also have this natural habitat that surrounds the farm. Likely, the natural habitat surrounding the farm is boosting wild bumble bee populations and visitation rates, while the stocking density, of course, is boosting the managed bumble bee visitation rates. So farms that both bring in more managed bumble bees and are surrounded by

more natural habitat will have more visits by both managed and wild bumbles. And then as far as honey bees, we saw that they actually made more visits on the conventional farms, sort of the opposite pattern of the southeastern blueberry bees. And we're not quite sure what's driving that pattern. We did make sure that the conventional farms did not have significantly more honey bee hives. And as I mentioned before, we also found that stocking density alone didn't really increase honey bee visitation rates. So I don't think it's that the conventional farms have more honey bees. It may be related to the plant health and possibly the density of plants. Conventional farms being more intensively managed may have, in some respects, healthier plants or just a higher density of plants in an area. And that may be what's contributing to those greater honey bee visits. We know honey bees really like to forage in dense areas, and they may be better recruited to really densely blooming areas on intensively managed conventional farms. And we also know that because they're only brought in for a short period of time, the effects of management may not be as great as they are for, say, the southeastern blueberry bee, which essentially lives on that farm all year round.

Amy 17:17
So you've kind of already answered this question. But I guess just overall, what other factors can contribute to visitation rate?

Guest 17:25
I think one of the biggest factors is competing bloom in the landscape. And for the honey bees, that may be why we don't see greater visitation rates when we're bringing in more honey bees, because there is competing bloom in the surrounding landscape. And then the other factor, of course, is the quality of the colony. You can bring in more colonies on a per acre or per hectare basis. But if those colonies are weak, then you don't actually have more individuals on a per hectare or per acre basis, more worker bees or foragers. I think those are probably the two main factors. And of those two, as I mentioned, we did look at hive quality. And when you factor that into account, it does improve that relationship between stocking density and quality and visitation rates. Competing bloom in the landscape is a little harder to quantify given honey bees' large foraging ranges. So we think that could be a big factor that limits the value of increased stocking density.

Jamie 18:29
So, Rachel, this is all great. We're going to make sure and link again to your manuscript in the show notes. So you listeners out there need to take a look at this. But Rachel, just kind of bringing all of this home, all of this information about stocking density, all this information about visitation rates, we have beekeepers from around the world listening to this podcast. We know that this was a Florida blueberry study, but I really feel it's got far-reaching impacts when we talk about providing pollination services for farms, etc. So could you share then what are some of your major take-home messages for beekeepers?

Guest 19:05
For beekeepers, I would say that the main take-home messages are for blueberries in particular, we do not see a strong advantage of increasing stocking densities beyond the typical, which is around three or four hives per acre. When I first started this position, we did surveys. It was closer to three hives per

acre, the most recent survey in Florida was actually a little over four hives per acre. So I say three to four, maybe you can bump that up to four and a half hives per acre. That is the typical stocking density. And because we don't see strong positive effects of increasing beyond that, we are currently recommending that. We're not recommending that you necessarily go below that, but we're not recommending more than that. As I mentioned before, we also found that hive size and hive quality does matter and when you incorporate that into your calculations, having more and stronger hives can increase visitation rates. This speaks to the need to ensure hive quality when you're deploying hives in cropping systems. And both the beekeeper and the grower can ensure that and check for hive quality. We're currently trying to come up with quick and easy ways that growers can assess that when they rent honey bees that don't involve invasive methods, because they don't want to go into honey bee colonies. And beekeepers probably don't want that either. So we're trying to find easy methods that they can assess hive quality without it being invasive. Those are probably the main takeaways. I think other takeaways would include that competing bloom may be a significant factor for blueberries, in particular. And this may be more of a concern for the grower than the beekeeper, but really thinking about what in the landscape might be competing with blueberries during the blueberry pollination. And then finally, because we didn't see a negative effect of farm management, conventional versus organic on honey bee visitation rates, that might be somewhat promising in that we're not seeing any immediate impacts of more intensive conventional farm management on honey bee visitation. Of course, that doesn't account for longer-term or delayed impacts of pesticide use and honey bee health, but at least, in terms of the visitation rates, the conventional farms are receiving as high or higher, as compared to organic farms.

Jamie 21:33
So, Rachel, that's fantastic information. I really appreciate you joining us so much for this segment on Two Bees in a Podcast. I really think that you shared some great results. We look forward to continuing to see the research that you and your team put out on behalf, not only of the native pollinators, the ones that you focus on a lot, but also the benefits that we're able to see your research give to beekeepers and honey bees as well. So thank you so much for joining us on this segment.

Guest 22:01
You're very welcome. Always fun to speak with you both.

Jamie 22:05
Everyone, that was Dr. Rachel Mallinger, an Assistant Professor of Entomology in the Pollinator Ecology and Conservation Laboratory here at the University of Florida's Entomology and Nematology Department.

Amy 22:42
We are on our third Five Minute Management related to queen rearing. And this is my personal favorite. I'm always just really interested in grafting, the whole process and why people do it. I almost feel like it's just so fun to be able to just play around with grafting just to kind of test your eyesight a little bit and see what actually emerges and grows and what you're actually able to do. So, Jamie, with that, I'm going to hand it over to you. You've got five minutes to talk about grafting and the process.

Jamie 23:16
Yep, I'd be happy to. Grafting, in its most basic essence, is removing a young larvae from one cell and placing it into another cell. You could technically graft drones, male larvae, you can graft female larvae, but for the purposes of producing queens, you obviously have to graft female larvae. So there are special tools, we, of course, call them grafting tools, that are designed to put into a cell and go underneath the youngest of young female larvae sitting at the very back of that cell. So what are you moving them into? Well, you are moving them into plastic cups or wax cups that are basically the base of a queen cell. Think about it this way. A production queen in your breeder colony is laying eggs in worker-sized cells. So you have every reason to believe that the egg deposit and then those worker-sized cell are female eggs, right? Out of those female eggs will come young larvae. And now you're needing to move those young larvae from a worker-sized cell into a queen-sized cell so that the starter colony, where you move those cells, will want to make queens rather than workers. So the way to do that is there are a couple of different types of cells. You can purchase plastic queen cups, or you can purchase wax queen cups. It really doesn't matter to me what you use. Bees seem to do well with both types. But I will tell you if you elect to do the plastic, it's better to put the plastic cups on the grafting frame and put that frame into the colony for 24 hours to up to a week, just to get the bees to condition those plastic cups. You don't really want to give them you know fresh plastic and graft a lot of young larvae into that fresh plastic, because the bees might just reject those young larvae just because of the smell of plastic. So a lot of folks, if they're using those plastic cups, will condition those plastic cups by placing them into a hive up to a week before they remove them, and then graph those young larvae into them. Alright, so what you're wanting to do when you are grafting, you are wanting to select larvae that are somewhere in the neighborhood of 12 to 24 hours old. These larvae will be floating in a small pool of royal jelly. In fact, if they're big, they are too big. Everybody will pick out, when I'm first teaching people to graft, they're always going to pick out one that's too big and say, "Oh, this is so small, is this right?" I'm like, "Nope, smaller." They're like, "Well, we can't see ones that are smaller."

Amy 25:59
That's what I do.

Jamie 26:00
I'm like, "Those are the ones you need." So a lot of folks will find out that they need a lot of light, and perhaps some sort of a magnifying glass at their grafting station. So you're really wanting the tiniest of tiny larvae, somewhere in the neighborhood of 12 to 24 hours old. You get better with practice. You'll take that grafting tool, go down the sidewall of the cell. These tools usually have spoon-shaped pieces right at the end, you'll slide that spoon-shaped piece right up onto the larva. And then you'll pick it out of the cell ever so gently and move it into those queen cells that you've got ready, either the wax cups or the plastic cups. Now, a lot of beekeepers will further condition those queen cups by putting a little bit of royal jelly that they've diluted with water into the back of those cells to make it easier to float that larvae off of the tool that you have into the back of that cell. So what they will do again, is they'll take a little bit of royal jelly, put a little bit of water in it, stir it up, and maybe with a matchstick, touch the royal jelly and then touch the back of the cell. And then they'll float that larva from the grafting tool right off the tool onto that. But a lot of beekeepers realize that type of conditioning is not necessary. So they'll just place

them right into the back of that queen cup. It's a lot easier for me to describe than it is for you to do successfully right off the bat. A lot of folks will find out that maybe their eyesight is not quite as good as it was. Or they'll find that there's a high rejection rate from the bees early on in the grafting process. It just takes practice. It takes practice and muscle memory. Again, you want to stay away from the really big larvae. You want to make sure and get the tiniest of tiny larvae that you can identify floating in a pool of royal jelly in the back of their cell. But practice, practice, practice and when you think you're good at it, practice some more.

Amy 28:02
I think that's fair. All right, and you hit it right at the five minute mark. So congratulations, the first time this year Alright, so that was our Five Minute Management. Next week, we will be talking about mating and what that looks like for queen rearing.

Stump The Chump 28:27
It's everybody's favorite game show, Stump the Chump.

Amy 28:40
Welcome to the question and answer segment. We're excited. We still have many questions from our listeners and so, keep them coming. Jamie, I have three questions for you. So the first question I have, this person is asking over the last few inspections they noticed some cockroaches running on top of the sticky board and then on top of the inner cover. They said that the bees don't seem to mind but with cold weather coming up should this person be concerned?

Jamie 29:07
We have never really considered cockroaches a problem in honey bee colonies at all. We're based in Florida, right? There are cockroaches in nearly everything around here from houses, trees, and birdhouses to everything. So we see them with regularity in our own colonies here in Florida, both our research colonies and colonies used by hobbyists all the way up to commercial operation sizes. And you've got to think about what resource honey bee hives offer so many different organisms, right? Honey bees nest in cavities, they have these food resources in cavities. They protect these cavities from outside invaders. There are lots of nooks and crannies in the cavities in which honey bees nest and all of these reasons and so many more are what make honey bee hives good places for other things to live, and cockroaches are just one of those other things that live in honey bee colonies. And I don't really consider them an issue. I know that in times of significant stress, they might feed on honey bee brood, and they might feed on dead bees at the bottom board of the hive. But in most cases, when honey bees are able to take care of themselves adequately, they're removing these things from a hive, the cockroaches aren't causing the death of the brood or the adult bee. So I really don't consider them an issue. I can envision though, Amy, one scenario where cockroaches could be an issue in living honey bee hives and that's with the potential spread of diseases. That's especially if cockroaches are going back and forth between hives. For example, imagine a commercial beekeeper keeping his or her bees on a pallet, you'll have maybe four colonies on a pallet. And you can envision a situation where cockroaches are going from one colony to the next to the next because they walk around inside the hive, they're picking up pathogen spores or virus particles, etc. from those nests and moving them to

the next nest. The only catch is if it's happening with cockroaches, you can all but assure yourself that the bees themselves in that close proximity are drifting to the wrong hive throughout the day. So the bees are probably as responsible for moving stuff around as cockroaches are. So to make a long story short, I can envision a situation where they certainly participate in disease transmission, but my guess is it's kind of super minor compared to what we as beekeepers or the bees themselves do with regard to pathogen transmission. So no big problem. If you don't like cockroaches, and most people on planet Earth don't, when you see them, you could just smash them with a hive tool and move on.

Amy 31:42
Yeah, I was about to say I don't love I don't love cockroaches. One time a cockroach fell on my face, and it was the worst feeling ever. Even thinking about it, I feel like it's crawling all over me right now. So that's fun. Okay. So the second question that we have, this person's asking if grease patties help with small hive beetle control or Varroa control?

Jamie 32:06
Those are good questions. So let me back up a little bit and talk specifically about grease patties. When I first got into beekeeping in the early 1990s, the super early 1990s, grease patties were very commonly used in honey bee colonies to help control tracheal mites. So tracheal mites, like the name implies, are mites that get into the tracheal tubes of bees, and principally, they're going into the tracheal tubes that are in the thoracic cavity of bees. There are a lot of reasons for this, but it basically boils down to that the thorax is full of muscle, muscle needs a lot of oxygen to do its thing, so the largest tracheal tubes in the entire bee's body are found in the thorax, and these tubes empty on either side of the thorax in the little holes called spiracles. And those spiracles are where tracheal mites go into in order to get into the tracheal tubes. They're in the honey bee thorax. So people found shortly thereafter that adding grease patties to honey bee colonies can help control tracheal mites. The reason they were putting grease patties in colonies in the first place is grease patties were really popular way to deliver antibiotics or other medications to honey bees. And what is a grease patty? A grease patty is usually powdered sugar, confectionery sugar if you're outside the US, mixed with some sort of vegetable oil to get a playdough-like consistency. A patty that's not sticky to the touch, but is still pliable. And beekeepers would mix in these treatments. They'd put pancake-size grease patties into honey bee colonies and use it to treat whatever diseases they were going after. So then folks started looking at the efficacy of these things against tracheal mites and discovered that colonies that have these grease patties have lowered tracheal mite infestations. And the prevailing hypothesis was that as honey bees work with these grease patties, eat them, or get them on the outside of their body, they ultimately get covered in grease. Tracheal mites, when they are ready to move from one bee to another, come out of the spiracle in the thorax, wait for their bee to pass another bee, and they jump on that second bee, and they can recognize that second bee from the wooden wall of a box or from the comb because that bee has a chemical signature produced by something we call cuticular hydrocarbons, or hydrocarbons on the cuticle. So if a bee is getting super greased up with grease patties, the prevailing hypothesis is tracheal mites just simply couldn't recognize them as a bee onto which they needed to get. So long story short, these things were put in a lot in the 90s, maybe some in the early 2000s for trachoma control. Now, we hardly ever see tracheal mites in the US largely because of all the treatments used against Varroa. So, fast forward to this question. Can they be used against small hive beetles and Varroa? Short answer,

no and no. At the moment there's no evidence that grease patties themselves are effective treatments for either beetles or Varroa. Regarding Varroa, first, a lot of folks have tried mixing things into grease patties like essential oils, etc. to try to get Varroa control. But in that case, the grease patty is not what's effective, the treatment that they were mixing into it was what was potentially effective. The grease patty was just the carrier. In contrast, there is one study done looking at the effects of grease patties on small hive beetles, and they found the small hive beetle populations were higher in colonies with grease patties than in those that were not. That was one of the first studies I was ever a part of, over two decades ago. Two decades ago, now, in fact, the year that this podcast episode is coming out. So some colleagues and I produced a nifty little paper showing when colonies have grease patties, they're likely to have more beetles. So there you go, Amy, a big, huge, long crash course in the history of grease patty use and their likelihood of efficacy against small hive beetles and Varroa.

Amy 36:25
Sounds great. Alright, so the third question. I really like this third question because this person is asking how a landowner can go about finding a beekeeper interested in keeping bees on their property. And I really love that, I guess, just networking collaboration aspect of it. And so I'm excited to hear what you have to say about that.

Jamie 36:44
Yeah, it's neat too because we've kind of been talking about this behind the scenes. And I think we probably already addressed it with one of our guests in the podcast, but we were addressing it from the perspective of, "I'm a beekeeper, and I need more land." In this case, this is a landowner who simply wants to offer their property to beekeepers. So just right off the top of my head, there are two really good ways that I think you could offer your land to beekeepers. Way number one, if you are in the US, your county, or a neighboring county in your state will have a Cooperative Extension Service managed by the land grant university in your state and that Cooperative Extension Service will have county agents working at the facility, and those county agents will know landowners of all types in the county. So you could go to your Cooperative Extension office, ask to speak to one of your ag agents or horticulture agents, or a similar agent, and say, "Hey, I'm a landowner who wants to offer my property up for a beekeeper to be able to keep his or her bees on that property." So consider doing that. Now, I know that we have a lot of listeners, a ton of listeners, in fact, outside of the US. So what I would do is follow that up with my second recommendation, which is this. There are so many beekeeper organizations on planet Earth, from local beekeeper organizations to state or provincial beekeeper organizations to regional, national, and international beekeeper organizations. I would recommend you do a simple Google search online for "where you live beekeeping association" and see if there's a beekeeping association near you. So, Amy, you and I live in the Gainesville, Florida area. I would just Google "Gainesville Beekeepers Association" and that would take me to Gainesville area beekeepers. If I was a landowner, I would just start going down the contact list, probably starting with the officers of that club and say, "Hey, I'm a landowner with such and such amount of land. And I'd be happy to host bee colonies if you have any beekeepers in your club who are interested in putting bees out." So I would absolutely go with those two strategies. And in addition to that, if you don't have a local bee club near you, you could look at your state or provincial bee club, or perhaps, your state or national bee inspection program. Maybe they know some beekeepers in your area as well. But it's pretty easy to find

beekeepers if you go those two routes. There are some other routes that may work as well. You can contact beekeeping equipment supply companies, you can contact your local university or bee inspection program to see if they know any beekeepers in the area. But I really like the idea of reaching out to your local Cooperative Extension Office or reaching out to your local bee club to see if you can find some beekeepers.

Amy 39:36
Yeah, absolutely. I know that here in Florida we have many groups on Facebook. I know you don't use Facebook, Jamie, but on Facebook, there are lots of state groups and there are lots of local county groups where the associations will get together and basically post anything and everything on there as well. So I think those are really great resources and I'm excited to see landowners connect with more beekeepers and vice versa. So everyone, that was our question and answer segment for today. Don't forget to please send us an email, write to us on social media, or give us a phone call if you'd like to ask your questions on air. 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 40:39
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!