Episode 115_mixdown PROOFED

Thu, Sep 08, 2022 9:43AM • 57:20

SUMMARY KEYWORDS

beekeeping, bees, cities, honey bees, beekeepers, hives, urban beekeeping, observation, honeybees, switzerland, joanne, question, colony, propolis, resources, pollinators, workers, green spaces, europe, tasks

SPEAKERS

Jamie, Guest, Serra Sowers, Stump The Chump, 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 honeybees and beekeeping, grow the beekeeping community and improve the health of honeybees 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, welcome to another segment of Two Bees in a Podcast. Today, we're joined by Dr. Joan Casanelles Abella who is a postdoc affiliated with two institutions in Switzerland, the first of those being the Biodiversity and Conservation Biology Swiss Federal Institute for Forest, Snow, and Landscape Research WSL, which is in Birmensdorf, Switzerland, and the second being Ecosystems and Landscape Evolution, the Institute of Terrestrial Ecosystems, which is at ETH Zurich, in Zurich, Switzerland. And Dr. Joan and a colleague put together a really interesting paper that Amy and the team here at the University of Florida were able to read, and it's entitled "Challenging the sustainability of urban beekeeping using evidence from Swiss cities." All of you listeners out there know that there's been a great explosion in urban beekeeping. A lot of folks are proponents of urban beekeeping and really advocating for urban beekeepers. Dr. Joan and a colleague really did a great research project on this topic, so we're really excited to discuss with him some of the findings that they have made regarding urban beekeeping. Joan, thank you so much for joining us on Two Bees in a Podcast.

Guest 02:05
Thank you, Jamie, for inviting me. I'm very excited to be here today.

Jamie 02:08
Yeah, we're excited too. When we read your paper here in the laboratory, instantly, we're like, "We've got to have someone from this author team on," because we really want to talk about it because urban beekeeping is such a hot topic around the world. So Joan, before we get talking specifically, about your research project, if you could do our listeners a favor and tell us a little bit about yourself, the degrees that you have, how you got interested in studying bees, and how you ended up where you are now.

Guest 02:40
Yeah, so I'm originally from Barcelona, where I studied my bachelor degree in biology, and then I specialized in ecology. And after that, I moved to the Netherlands in Amsterdam to study my master's degree, which was specialized in ecology and evolution. Back at that time, I was interested in urban ecology, so biodiversity in cities and what factors are shaping the nature that we observe in urban environments. And I was also interested in learning about bees and plants, so the taxonomy, the species, their ecology. After that, I moved in 2017 to Switzerland to start my PhD in urban ecology which I defended in last January, 28 of January this year. And I'm currently working at the same Institute at the WSL as a postdoc, also continuing my researcher as an urban ecologist. So yeah, just fun. I like a lot plants and I like bees, and I just find bees a fascinating system to study what happens in cities and as umbrella taxonomic group to understand the processes that shape biodiversity in cities. Among different topics, I am interested in understanding the diversity, the diet of wild bees, and also the effects of beekeeping in shaping the wild community. So that's a bit of an overview of my current research and past research.

Amy 04:25
Well, it sounds like you have a lot of experience, and I feel like, Jamie, maybe we need to take a trip to Barcelona and the Netherlands and Switzerland. Go to Spain. Look at all this urban ecology. I'm excited.

Guest 04:37
Nice spaces to discover. Yeah.

Amy 04:39
Yeah, those are great places to spend time, it seems like. I'm from an urban area. I grew up in an urban area, I've worked in urban areas. I've worked with beekeepers in urban areas. But it may be a little different in Europe than it is here in the United States. And so can you describe the culture of urban beekeeping in Europe and maybe a little bit more about Switzerland specifically?

Guest 05:02
Definitely. So beekeeping traditionally was done in agricultural areas as normal agricultural activity, and also in natural areas in some countries. And this has been like this for many decades. In Europe, there was a tendency of abandoning beekeeping just because cultural activities were less popular from the 50s, 60s and this affected beekeeping. But let's say it continued in agricultural areas more in some countries like in Spain and Switzerland, for instance. But recently, and when I say recently, I'm talking at least about the last 10 years where we have good data to say that urban beekeeping has become more and more popular in European cities, I think this is the case for other cities in other areas in the world. But I will focus more in Europe, which is the continent I know more. So in in Europe, the last decade has been, yeah, a boom in northern beekeeping. It's not only happening in the Swiss cities I analyze, but also we have data in London, in Paris, in Berlin, in Barcelona and in other cities in the continent. This is due to different reasons. And to be honest, we don't know that much. We don't know what is the main cause. But it seems it has been as a reaction to the narrative of the big crisis that has been in the media for for a long time, and that pushed many people to engage in kind of activities that

they've perceived they could be saving the bees, and also to a willingness of urban dwellers to engage in some mental activity that connects them with the environment. Those would be some of the reasons. There are also other processes going in cities. In the case of urban beekeeping, there's been a lot of what it's called greenwashing when some companies that decide to put hives in the buildings to show they're doing something for the environment. And also some people that have seen an opportunity to do business outside agricultural areas, and that are also having a lot of hives in northern areas just for production and selling city honey bee hives, city honey. So you have, in the case of Paris, they sell like special honey for the city, at prices that can be quite high. I don't remember, got this number, like five years ago, it could be around like 40 or 50 euros per jar. So yeah, there are different actors and motivations to do beekeeping in cities. And this is quite interesting and also poses many questions for research.

Amy 05:59
Yeah, so Joan, I mean, for me and my personal story, I grew up in the city. I went on a couple of trips abroad and realized I had no idea where my food came from. I feel like that is part of the movement as well. It's just getting closer to knowing where your food comes from and understanding local food and local agriculture, just because growing up, we don't necessarily know where that jar of honey comes from. And so I feel like that's just kind of been a movement of city people wanting to get into agriculture somehow, and, of course, the fascination with honey bees. It's just something that piqued my curiosity, and I think for others as well.

Jamie 08:42
Amy, I think that's a really good point. Joan, when I was looking around, thinking over the last 10 years about this explosion in urban beekeeping, this is something we're seeing here in the US as well, and to Amy's point, she had thought, like a lot of maybe people do, that they're confused about where their food comes from. And so there has been this push for people to get back to rural life activities, even though they live in urban centers. I bet I already know the answer to this question based on your background, but ultimately, what caused you to investigate this topic? I mean, you had an interest in urban ecology, you developed an interest in bees, you are watching bee numbers go up. What made you want to do the study that we're talking about today?

Guest 09:33
So well, there's been, for many years, already an interest in understanding the effects of beekeeping on wild bees, and I think, on maybe an initial point to remember is that we don't have a single bee species in the world. Honey bees is just one of the around 30,000 bee species that exists on the earth. In Europe, we have around a diversity of 1000 species, which are called the wild bees and it includes bumble bees, mason bees, mask bees, different types of bees that they all pollinate. They don't do honey but they do many ecosystem services to people, they help plants reproduce, etc. Honey bees are just one of those species which are the ones that we know the most because they are the ones that are used typically in every culture. So since a long time, some ecologists have asked the effects of having a lot and hundreds of hives in certain areas, for instance, for pollination of crops. What are the effects that these have on other pollinators that coexist in those areas, on other wild pollinators which are not managed by humans and therefore more susceptible to scarcity of food to environmental problems, etc.? And this has sparked a lot of research in agricultural areas, trying to understand

whether honey bees and other pollinators like wild bees might compete when beekeeping is very intense or where there are a lot of honey bee hives in a given area. So while this has been done a lot for agricultural and natural areas, the focus in cities was not very important because already keeping bees is I would say quite, at least for what I know, quite reason, but since cities are usually surrounded by agricultural areas that have honey bee hives, and now cities increasingly have more hives, honey bees have become quite common residents of cities. Myself, doing fieldwork in Amsterdam and in Zurich, and sampling pollinators and sampling plans, one of the things you realize is that honey bees are ubiquitous everywhere, usually in cities. Wild bees, you find them more in areas that are less urbanized and have more green spaces that are more diverse. And the more diverse are the green areas, the more wild bees you find. But honey bees, they're simply fine everywhere. You see them in very poor patches, you see them in very rich gardens. And this makes me wonder, what are the effects of having such a big number of managed honey bees on the diversity of wild bees? Is this happening only in Amsterdam or this process is also happening in other Swiss cities? This was my initial question. And then also wondering, why honey bees and wild bees compete in certain situations in cities. So I had this question, but I was not very sure if I had the data to assess that. And then I discovered something that was, well, very fascinating, that in Switzerland, by law, beekeepers have to register their hives to a central system. And this is done for veterinary reasons to control the spread of diseases rated with honey bees. And that means that since 2012, when they made the law specifically for bees, all the different regions of Switzerland or the beekeepers have to report their beekeeping location. So the coordinates where they have the hives and give an estimate of the number of hives that they have. And this allows us not only to have a spatial data beekeeping, which you don't have in other places in Europe, I will say in no other place in Europe at least, but you can see a temporal evolution on the beekeeping at the country level. And this is quite unique. And while the data has some caveats, like some regions record better data than some others, there are some mistakes because of the typos of entering the data. But overall, the data is quite good. And it works well to check general patterns. And this was the reason we decided to go and focus on this study.

Amy 14:10
Yeah, so you looked at Swiss cities and you looked at number of hives between 2012 and 2018. And so can you discuss how the numbers of these have increased in Switzerland? And then I'm not sure if you know the answer to this, but are the increases similar in other locations as well?

Guest 14:33
So in Switzerland, we focus in the 14 major citie. When you compare them with the US, probably they look like towns, but for Switzerland-level, they are quite big. And in those cities, what we've seen is that between 2012 to 2018, the number of honey bee hives has doubled. It was initially around 3100 hives in 2012 and in 2018, that number was around 6400 hives. So this is like a quite fast increase because this happened only in six years. What we know for the Swiss data that we have is that this has happened in other urban areas in Switzerland. I cannot say that this has been the case of other cities in Europe, just because we don't know. Very few cities record beehives, and when they do, it's usually optional. So, yeah, this information is not clear in other cities. According to the experts in London and in Paris, the number of hives has increased a lot, recently, but there is no number magnitude that I can give you here.

Amy 15:51
That makes sense here. So here in the state of Florida, beekeepers are required to register with the state. So we kind of have a general idea, even though not everybody knows that they need to be registered. But in other states in the United States, there is no registration. So it's really hard to look at those numbers. So I completely understand your response and how we could know some answers and not in other others depending on the rules.

Jamie 16:18
That's a really good point, Amy. Joan, we have similar situations here in the States, like Amy had mentioned. It'd be interesting for us here in Florida to share similar data with you to see if you see similar trends, even though you can conclusively state that the number of colonies doubled from 2012 to 2018. In Switzerland, my guess is similar to yours is that it's happening in other cities in Europe. I know it's happening in cities here in the United States. There are lots of articles and newspaper reports about urban beekeeping. I know I've spoken to a lot of urban beekeeping groups in my job here through the University of Florida. So it seems to be very popular. Getting back to your manuscript, and we're going to make sure and link your manuscript as well as a few press releases about your manuscript in our show notes, you and your co-authors mention in your paper, you say your study represents a first attempt to quantify the sustainability of urban beekeeping. But you recognize that there are some limitations. One of the limitations that you mentioned is that you and your team estimate something you call urban green spaces. Could you tell us a little bit about urban green spaces, and then tell us about this estimation and how you think it could influence your results?

Guest 17:42
So, in our study, as you said, we wanted to assess the sustainability of urban beekeeping. We refer the sustainability of urban beekeeping in terms of the resources that the existing honey bee hives or the distinct honey bee population in the city require in regard to the existing resources that the city has resources in terms of food resources, which in the case of bees are flowers, like in terms nectar or pollen. So, what we did here, in order to quantify that, we needed first to know an estimate of how many resources did honey bees require? And then also decide how did we measure or inferred those resources, those feeding resources? And the best way would have been to know exactly per surface unit, how many nectar or how many pollen do we have. No, actually, we could count all the flowers existing in the city of Zurich for instance, and measure exactly how many pollen and nectar do we have and then get an estimate of the whole city and then say like, okay, in this part of the city, we have 30 hives, is 30 hives need so much nectar and pollen they offer that that the city has what the green spaces have is that and then make this comparison. This data, of course, we don't have it, we cannot produce a nectar or pollen map for the city at the resolution that we will need. So we have to use another source of aid which was more simplistic. In this case, what we need is to use the existing urban green spaces as a surrogate of Florida resources. So we know that cities have different urban green spaces in those urban with spaces. We know that we have flowers. These green spaces could be gardens, could be meadows, could be parks, cemeteries, and usually those spaces contain a certain number of flowers, of course nectar and pollen. We consider all the different green spaces to be equal. So we couldn't really make differences among them. And we use the existing number of organized spaces as a surrogate of the resources. So with this, we decided to, using some data that we have from London from a previous study, we attribute some needs from honey bees, saying like a colony requires,

I don't know, 7.5 square kilometers of open green space, and then check what was the availability of urban green spaces in the city and then make a balance to see and to spot whether the city had enough green spaces to satisfy the needs of the existing hives.

Amy 20:55
Yes, that kind of goes into my next question. So you looked at the sustainability of urban beekeeping under basically, available flow of resources, and then also something that is the carrying capacity of these bees in urban environments. And so, when colony populations go past that carrying capacity in an urban environment, would those populations of honey bees naturally decrease? Or what do you think would happen as far as do you think beekeepers would try to continue splitting their colonies and increasing their colony numbers?

Guest 21:32
So what ecology tells us about the carrying capacity is when it is exceeded, then the population declines. Usually, when there is a scarcity of resources, there is something that happens, which is called competition, right? This happens between organisms that share a similar resource. For instance, if there would be a scarcity of resources in a city, we would expect honey bees to compete among them, but also with other pollinators that share the same resources. And this, ultimately, would be quite bad for the other pollinators because honey bees are very good competitors. So because honey bees are managed, they are not really naturally occurring in the inner cities, beekeepers have the possibility to alter the scarcity or counteract the scarcity of resources by providing water with sugar. And this is something that happens also outside cities, in bad seasons. In one day, there is a lot of drought or for whatever reason, there are less resources in the landscape. Beekeepers can always provide nutrients and resources to the hives that they that they manage. And this makes honey bees more resilient to these alterations than other pollinators like wild bees? So yeah, when or if the carrying capacity of the city would be exceeded, it doesn't necessarily mean that the hives may decrease if beekeepers can supply extra resources. It could happen though, and this something is recorded is that honey bee colonies might compete among them and even have some aggressive behavior, so attacking other colonies to get the resources.

Amy 23:35
That makes a lot of sense, actually. So that was a very good explanation. Thank you.

Jamie 23:41
So Joan, this is all very interesting to me. When we were seeing this paper again, we were very excited. And think about it because you're right, there seems to be an explosion in urban beekeeping. And you mentioned competition resource competition. Beekeepers can mitigate these competition issues because we can feed bees, but maybe the native bees can't be fed similarly. So if you had to summarize your main research findings from your project, what would those summary statements be?

Guest 24:11
So the main reason, we have, I would say two or three main results. The first one is that we demonstrated that urban beekeeping is increasing rapidly in Swiss cities, like in 14 cities. All of them had increases over a very short time period. And this has important consequences because it means

that we're populating the city with managed honey bees over a short period of time. On the other hand, we are quite sure that the resources or the green areas have not increased at the same pace as beekeeping. We have just to remember that a healthy colony can have around 20 to 80,000 honey bees, so we're adding thousands and thousands of workers in cities, whereas we don't change that much the food that is there. This opens and poses some questions about what will happen to the wild bees, those that are really in danger and that are declining worldwide. And what the implications can be have to their survival in the future, especially considering that cities can be hotspots or can serve as refuge for several pollinator species. The second main result that we found is about the sustainability. With our quite simple modeling framework, we saw that in most of the cases, and for most cities, the existing resources are not enough to satisfy the increasing numbers of honey bees in cities. This means that this opens some questions of whether this will clear competition with wild pollinators. This could in the future make wild pollinators decline and really endanger the diversity of wild bees in urban areas. Of course, we don't have data to demonstrate that and we cannot assess competitions with our data. Competition and these effects on other wildlife species require time. This is a problem because maybe when we see the consequences it's already too late to act. So that will be the third main result is that this pushes me to open a debate with beekeepers, with city residents, with conservationists, with politicians to assess what are the goals that we want to do with biodiversity and with beekeeping and to start some revelation to have a strategy for biodiversity and act before we will see the consequences.

Amy 27:00
So with that, I mean, there's so many points that you just said, and I hope that our listeners do go to our additional resources, because again, we'll link this paper so that they can look at your study. And so what recommendations do you have for beekeepers?

Guest 27:19
So we were discussing before, who's beekeeping in the city? And there is no simple answer to that. What we know is that many people in the cities, they do beekeeping as a hobby. So there are people that typically do not have that many hives, they don't do it for economical reasons. And many of them believe because they believe they're actually helping the bees, most of them are not aware that honey bees are probably not in danger at all in Europe, and that there are more than one species of bees, and that wild bees aren't really endangered. There is also a small proportion of the beekeepers who have a lot of hives and they do it economically. But this wouldn't be the rule. The majority, at least in Switzerland, it seems that the majority of beekeepers they do it, yeah, just for a willingness of helping the bees, for recreational activity, as a connection with nature. The main problem is that sometimes being having good intentions without the right knowledge can have bad consequences for the whole system or for the original cause, which was to protect the bees. My recommendations for beekeepers is get to know more what is the wild bee diversity? There are a lot of documentaries and information and understand well what the real big crisis means, that we have a lot of wildlife species that do a lot of functions for us, we don't know them, we many times ignore them, but they are still here and with a ban on them is those ones that were that we have to protect. There are many ways of helping wild bees like planting resources, planting native plants, planting diverse gardens, we can have like insect hotels, etc. Then if beekeeping or urban beekeeping is a motivation to do then get the right knowledge on how to manage that. We've been in contact with several beekeeping associations and consultancies. They noticed that many times these amateur beekeepers, they don't have done much training, and many

times, they are not aware that in their neighborhood, they may have like a lot of people doing beekeeping and that this may be saturating the landscape. So entering in contact with beekeeping associations could be a good idea to see whether doing work on beekeeping is a good solution whether these people are leaving or if the landscape and the neighborhood maybe is very saturated of honey bees, also that beekeeping comes with a responsibility so people that that have livestock that have, for instance, horses or powers they know they have to provide food to their animals. With beekeeping, it seems that there is no responsibility on feeding the bees because they can just move freely and forage but there is a responsibility on providing resources and beekeepers mas make sure that if they want to have some hives that they plant plants so their honey bees can feed. It's the same with with other domestic animals. We know that they have to be fit and it's the responsibility and accountability on the owner to do that. The same happens with honey bees. And also, get to know the situation in the city and the situation of the bees and asses what are the best options to have the bees. Many times maybe it's not necessarily beekeeping, but might be also being engaging in creating habitats for wildlife. I think this is the most important thing.

Jamie 31:17
I think these are all really, really good points that you're making. Joan, so you're talking about this all from a beekeeper perspective, if you're going to keep bees in urban settings, what should you do? My follow-up question is from an urban planning perspective. So a lot of urban planners just need to accept, I guess, that there will be beekeepers in the area. So what recommendations do you have for city planners or urban planners based on your results?

Guest 31:46
That is a very good point, Jamie. I think, as I said, like there are responsibilities for beekeepers. But of course, they have some limitations. If they want to know what happens in their neighborhood, they should have access to some data that or some beekeeping association that has a data showing what is happening. I think authorities, urban planners and municipalities have the duty of recording this information and help guiding or when beekeepers or when beekeepers are not the ones that can make maps or can force people to reduce their hives. This is the role of authorities. And when you have these products, then it is way more easy to make policies and to plan events. In Switzerland, we have this special case where people are registering the hives in the wild. But even though people are registering the hives, municipalities are not using this information to kind of regulate and avoid unsustainable beekeeping. Yet they look up the information but they don't really do that. I think this demonstrates sometimes the lack of awareness of the problematics and control around beekeeping might have in urban biodiversity. So the main point would be like be aware of the problematics make or develop ways of monitoring or when beekeeping but not only beekeeping, also the resources of the city. And then work together with conservationists, with researchers, with beekeepers, with city residents to plan a city that can harbor wild bees and protect them, that can have enough resources for wildness and also that allows a certain degree of beekeeping regulate where hives can be placed and where hives shouldn't be placed. Help people make a decision whether they could, they should or they should not do beekeeping in their neighborhood also inform people of what other tasks they can do to engage in in the protection like planting plans and having the habitats having the hotel. Yeah, I think this, I mean, it's not only that the authorities can do that, but it's their responsibility to engage in these kinds of policies.

Jamie 34:16
That's absolutely fantastic information. Everybody, we've really had a great honor to be joined today by Dr. Joan Casanelles Abella, who's a postdoc who's worked a lot on the topic of sustainability issues related to urban beekeeping. He's doing it all from Swiss cities, but it has ramifications and other cities around the world. So Joan, thank you so much for joining us on this episode of Two Bees in a Podcast and sharing your knowledge with us and our listeners.

Guest 34:47
Thank you very much, Jamie and Amy, it has been a pleasure to be able to explain my research and yeah, realizing that problematics in Europe and also sharing in other continents. Yeah, thank you very much for all your attention

Amy 35:13
Jamie, as I mentioned, I'm a city kid and I grew up in the city. I didn't know where my food came from, and just in grad school decided with my friends that we were going to become beekeepers. It's been really interesting to see just what my career has become. But something that he mentioned that I really liked was that there are more beekeepers in urban areas, like it's just become a really hot topic. Like urban gardening, urban beekeeping, what have you. And I think something that I really enjoyed was the fact that he was talking about more responsible beekeeping practices. And that's what I try to do when I do like outreach opportunities. We're not necessarily, of course, it's great to have more beekeepers, just because we have more friends. But at the same time, we want to make sure that they are more responsible as beekeepers. I mean, just one example would be like pests and disease management, right?

Jamie 36:12
Yeah. Amy, I mean, you've touched on so much there and I kind of sit back in my chair and think about the pendulum as it's swinging. So when bee populations, honey bee population specifically, were reported to start declining, back in 2006, it was on the news everywhere. So, gosh, thousands, maybe tens of thousands, maybe even hundreds of thousands rushed into beekeeping around the world because it makes sense. If bees are dying, if I keep bees, maybe I can reverse that trend. Well, one of things that Joan says is there's a lot of faulty premises there. Honey bees, specifically, Apis mellifera, is not an endangered species, right? But number two, sometimes jumping into it is the contrary of helping and that's kind of one of the take-home messages from his urban beekeeping shpeel. You had mentioned specifically if we're going to keep bees we need to be responsible. I'm almost scared to talk about this given how political this issue has become. But I think about this idea that's been very pervasive in our industry for the last 15 years, treatment-free beekeeping, green beekeeping, things like that, where, "I'm not going to do anything to control diseases and pests, the bees will handle it themselves." Well, we've created these artificial densities of colonies, with colonies and these artificial hives, we got these high pests and disease pressures, I don't think you're responsible to not do something about it. And if you're going to keep bees, I think we have an ethical obligation. And even Joan was mentioning, I think we have an ethical obligation to control diseases and pests, I think we have an obligation to provide food when they need it if the densities are too high to be supported by an area, which then brings the question, well, if these things are happening, is keeping bees in this area

the right way that I can help bees? And I think that those questions came up a lot in what Joan was mentioning.

Amy 38:13
Yeah. Something, especially, I mean, here we are in Florida, but something that we didn't even really discussed, but is an issue, is just our state is just becoming more and more developed every day. So I mean, we are losing some land to urbanization. It'll be interesting to see just in the future where this all goes.

Jamie 38:35
Yeah, what's the right balance? So that's why I like this paper so much. In Florida, the way that I like to think about this concept is using our state as an example, because I know a fair amount about it. When I was hired back in 2006, we had I think, 150,000 colonies on the roll. And in Florida, if you keep bees, you have to register your colony with the state. It's a law. All right, so now we have 600,000 colonies in Florida. And this is 15 years later. Now, there are a lot of reasons that we've got this number of colonies, but basically, we quadrupled in the number of colonies over the last 15 years. And I remember, five or 10 years ago, commercial beekeepers expressing concern to me that gosh, can our state support this, and then couple that with the huge development that you get in a state like ours, and I'll give you an example. We're recording this here, the first of June 2022. Well, I just got back from Thailand and a couple days ago, and I was in Bangkok. That city's massive and it just spreads and spreads and spreads. And I kept thinking about cities growing and the huge population flocked to cities and this urbanization, but people still wanting that link to nature to ecology to the wild. And it's we're going to be facing some interesting issues here with how do we manage the bees in these settings where we're losing resources or losing natural habitat, and especially those of us who manage Apis mellifera. And in many places, it's an introduced species like here in North America or South America, Australia, New Zealand, places like that. So there's going to be a lot of interesting dialogue moving forward, as we try to grapple with this issue.

Amy 40:22
Yeah, I agree. Something that he was discussing at the very end, when you were asking him about urban planners is, I do think it is responsible for beekeepers to work with their local authorities and not work against them, but work with them to figure out just a good balance to be able to work with them still have our honey bees, but not maybe oversaturated figure out what we need to do or who we need to talk to, as far as just keeping a good balance.

Jamie 40:51
Yeah, there's a lot of fun considerations in this topic. And I think we could talk about it a long time, but when it just pops into my mind is this idea, "Okay, bees are dying, I'm going to save the bees by keeping bees, but now I'm not going to treat my bees or do anything. So now my bees are a source of diseases and pests for everybody else's bees." Sometimes, maybe a good way to help bees, especially in urban settings, is maybe not keep bees but maybe provide bee habitat. A lot of folks live in high rises with balconies. Well, fill your balcony with pollinator plants that are native and beneficial to honey bees and other bees. So, gosh, it's going to be interesting moving forward as we try to wrestle with this issue

of pollinator populations, growing human populations, feeding populations, and providing appropriate habitats for wild bees, as well as the honey bees that we enjoy managing.

Amy 41:40
Absolutely. I would love to hear our listeners' thoughts. So if you have thoughts on this topic, or if you agree or disagree with Jamie or myself, feel free to send us an email or send us a message on social media. We are looking forward to hearing your feedback.

Stump The Chump 41:57
It's everybody's favorite game show, Stump The Chump.

Amy 42:08
Welcome back to the question and answer segment. Jamie, the first question we have today has to do with observation hives and thermoregulation. We've got an observation hive room here at our facility.

Jamie 42:23
We do and I think it's the coolest observation in the world.

Amy 42:27
I mean, so when you walk into the observation hive room, it's red. And also it's a little bit warmer. And so our questioner is asking about insulation and thermal regulation with honey bees in observation hives, specifically. So, how do we and how do beekeepers prevent bees from either overheating or not being warm enough when they're in an observation hive?

Jamie 42:50
Oh, Amy, I've got so many thoughts about this. And I'm going to have to make sure that I'm succinct. Well, I've been working with observation hives since I was in middle school. Once I got bees, I begged my parents to let me have an observation hive, and then through high school, I did science fair projects that were heavily reliant on observation hives, and then as a PhD student, I did a lot of observation hive work. And now here in our new bee lab at UF, we do a lot of observation hive work. And so this individual is asking this question based on a video that they saw me do of the tour through the bee lab where they saw our observation hive room. And in that tour, I make the comment that we keep that room warm in the bee lab, just the observation hive room. We keep it warm in the bee lab because when you put bees in observation hives, it can compromise their ability to thermoregulate. So let's think about this briefly. The bees that we keep are very good at thermoregulating, they keep the nests warm and when it's cool out, sorry, they keep their cluster warm when it's cool outside they keep their cluster cool when it's warm outside. And they do that because their combs go side by side by side. And the bees have entrances that they can fan, they can collect water and sprinkle droplets around the nest so that they can fan their wings and evaporate that water and cool the nest, or in their nest, they can tightly cluster together and shiver flight muscles to raise the temperature in the nest. Okay, so these combs being stacked side by side by side by side means that bees can control kind of that cluster configuration. They expand the cluster, contract the cluster, all of these things. Well, when you put bees into an observation hive, the whole point of an observation hive is to be able to see the bees. So if you kept them in a cube observation hive, kind of like what we have in our apiaries, right, the standard hive

is just the cube. If you keep bees this way you'll only ever see the bees on the outside of the outermost combs, which is a pretty boring area in the bee nest. You'll rarely ever see a queen, you'll hardly ever see brood and all that stuff. So the purpose of observation hives is to see as much as you can. And in order to do that, most observation hives are only one comb thick. And what they'll do to add more combs is they'll just stack them, one on top of the other. So our observation room as an example, we have observation hives created by actually, my father-in-law, he built them for us, Bruce Morgan, and they accommodate three deep frames, one stacked on top of the other. And if you make observation hives too wide, then the bees will cluster and you'll never see the combs. So most observation hives are just wide enough to get a layer, maybe two layers of bees between the comb and the glass wall so that you can always see the comb or the queen or whatever you're looking for. So if you think about what we do with observation hives, stalking the combs, taking away their ability to cluster really well, we basically compromise the ability to thermoregulate well. In an observation hive, they can thermoregulate, but they are much more vulnerable to the environmental temperatures. Now, most observation hives, of course, are kept in climate control rooms, someone's living room, someone's workshop, etc. And in these circumstances where we tend to keep, most humans, at least in North America tend to keep their temperatures in their houses set somewhere between 70 and 80 degrees Fahrenheit. And that is a temperature from which bees can easily stay warm or stay cool. So most folks who keep observation hives, simply wrap them with a blanket-type material, and only open them up when they need to view them. And honestly, in my experience, working with observation hives, that's all that's been necessary. The reason we keep our room warm here in the UF Bee lab is because we want to keep the ambient temperature around that observation hive as close to the standard colony temperature as we can get it so the bees aren't having to overwork, to thermoregulate so that when we do our experiments, bees are doing what bees normally want to do. And so that's why we do it. Most folks wouldn't keep their rooms set on 94 ish degrees Fahrenheit or 34 and a half degrees Celsius. So we do it for experimental reasons, but the bees would be able to thermoregulate at what we would consider normal human temperatures ourselves. So that's a long way of saying I don't worry too much about the thermoregulation in observation hives if I'm just keeping observation hives to watch. I'll keep the observation hive wrapped in a blanket, or with some sort of insulating material until I want to view them. When I view them, I'll take it off and watch them. And then when I'm done, I'll put that insulatory-type material back on. I will say there was one point in my life that for some research I was doing the only space I had to keep an observation hive was out in a building that had no insulation and no climate control. And so I almost lost those observation hives during winter. In fact, I tell the story where I thought I did lose one of those observation hives. The bees weren't moving, they appeared frozen. And so I brought them back to my house when I was a young teenager, put them in the utility room of our house and closed the door because I was going to deal with the observation hive later. Well, those bees weren't dead, they were just nearly dead. And so they reanimated and filled that room and my mom discovered it first before I did. I'm making a big shpeel about it. All I'm gonna say it is in most cases, if you keep observation hives in climate control rooms, you'll just wrap them with a blanket when you're not observing them. Most of the times they'll otherwise be okay, so I wouldn't worry too much about them overheating or getting too cold if you keep that blanket around them and keep it at a temperature that you are also satisfied with in the building.

Amy 49:09

So I'll ask you a follow-up question from that same questioner and it has to do with if the bees are too hot. So let's say they fill their spaces with propolis. Do bees remove it if they need more airflow? I mean, I don't even know the answer to that.

Jamie 49:26
Yes. So I'm not aware of any evidence for them using propolis. So, we know that they will restrict entrances with propolis, especially bees from Africa, for example. They'll reduce their entrance down to a very small entrance. But there's no evidence that they will remove or put back or remove or put back based on them trying to regulate airflow in the nest. It appears that they're just trying to reduce it to a point that they like it, and then that's where they keep it. And I will say a lot of folks who keep the more temperate derived Apis mellifera, so the ones that come from Europe, those bees don't tend to restrict their entrances as much as the bees from Africa. When I kept bees in South Africa, those hives would have standard Langstroth hive entrances, those big wide entrances that are a couple centimeters high, and then the entire width of the hive. The bees that we kept there, for our research purposes, would reduce those entrances just to a couple of centimeters and they do it using propolis. But I don't ever see that keeping bees here in the US or ever see it when I go and see the more temperate derived Apis mellifera kept. So I don't think they're using propolis for that purpose. I will say a lot of folks probably, this individual mentioned they're from Montana, probably a lot of folks will keep observation has in rooms that are not climate controlled, maybe in their storage shed or in their workshop. And in those cases, I would wrap them with a blanket or two, maybe even having some actual insulation on the walls of that hive that I put there and then wrapped with a blanket, but I don't really ever worry about them overheating unless it gets really, really hot in the building. So if it were the case, then you can remove those blankets and just cover the observation hive with a piece of cardboard because bees don't want to have full light in their have 24 hours a day. So the only reason to darken it is just to keep from annoying them. So if you think it's too hot in the building, by too hot, I mean, it's getting over 94-95 degrees Fahrenheit or 34-35 degrees Celsius, then you might worry about cooling it, but most buildings don't get that hot.

Amy 51:32
Alright, so the second question that we have. So a fun fact about honey bees is that the worker bees perform different jobs throughout their life, right? And so we know that not all worker bees will do every job. And they can kind of skip back and forth as far as the jobs that they need to do. But, can worker bees do all the jobs in the colony if they need to? And is it possible for them to maybe skip backward and do a job that they would have done earlier on in life?

Jamie 52:02
So the evidence suggests, the data suggests that all workers are capable of performing all tasks, number one, but that not all workers perform all tasks, number two. So they will absolutely skip tasks but that doesn't mean that they're incapable of doing that task. It just means that the colony collectively decided through their hive wisdom that that task wasn't necessary. So the worker, through multiple feedback loops, said, "This is not a task that's necessary to be performed, at least by me at the moment," and then they will jump. And we have the advantage the listener doesn't have, which is we can see the whole question and all the motivation behind it. Some of the motivation behind this question was, since a lot of workers will skip tasks, maybe it's simply where they can't perform that

task. Maybe it's in the DNA of some workers to be predisposed to certain tasks and not to other tasks. While there is definitely evidence that some workers are more or less resistant to certain diseases or pests are more or less prone to do one behavior or another, but the data still collectively suggests that all workers are capable of performing all tasks, even if they don't. And I really liked the second question here, which is, can worker bees who have, theoretically, graduated from certain tasks and are now in the big girl task, as they've aged, they're doing things that the older female workers do, can they revert and go back to younger, female tasks? If there is a need for that? And the evidence for that is very clearly yes, we know that if there's something that takes out like the young population of workers, the older workers can go back and perform some of those younger worker tests.

Amy 53:54
I'm just thinking they're probably like, "Geez, I had already skipped this part of my life. And here, I am, like having to do it again."

Jamie 54:00
"Yeah, I'm having to come back and pick up the slack from you guys who aren't doing what you're supposed to do." Now, it is possible that some workers can't perform all tasks going back in time, like some of their brood food developing plans, for example, can atrophy and shrink over time to where if you're an older old worker, you're just not going to go back and make brood food and feed the young. But there is some behavioral plasticity, which is the official term, there is behavioral plasticity, where workers can go either direction based on need.

Amy 54:29
So cool. Okay, so the third question we have is about propolis. And how does one get rid of propolis when it is all over the place? So propolis on your fingers, your gloves, your suits, your hive tools, the floor. We have a lot of propolis on the floors of the lab.

Jamie 54:46
So you don't. You don't get it out of clothes. Now, maybe a lot of people are going to email us and tell us all the amazing ways that they do it. But it's easy to get off of hive tool, you can scrape it off of hive tools. It's easy to get it off of like a laminate or a tile floor or a concrete floor, you just scrape it off of that. But it's nearly impossible to get it off of clothes, off of gloves, off of any type of cloth or fabric material. Propolis can be dissolved in ethanol. And so ethanol is the drinking alcohol, right? That's what's in beer and vodka and whiskey and wine and all that stuff. But you have to have very high concentrations of ethanol, unlike what would be available in even the strongest of spirits. So it's also probably not worth it and what you'll find, I don't know what stage in their beekeeping life the person who asked this question is, but what you'll find is that beekeepers basically have bee clothes and then everything else. The way I do it is once a shirt or pants get very old they become bee clothes because I'm not worried about them getting propolis and propolis stains on them, which I recognize will be on those bee clothes forever. So that's the best way to deal with it is graduate some clothes into the bee clothes world and just know that that's the last job that your clothes will ever do. You see how I'm pulling this altogether back to the previous question? Those clothes, Amy, cannot go back in time, unlike workers. Once they become bee clothes, they're bee clothes forever.

Amy 55:28
Yep, there's no going back.

Jamie 56:27
That's right.

Amy 56:28
All right. Well, we really love the questions that are coming in. The best way to send these questions over to us is by email, so don't forget to send us an email or find us on social media @ UF Honey Bee Lab.

Serra Sowers 56:42
Thank you for listening to Two Bees in a Podcast. For more information and resources on today's episode, check out the Honey Bee Research Lab website at UFhoneybee.com. If you have questions you want answered on air, email them to us at honeybee@ifas.ufl.edu or message us on social media at UF honey bee lab on Instagram, Facebook and Twitter. This episode was hosted by Jamie Ellis and Amy Vu. This podcast is produced and edited by Amy Vu and Serra Sowers. Thanks for listening and see you next week.