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SPEAKERS

Amy, Dr. Scarlett Howard, Jamie

Jamie 00:10
Welcome to Two Bees in a Podcast brought to you by the Honey Bee Research Extension Laboratory at the University of Florida's Institute of Food and Agricultural Sciences. It is our goal to advance the understanding of honey bees and beekeeping, grow the beekeeping community and improve the health of honey bees everywhere. In this podcast, you'll hear research updates, beekeeping management practices discussed and advice on beekeeping from our resident experts, beekeepers, scientists and other program guests. Join us for today's program. And thank you for listening to Two Bees in a Podcast. Hello, everyone and welcome to another episode of Two Bees in a Podcast. Today we are joined by Dr. Scarlett Howard, a postdoctoral research fellow from Deakin University in Australia. She'll be talking about the impacts of urbanization on bees. In our five minute management, we discuss mitigating the threat your bees pose to others, and we'll finish today's episode with our segment stump the chump.

Amy 01:13
Hi everyone, welcome to this segment of Two Bees in a Podcast today we have Dr. Scarlett Howard, who is the Alfred Deakin postdoctoral research fellow for the Simmons lab with the center of integrative ecology. She is joining us from Melbourne, Australia, and she's part of the school for life and environmental science. Dr. Howard, thank you so much for joining us today.

Dr. Scarlett Howard 01:36
Thank you for having me. I'm really excited to be on.

Amy 01:38
Alright, so today we are going to talk about the impact of urbanization on bees. So we're going to talk about honey bees and native bees. But before we get into that, Dr. Howard, why don't you tell us a little bit about yourself?

Dr. Scarlett Howard 01:51
Well, as you said, I'm living in Melbourne, Australia at the moment, but I have worked all over the world with bees. So I've had a lot of opportunities to travel. And yeah, do a lot of really interesting work with both native bees and honey bees. I would say I first got my start with bees during university. I'd finished my undergraduate degree and I was looking to move on to a research project in masters and I was actually extremely afraid of bees. But I heard of this amazing project, looking at how bees learn, honey bees in particular, looking at whether they could learn size cues, so larger versus smaller. And I heard about this, these things that they could do, like recognize human faces and you know, discriminate between patents. And I'd never heard of heard of that work before. And I thought I need to see this for real, and see if it's actually true. And so I picked the project even though I was really scared of bees and immediately fell in love with the work, fell in love with bees, and everything about them. So now I work across all different types of bee research. I work on their cognition, their behavior, pollination, and flower preferences. I did a year of working on their neurobiology at the University of Toulouse III in France. And now I'm working on native bees and the impact of urbanization on both native and introduced species in Australia.

Jamie 03:13
Yeah, I think that's a really interesting concept, right, this impact of urbanization on bees in general. I know that as someone who works specifically with honey bees, I know there's a lot of beekeepers who are in urban areas, and you see colonies popping up all over the place. But as humans continue to spread, as we continue to develop the areas in which we live, I can imagine that there's a lot of impacts of urbanization on bees. Can you tell us a little bit about the factors that are, you know, some of the roles that urbanization plays on impacting bee populations and health etc?

Dr. Scarlett Howard 03:43
Yes, so, there's a fair bit of research in on this in different countries, Australia is quite lacking in it, but there is a bit in, in the US where you are. So mainly, urbanization is like a lot of different factors coming together, which can have like positive, negative, or neutral effects on bees, depending on like the study that has been done. So urbanization, you know, it causes an increase in impervious surfaces. So that means that ground nesting bees can't burrow because there's, you know, cement or things they can't get through temperature increases in cities, so local temperature increases. There's obviously loss of habitat, there's pollution, there's more non-native flora and fauna that either compete with or take resources away from bees. And there's also of course increase in pesticide and herbicide use. In particular, looking at bees, the negative effects we know would include things like lower flower visitation rates, lower species richness in more urbanized areas, a loss of rare species. And yeah, as I said, a lot of that works been done in the northern hemisphere, whereas effects in the southern hemisphere are quite understudied. But there's also some positive impacts of urbanization that being recorded or as I said, are some neutral impacts. So some bees actually do surprisingly well in cities and

Jamie 05:03
Are those, are those the pigeon version of bees?

Dr. Scarlett Howard 05:07
Yeah, I mean, honey bees can do pretty well in urban areas. But then at the same time, there has been recorded wing asymmetry and honey bees living in more urbanized areas. And that's a sign of stress. So I think it depends on the species. It depends on the location. And it depends on the type of stresses they're facing in those environments as well.

Amy 05:26
So those are all really interesting points that you've mentioned. You know, I used to live in Orlando, which is a bigger city, I would say, you know, in Florida especially. And I taught beekeeping there and worked with a lot of beekeepers in the city. Something that people were talking about were definitely, you know, that that the bees did well in cities, because there were people in the city planting more pollinator plants. And so we were trying to teach them to plant more diverse flowers. And so, you know, something that people were also doing, they had raised gardens on their rooftops, but they also kept bees on their rooftops. And so I have heard a lot about this. I've seen rooftop beekeeping. And I'm wondering if you think that this is a- Is this normal for Beekeepers in the city is I mean, where else are we supposed to go?

Dr. Scarlett Howard 06:14
Yeah, it is actually quite normal in a lot of cities. So in Melbourne, where I'm from, we do have Beekeepers keeping cities on the rooftops. There's also universities that do the same thing. And I'm pretty sure I've read about, I can't think of any specific other cities, but there are a lot of them throughout the world keeping bees on rooftops, like even Notre Dame in France. They had bee as we know, with the with the fire, the bees actually did survive it. But a lot of people weren't aware that they kept bees on the roof.

Jamie 06:43
So Scarlet, I'm really interested in some of the things that you said about urbanization, leading to these potential impacts. So as someone, clearly you've been looking at the literature on this topic, and you're working on this topic, you know, you went over impervious surfaces, temperature increases in city, loss of habitat pollution, etc. Increase pesticide herbicide use. So can you tell me what concerns you most about urbanization and its impact on these? I think it seems like urbanization is inevitable, right? So it seems like it would behoove us to, to mitigate all of these impacts on bees. So what are some concerning trends that you see what concerns you a lot about this topic?

Dr. Scarlett Howard 07:26
I will say first that you're quite right. There are going to be a lot of- there's going to be a lot more urbanization, I think the UN is predicting by 2050, that about 70% of the world's population will be living in urban areas. At the moment, I think at the moment, it's about 50%. I'd have to check that though. But yeah, I guess the things that concern me most just based on the literature, my work is still quite new. But based on the literature, the loss of habitat and habitat fragmentation by urban areas, that's quite a big problem in terms of bees, but also other animals too. In Australia, we- and I think worldwide as well, looking at bees, we've got 20,000 bees across the world, in Australia, we've got 2000 native bee

species, with more even being discovered as we go. And about at least 60% of those bees are ground nesting. So they need to burrow holes into the ground and with an increase impervious surfaces, that's just not possible for them. And they might be losing habitat that way, but also, as new bees hatch, and people do things like more mulching, and that again, ground nesting bees can't get past the mulch they're, they're losing places to actually nest and reproduce.

Amy 08:45
So you know, something I didn't realize or something I guess I didn't think about were the ground nesters, you know, we focus a lot on honey bees and manage honey bee population. And now you're talking about urbanisation and loss of habitat for ground nesting bees. You know, I guess I have a couple- I have so many questions going on in my mind. And one is, you know, which bees are the are the most vulnerable to this? And, you know, how do we, how do we handle this? What do we do for the, for the native ground nesting bees?

Dr. Scarlett Howard 09:15
It's a really good question. So I'll start with the first part of that, which is which bees are most vulnerable. And I mean, you know, for example, the ground nesting bees, as I just said that they losing habitat with the impervious surfaces. They're quite vulnerable in that way. But another aspect of that is small specialized bees. So they're generalist bees which honey bees are, meaning they can feed on lots of different flower species. So they've got that ability and they do visit a lot of different types of flowers, which is great for pollination. But then there are these specialized bees that usually can only feed on maybe one or a few species of closely related flowers and some larvae can't or some of their larvae can't even develop on any other pollen except the pollen of very specific native plants. And so, those bees are also quite at risk when you consider those things like the loss of habitat, more non native flora coming in. So the both of those, I would say both of those general groups are quite vulnerable. And there's probably a lot more to say on that. But moving on to the next question, which is what can we do for the, for the ground nesting bees, I would say, you know, if it's possible, mulch your gardens less, leave some bare ground cover for them to nest in, if you're interested in having native bees in your garden, which hopefully you are. And then it, as always, and I think this is said a lot is to plant more native species in your garden, if you, if you really want to get into it, you can have a look at what your local bees species are in your area. And they'll be different for everyone. And find out what plants they visit, see if you've got any particularly rare species around and maybe try and plant to those species if you really want to get into it. But otherwise, you know, if you can leave some ground cover for them and plant more native flowers.

Amy 10:59
Yeah, I think that's a great idea. We have, you know, with the University of Florida, we have an entire landscape plants, you know, conservation for natural resources. And they're all huge advocates of planting native plants and promoting native bee populations by just, again, planting plants and providing the space for them. Right. And so it's I'm just wondering if there's, I guess, something kind of worldwide with the different types of native plants that there is like if someone from a different state or a different

country wanted to find what native plants they could bring in? What would that look like? Where would they go to find that information?

Dr. Scarlett Howard 11:38
That's a great question. There's probably a lot of resources out there. And things that I've only just become aware of as well, even though I've been working with bees for almost eight years now, I think in terms of like researching them, they'll be, you know, local, or, you know, statewide entomology groups that you can find, I would say, especially in the US, I'm sure there's a lot of interest there. I've just joined one in Victoria. So. And already, I'm learning so much from them, again, even as a person who researches bees, I'm still learning so much stuff. So resources like that, have a look at local societies, local entomology groups, maybe local naturalist groups, and they might be able to give you a bit more information about it. You can always email people at universities as well, like, I know, I'm very happy to answer questions from anyone in the public to help them encourage bees into their gardens and work on what they can plant what sort of native bees they've got around. And if you ever look at the universities that are close to where you're living, and there's an Entomology Department or something like that, yeah, I would say bee researchers are pretty friendly people for the most part, as far as I've seen, and they've been more than happy to answer questions like that.

Jamie 12:53
So Scarlet one of the reasons you seem so knowledgeable about this is this is near and dear to your heart. Right? You've read a lot on this topic. But you've not only read a lot, you're actually investigating this topic as well. Can you tell us a little bit about your work, your specific work related to this issue of urbanization impacts on bees?

Dr. Scarlett Howard 13:09
Sure. Well, my interest in bees, as I said, started with honey bees and they're a non native species in Australia and in a lot of places as well. And then I sort of as I went further down the honey bee rabbit hole, as I'm sure a lot of your listeners have just falling in love with bees, as you work with them more and more, and if you keep hives and that sort of thing. And then sort of getting on to native bees and talking to more people who are working with both honey bees and native bees or just native bees and finding out we have this huge diversity of bees across the world. It's, it's usually when you think of a bee, you're thinking of honey bees, but there's so many other bees around. And so I became really interested in, especially particularly in the ones in Australia, we have some quite beautiful ones. We you know, some with blue stripes, some that called Teddy Bear bees and some that are huge, great carpenter bees up in the north. So we've got such a huge diversity. But while there's really great research going on here in Australia, with the native bees, there's a lot of things that aren't being covered. You know, we're, we're a continent in itself. But there's only so many bee researchers working and what I found a big gap in knowledge is how urbanization in particular was impacting native bees. And I wanted to come at it from a behavioral perspective because I've been working on honey bee behavior for such a long time and I love watching how, how honey bees learn, how they behave, and looking at the differences between individuals even. So I thought I'd apply that knowledge from honey bees over to native bees. So what COVID really impacted my ability to do fieldwork last year. We'll start

with that. But the plan and what I partially started to do is have a look at these from different types of urban areas. So taking native bees from either your high density urban areas, suburban areas. And then, you know, state parks that are, you know, have very native plants. And so they're, they're a more natural environment to the native bees and comparing their behavior. So things like their ability to learn, which is very important to bees, they need to learn the location of flowers, the color of flowers, the scent of flowers that are rewarding to them that provide pollen or nectar, they need to learn where their nests are to make sure they can navigate back. They're really tiny creatures, but they are so complex, at the same time, they're able to learn all this incredible information and store it, and then apply it. And also, as a lot of research has shown, they can then you know, apply that knowledge to novel tasks. So when you're living in a dynamic environment, like like a city, or like a suburban area where things might change really quickly, like you might have a meadow that suddenly cut down, you know, someone's front yard, where a bee is going to get all its flowers, and then all of a sudden, that's mowed down, and you have to adapt and find a different place to find food resources. So I mean, my questions relate to, for example, is the stress of the city is city life for a bee, is that causing negative impacts on their cognition and their learning? So are they actually worse learners when, when they're from the city? Or is it actually means that they're, those bees living in the city have to be more adaptive, and they have to they're more flexible and actually have better learning? Because the only bees that can that can survive in highly urban urban areas and adapt to change are those which have really good learning. So these are some of the questions I'm asking, can't tell you any of the answers yet, because I don't have them. But what I do know so far, and a paper that's just about to come out. So by the time your listeners are hearing this, it should have come out, I looked at a single bee species, the ground nesting bee, and was able to find that it learned quite well, in terms of flower color, so it could learn rewards, I should say it could learn to avoid certain flower colors, if a predation events or crab spider attack would happen. And that's sort of the basis of where I went ahead. So that was just in the suburban Greenbelt. But building from that, knowing that already we can say, we can test these native bees on their learning abilities, like we do with honeybees. Yeah, then we can do this big comparison.

Amy 17:14
So I have two really silly questions. The first is- I have so many questions now.

Dr. Scarlett Howard 17:19
There's no silly questions. Let's put that out there.

Amy 17:21
We could probably stay here all day. Jamie would probably be like, yes, this a silly question. Okay. So first question I have is, so are these, they are solitary bees, right? Are they solitary? Or they live in colonies?

Dr. Scarlett Howard 17:33
I mean, there's a whole range of sociality. So-

Amy 17:36

Okay.

Dr. Scarlett Howard 17:36
The bees, I was just talking about there seems like a semi social they nest in aggregations of females. So they're not completely social like honey bees living in the big hive with division of labor, but they're also not completely solitary.

Amy 17:48
Got it. And then how do you even do research on their behavior? I mean, do you go out and catch them and bring them to the lab and, you know, show them a couple of colors and have them just point to which one they want? Or, you know, what does that look like?

18:01
I mean, basically, you're you're exactly right. So for these native bees, and this was done like under, you know, up and down restrictions in Melbourne during COVID last year. So, at times, I was able to go out and I could collect the bees in the field. Later on, I hope to actually do the testing in the field when, when you know, spring and summer rolls around in Melbourne again. But yes, I collected from the field, took them back to a lab area and then did some testing, then I return them back to the field because they very important in the environment. So they're actually fairly easy to catch. They're fast, but once you get good enough at doing it, you just catch them in a little vial, bring them back, I had apparatuses set up to place them in. These bees, unlike honey bees, honey bees are very easy to train because they're so keen to drink sugar water, the worker bees, and so we can just train them really easily with sugar water. These bees were a little harder. They didn't really want to drink any sugar water. So I had to adapt and change it to a predation event which was just a squeeze with some soft forceps. So little pincers. So each time they claimed, they were very attracted to the colors I showed them. So it was a blue versus a yellow color. And easily discriminant, discriminable by bees. And so if they were first attracted to the yellow color, I would then every time they went to the yellow color, simulate a predation event by a crab spider, which is a predator to them. And over time, over 10 trials, I should say, of the, of that predation event. So either choosing the correct or incorrect color they learnt to to avoid the yellow color and go to the blue color instead.

Amy 19:33
That is so cool. When I asked the question, I was totally joking, but now I feel like I could be a scientist. You can be Amy, you can. I'll stick to communicating science instead. Alright, well, yeah, thanks for answering those questions. So I guess my last question for you right now is just you've already mentioned it a little bit, just mulching less and you know, keeping more bare sand but with our global increase in population, what do you suggest what can our listeners do to minimize the impacts of urbanization on bee health?

20:04
Look, that's, that's a very complex question I would probably say and I mean, even in, in Australia, since we don't know enough about it, it's hard to actually say, you know, some bees are actually doing

okay. Again, I would come back to this idea of making sure that you're providing the resources. So not necessarily just flower, floral resources, which are very important, but other resources. So you've also got cavity nesting bees. So if you have a look at some great online resources, and I know Kip Prendergast at Curtin University has a great booklet on how to build bee hotel, a native bee hotel, because a lot of the hotels you buy from, you know, big stores and that sort of thing, they're actually not appropriate, they can spread disease, because the holes are too close together. So if you have a look at some resources, and there's a lot of people out there, who know how to build a good bee hotel, you can, you know, put bee hotels in your garden, as I said, you can leave this bare ground for them to nest in. By not mulching, not putting down plastic, I know that will annoy some of the gardeners who don't want weeds in their garden. But if you want some native bees there, it's a good idea. And yeah, just if you really want to nail down the details, make sure that you do some research and find out what bees are in your environment. And I think the more people learn about them, the more likely they are to, to be really excited about helping them and moving forward on conservation plans. And the more they learn about them, like me, the more that you're just going to fall in love with them and, and want to just keep learning and keep finding out more new stuff about about bees, both, you know, honey bees and native bees, because I do love them both,some are non native. Yeah, I mean, that's, that would be my advice, just keep learning about them and see what you can do. And try make it you know, specific to your area, because bees differ all across the globe.

Jamie 22:01
So I'm sitting here thinking about what, what direction to take it because I have a couple of different questions. And they're very unrelated. That's why I'm sitting here pausing, wondering what to ask you, Scarlett so so I'm going to go back, I guess to something you said earlier before I bring it back to what I think maybe folks can do to help out. But earlier you were you were mentioning that were some negative impacts. You discussed those, you're looking at those as well. There's some positive impacts. And there's also some neutral impacts. And you mentioned some bee groups that might be particularly threatened in urban setting, for example, ground nesting bees. I wonder, are there any bees or bee groups that tend to do well in urbanization? I kind of joked earlier about you know, honey bees being the pigeons right of the, of the city. But in seriousness, are there groups or are generalists do better? Do social bees do better? Do solitary bees do better? Is it somewhere in the middle? I mean, what bees actually don't seem to mind urbanization, if there is such a group of bees, that that seems to not be stressed.

Dr. Scarlett Howard 23:00
This is a great question, I actually have just got a grant from the Hammond slide foundation to look at this. So to have a look at the intersection between urbanization bee and how that affects bee behavior morphology and with the level of sociality, and whether it be as a specialist or generalist, so is a bee that is solitary, and a specialist more at risk of having these negative impacts, then a bee that is a generalist and is you know, more social, so either eusocial or, you know, semi social. And so I don't actually have the answer for you yet. But as for I mean, as for the positive effects in different countries, there, yeah, there are positive effects. So there's sometimes higher species richness in more urban areas, there can be increased reproductive success, compared to farm land, that was a particular study

in 2018. I can't remember the exact species, but I could look it up for you. And even there was a study across urban gradient gradients in Africa as well, that found that urbanization didn't actually impact the bee abundance or diversity that they found, although it did actually have a negative impact on some other insects like wasps and beetles, but for bees, there was yeah, there was no impact on those particular trait traits that they were looking for.

Jamie 24:20
And then, and then more to kind of have a management of this particular issue since you've been talking about that as well and some of the things that our listeners and others can do to mitigate this issue. So the University of Florida where Amy and I work is based in Gainesville, and Gainesville, probably like many urban areas around the world, it's just seems to be exploding. There's new subdivisions going in all the time. And one of the things that frustrates me as a bee scientist or a biologist in general, is I'll go driving down the road and I'll see that they'll bring in all of these plants that are not native when they're perfectly acceptable native equivalents. You know, here in Gainesville as an example, they'll throw up a lot of non native palms when Florida is full of native palms that are very attractive have been useful to pollinators. And so it frustrates me a lot. And it seems like such a simple change that can be made. And then in the US, I'm not sure maybe you can comment on this in Australia, there's a movement towards designating cities, bee cities. And to do this, there has to be, you know, some focus on planting native plants and things like that. Do you feel as someone who studies bees, do you feel that it should be part of a city planning effort to plan for things such as bees to allow bee corridors that also provide habitat for other things, you know, birds and all of these things? It seems like the stuff that you would do to benefit bees would be of general benefit to a lot of pollinators and other animals, etc. So, I know, I know, there's hardly a specific question and everything I just said, I'm just venting all of these things that kind of popped into my mind when I think about this issue. But I'm curious if if you feel that there should be some concerted effort by the politicians and the administrators who are the ones kind of governing all of these things to make cities and urbanized areas, more beneficial or better places for bees and other organisms to live in general, not just humans.

Dr. Scarlett Howard 26:13
I completely agree with you. On all of those points, I do think that everyone benefits when we're including nature in our city planning and our policies, and our, you know, urban plans and planning for parks and outdoor spaces for people because having nature around I mean, it's, that's beneficial for both pollinators as well as other wildlife as well in cities. But it's also beneficial for people. And I think people do really appreciate it when in, you know, a big urban wasteland, there's a lovely park that's full of native plants and animals. Because yeah, you know, I think particularly having been in this situation and talk to a lot of people in during the pandemic who were locked down, and could only go five kilometers from the house that I don't know if that happened where you are. But that happened in Melbourne, and we were restricted to five kilometers. And just like two hours outside a day at one point actually was only one hour. And yet having these spaces where people could go and be in nature, when they couldn't go anywhere else was incredibly important to mental health. And I think anything we do in terms of calling attention to the plight of pollinators, as well as other wildlife in cities, it benefits everyone, benefits nature, it benefits people. So yeah, I'm all in favor of considering wildlife when we're

creating these urban environments. And I think we can live together with wildlife successfully. But it does take a bit of planning, it takes some effort, and it takes some change. And we do need to see that, and hopefully we will be seeing that soon. There's definitely places already, big cities who are making efforts. I saw a fair bit of it in Europe when I was living there. And yeah, there's some efforts in Australia as well. And I can't speak for the US. I haven't been there. But yeah, there's a lot of passionate people about it as well, which I think is a good thing.

Amy 28:04
Yeah, I think a lot of the big cities here in the US there are departments that are growing, you know about sustainability, and sustainability landscaping and design. And so I love seeing that. And you know, the other thing that I really love seeing or just, there are a lot of volunteers that come and help at a lot of these gardens, you know, they'll come and just make this place beautiful for the general public. And so I think that there's a lot to be said about, you know, gardening for in urban areas and gardening for native pollinators and just generalists. So I'm, I'm super excited to see, you know, how we progress into the future and what big cities are going to start looking like, you know, because I do think that there's going to be a lot of change. So thank you so much. Dr. Howard, it was there anything else that you wanted to discuss with us? And anything you wanted to share with our audience?

Dr. Scarlett Howard 28:55
Oh, that's a good question that I wasn't prepared for. I mean, I'm just I'm going to push this point again, which is just give yourself the opportunity to do a little bit of research yourself, just Google your local native bees, and see what's around. And I think you'll be pretty surprised. And hopefully, maybe you'll be interested to keep looking because there's incredible diversity out there. And they are such interesting animals. I think a lot of beekeepers can attest to the fact that keeping bees has, you know, improved mental health and makes them really happy. And yeah, for me, I love being around bees, too. It's like it's like a calming thing, even when research isn't going that well. But, yeah, get out there, have a look at bees do a little bit of research and see if it's something you're really interested in doing and in helping bees in terms of this, some of these threats that we're currently facing.

Amy 29:51
That's great. Alright, everyone. That was Dr. Scarlet Howard, Alfred Deakin postdoctoral research fellow at the Simmons lab. At the Center for Integrative Ecology in the School for Life and Environmental Science. She's coming from Deakin University in Melbourne, Australia. Thanks for listening to this episode of Two Bees in a Podcast. Have questions or comments? Don't forget to like and follow us on Facebook, Instagram and Twitter @UFhoneybeelab All right, in today's five minute management,

Jamie 30:45
five minute management,

Amy 30:47

we are talking about mitigating the threat your bees pose to others. You know, Jamie, you and I have talked about how we love bees but maybe other people don't love them so much so.

Jamie 30:58
Those people are crazy.

Amy 31:00
Yes, they are. Alright, so you have five minutes to talk to us about how to mitigate the threat your bees pose and go.

Jamie 31:09
And Amy, like always , we have a document all this topic we'll make sure to link it in the show notes. But Amy there are 25 recommendations that I have and maybe it's overwhelming. So I don't have a lot of time to talk about all these in detail. But I will mention all 25 and then you can go back and look at the document if this topic is of interest to you. So number one, locate your apiary and colonies away from areas where people and domestic animals frequent. In other words, keep your bees away from folks, that's a first good step in mitigating the impact your bees have on others. Site your colonies away from property lines, don't put them close to the fence that increases the likelihood your neighbors will encounter them. Number three, make your colonies inconspicuous, put them in the backyard behind a tree or a bush or a fence or something that other folks can't see them. Usually out of sight out of mind is the kind of thing we recommend here. Number four, if people can access your colonies easily mark them with signage to signal their presence and to advise people to stay away. Number five, whenever possible fence your colonies, make it impossible for folks to walk right up to them. Number six and a lot of folks do this in urban areas, is consider if rooftop beekeeping is an option for you. Sometimes keeping bees on flat roofs or decks up and away from areas is a good way to mitigate the impact your bees have on others. This is a sore subject for a lot of beekeepers. But let's be honest, we need to be reasonable about the number of colonies we'll put in an area we get so excited about bees that our quarter acre yard now has 100 colonies in it and that's just not okay. Right so use use some some some basic courtesy with the number of colonies that you're putting on your property or in an area, keep the densities low whenever possible. Number eight, tell your neighbors about your bees. Now this is a debatable when some Beekeepers say that the neighbor shouldn't know about your bees, I take the stance that they should know about your bees. And for that matter, I believe you should give them a jar or two of honey every year because sometimes that sweetens the deal as it as it were. Number nine, do not take guests too close to your bee colonies if they are not protected appropriately. I've got a funny story about that. But I'll have to save it for another day or maybe the end of this. But nevertheless you shouldn't be taking folks up to bees haphazardly. Number two, give only professionally conducted tours and public demonstrations of bees beekeeping another it's kind of in hand in hand with number nine you don't want to just take a school group to your backyard to show them bees make sure that they can all be protected. Number 11, consider having insurance. I think that speaks for itself. Number 12, a lot of folks like to use a sting waiver, something that you require folks to sign as they approach your bee colonies or work them with you. Number 13, be especially mindful when managing bees at public places. If you're keeping bees in state parks or other places, you just need to be aware that the

public's going to frequent that area and you just need to be especially discerning in that particular circumstance. Number 14, you want to take similar precautions when keeping bees on private lands. If you're keeping bees on someone else's property, you need to assume that they're going to want to wander up to your bees and you need to protect them. Number 15, learn as much as you can about bee stings, how to prevent them and how to treat them. In the event you are around someone who gets stung and needs your help. 16, provide your contact information to people who live near or frequently area your colonies are. 17, whenever possible, register your bee colonies with the state's appropriate regulatory agency. That's intuitive. If you've got a state inspection program, register them with that program. 18, ensure your bees have a nearby source of clean water if you do not they will go to your neighbor's bird bath and pool. Take it from me. Number 19, use stocks of bees known to be gentle. Right, Italian bees as an example are known to be quite gentle. Number 20, hand in hand with that re-queen colonies that get defensive. Number 21, ensure that your colonies have adequate food reserves so that they're not visiting sweet sticky substances in your neighbor's yard to get them soda cans and things like that. Number 22, do not place or leave anything in your apiary that's going to cause an apiary wide feeding frenzy especially if you live in an urban area. You know, putting out frames to be robbed is a major no-no because this creates a big cloud of bees it freaks people out. Number 23, practice good swarm control techniques. So you're not dumping your swarms into your neighbor's trees or chimneys or walls of their houses. Number 24, always follow locally adapted best management practices how you should keep bees in a certain area. And number 25, and finally, work your colonies in a manner that minimizes colleague disturbance you smoke work calmly try not to get your bees excited if bees are in the middle of robbing season, reduce the amount of time you spend in that colony. So you don't get bees stirred up. And I know that that was probably over five minutes. But there were just the 25 things that have to get out there. All you folks out there again, you can look at the document for more information on all of these.

Amy 36:25
Okay, so you went a little bit over, but that was only probably three seconds over. Oh, and you also in the middle of doing that so that you had a funny story. And so now I have to ask you about that funny story.

Jamie 36:36
Yeah. So my, my wife and I when, on our very the very first time that she ever came over to see me, when we were just starting to date. I wanted to take her out to my grandparents property where I kept my bees because you know, everybody who keeps bees is just super cool. And I wanted to show her how cool I was because I kept bees and I had extracted honey earlier that day. So my grandfather and grandmother lived in a rural area of the county where I'm from and so we set all these supers out to be robbed. I set all these supers out to be robbed after I'd finished extracting them right you put your your extracted supers out there and the bees from the apiary will clean up those supers for you and get all the nectar. And so I know that bees are usually pretty gentle during this circumstance. So I took then first date girlfriend, now she's my wife, but my first date girlfriend out to my grandparents property, walk them up to the apiary let her stand on the road. And I really wanted to impress her with how cool I was. So there's a huge cloud of bees swarming around this stack of supers and I'd put out there and I was

just gonna walk up to them and just overwhelmed this girl though. Look how cool I am I'm so tough I can walk amongst a crowd of bees and be okay. Well Amy I walked in there completely unprotected and within two or three seconds I got stung on the neck and then I got stung on the face and then I got stung on the face and then I got stung on the neck so I'm having to maintain my composure with this awesome girl who I was trying to impress who now I was worried about getting stung. And I'm like Amanda maybe maybe you should walk back the bees are sort of stinging I'm just starting to get hammered. On my neck and my face and that led to that recommendation is don't take folks close to be colonies or be equipment if they are not adequately protected even if you elect to be a moron and not adequately protect yourself, don't don't call someone else to be a victim of your of your silliness. You think she just kept dating you because she felt bad for you? I think that's it right what's what's the dog that folks always adopt when they go to the shelter, they always get the the scrawny wimpery one because that's the one that looks like it needs the most love and that was probably that that chump when when Amanda was, was considering me for as potential spouse material.

Amy 38:52
That's hilarious. Thank you for telling the entire world that story.

Jamie 38:55
Yeah. I'm sure everybody wanted to hear it but there you go. It's out there now.

Amy 39:01
Thank you.

Jamie 39:08
It's everybody's favorite game show, Stump the Chump.

Amy 39:23
Welcome to the question and answer segment. Today we are talking about wax all three of the questions that we had Jamie are about wax today.

Jamie 39:32
That's exciting. I don't think we've answered questions about wax so far on this podcast. It's all about that wax. About that wax right? I wasn't gonna sing it. I was just gonna say it.

Amy 39:47
You know, someone, they they actually emailed us and they were talking about how they can just hear us smiling and laughing through our podcasts. And I'm pretty sure this is a prime example of that time.

Jamie 39:59
Sure. Did we tell them that we actually failed the whole time? Oh, yeah. Should we let them think that we actually smile while we do this?

Amy 40:05
Yeah, we should probably, I don't know, whatever you want to do. Okay, so the first question we have is this person had recently uncap their honey and processed it. Now they're left with, you know, the cappings. And basically just the pieces that came off? How, how should they process these capping to basically turn them into bars or something that they can use later on?

Jamie 40:27
So Amy, I don't actually get a lot of questions about wax. So it's neat that we have three in a row. And in this particular listeners, basically saying after I extract, I end up with some cappings, and some other wax debris. And what do I do with it? Now, if this listener, were asking as if they were a commercial beekeeper, I would have a different answer. But given they're asking basically, as a hobbyist or a sideliner, or based on the volume of wax, they mentioned that they're getting, the answers kind of simple. I always tell folks, there's two ways two pretty easy ways to render wax, if you've only got, you know, a smallish amount of it. The first of those ways is kind of doing it, what's what I call the double boiler method, you can't just put wax in a pot and expose that pot to heat, because you can get lots of problems with that wax. Instead, what you'll do is do double boilers, and if any of you out there, make candy or confections, you're familiar with what I say. And basically a double boiler is a smaller pot that sits inside of a larger pot and the larger pot has water in it that you put that larger pot directly on the stove or over some sort of heat source. And then the smaller pot goes into it so that it is the hot water in the larger pot that is melting the wax in the smaller pot. And once you have it completely melted at that point is really easy. You take the smaller pot, you pour the wax contents through something such as a t-shirt, I know a beekeeper who strains it through, you know t-shirts that that's very common for folks to wear, it takes out all the debris or nearly all the debris, but it does take a while to pass through those T shirts. Some people will strain it through cheese cloth or stockings or things like that. But whatever you know, cloth strainer you want to strain it through you strain it through that into a smaller container that is essentially the mold and once the wax cools in that smaller container you'll have a block that's pretty clean. Now you could just pour the wax straight into that mold but what you're going to find is a lot of the gunk and debris settle at the bottom of that wax and so you'll have a block that's three, three quarters pretty wax and one quarter just gunky stuff that you're going to have to scrape off. The second way that I like to recommend to folks to deal with wax is using a solar wax melter. These are really simple items that you can purchase from beekeeping supply companies, the premise was real simple. The box itself is usually made of wood or some sort of material like that it's got a glass lid, and inside of that box, it's got a place where you can put wax old frames, Queen excluders, cappings whatever. Whatever has wax on it, you put it in this wax melter and the sun through the glass melts that wax there's always a screen at the bottom of that wax the wax passes through that screen into some sort of mold some sort of container at the bottom that wax goes into and it's a second good way to render wax both of those are pretty easy you can even make your own solar wax melters you can google solar wax melter instructions on how to build, find them online, or purchase from equipment suppliers so both of those are ways that I handle those kind of small amounts of wax that you would typically get in hobbyist or sideliner operations.

Amy 43:44

Alright, so the second question we have, again it has to do with wax and it has to do with the coloring of the wax and so this person's asking can you explain why wax looks so different from to hivesin the same location, the darker wax it's a second year so it's a little bit older. They they had been used for a year and then clean after use and then the other one is a new hive so why would the wax you know why would the wax look different?

Jamie 44:10
Super easy questions glad that they were asked. So wax ages that's one reason that it can get darker the more bees that walk on it with their dirty feet the darker the wax will get. So if if if a comb has been used to make honey, you know bees will store honey in it then you extract the honey from that comb and you put that comb in storage it'll usually stay almost but not quite white. Then when you put it back on the beehive dirty little footprints can darken that wax over time. Now the listener said something that was very key there, how could wax from two different colonies look so different? The wax from my second year colonies darker than that of the first year and that right there gave the answer away is that the wax is just a year older, it's got more footprint on it, etc. But I will point out wax that has had brood reared in it also darkens over time. In fact, all wax will start off nearly white when the bees produce it and form it into those hexagons. The very first round of eggs it's laid into that the larvae emerge from those eggs, those larvae actually spin cocoons, silken cocoons around themselves while they are developing. And that as well as other debris and other things can build up in those cells over time. So the more and more rounds of brood that's been reared in wax, the darker and darker and darker it becomes until it's virtually black. So the two ways wax can become discolored. Number one, it can be discolored just by age and use as bees get dirty footprints just over time, and secondly, it can be discolored, the more brooch cycles that pass through it. So the fact that your second year colony has darker wax in your first year colony is exactly what I would expect to hear. Because that's certainly what happens over time with bees.

Amy 46:03
Cool. So our third question, this actually for some reason, there were probably two or three or four people that emailed me the same exact question. So this yeah, it was really strange that it all happened kind of at the same time. But the third question, as the listener was asking, so when extracted frames are returned to the hive for bees to clean up and repair, do bees use any of the wax debris in the comb repair process, or is it rejected and removed so.

Jamie 46:31
Amy, it's actually some of both bees do use some of wax debris in the comb repair process. So they'll go to that comb, and they'll kind of smooth the edges the edges that were created when you uncapped the that the honey uncap those cells that contain the honey, they will smooth the edges use some of the wax to do that. But there is also some wax losses debris, I mean, just by virtue of dealing with some combs that have passed through the extraction process. bees are you know, working with loose ends and a lot of bees are working on it. There's movement around the comb. So inevitably, some wax can fall to the bottom board of the hive and be kicked out of the hive as well. But a lot of it does get recycled and reused in the comb that they're repairing.

Amy 47:15
Awesome. All right. Well, there we have it. Those are our question and answers. Everything was about wax today. Thank you so much. Don't forget to email us, follow our social media pages, and feel free to send us a direct message on on any of the social media pages that we have. Hi, everyone, thanks for listening. Today. We'd like to give an extra special thank you to our podcast coordinator, Megan Winfrey and to our audio engineer James Weaver. Without their hard work Two Bees in a Podcast would not be possible.

Jamie 48:04
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!