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EPISODE 201 TRANSCRIPT

Jamie

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, Amy and I have the distinct pleasure of being joined by Dr. Antonios Tsagkarakis, who is an Assistant Professor in the Laboratory of Sericulture and Apiculture in the Department of Crop Sciences at the Agricultural University of Athens in Athens, Greece. Antonios, it's so great to have you on this podcast with us. Thank you for joining us.

Dr. Antonios Tsagkarakis

Thank you very much for the invitation. It's my honor to be here. Please consider me as a member of the University of Florida community.

Jamie

That would be great. That's right. You do have a history of interaction here at the University of Florida. We're going to get into that in a moment. Amy and I, I mean, our listeners out there don't know the behind-the-scenes story, so I'll just say that you and your spouse visited us some months ago. We really enjoyed the visit, and it was great to have you here. That was some of the inspiration that we have for wanting to have you on the podcast. So Antonios, that really leads directly into my first question. Could you tell us a little bit about how you got into the honey bee world and make sure you include your experience with the University of Florida in the process?

Dr. Antonios Tsagkarakis

Yes, Jamie, I have been working at the Agricultural University of Athens since 2002. From 2002 to 2021, I served as a teaching and research associate in the Laboratory of Agricultural Zoology and Entomology. At the same time, I worked as a beekeeping instructor in seminars organized by the Institute of Agricultural Sciences of the Hellenic Ministry of Rural Development and Food. Meanwhile, I also maintained my own beehives which I keep today on the island of Euboea.

So, in 2021, I applied for a faculty position in the Laboratory of Serticulture and Apiculture of the same university where I currently hold my position. I also consider myself as a part of the University of Florida community, as I said before, as I worked as a post-doctoral associate in the

Entomology and Nematology Department and the Citrus Research and the Education Center from 2008 to 2010.

Jamie

Antonio's I'm curious, how long have you been keeping bees and what got you into keeping bees?

Dr. Antonios Tsagkarakis

I started keeping bees from 2004. I started with 10 beehives and now I am about to 50 beehives in Euboea. I am not selling the honey, but I give it as a gift to some beloved friends of mine and also my family.

Amy

So, Jamie, when you were talking about Antonios coming to visit the United States recently and us here in Florida, I was laughing because, Antonios, you were going to Arizona for an entomology conference, I believe. I remember just hearing, I think you have more friends in the United States than I do. You have so many friends all around the country.

Dr. Antonios Tsagkarakis

It's true, actually. Yeah, this is true.

Amy

So, we are going to talk about your research and what you do in the laboratory in just a minute, your current research. But I would love to hear about just the apiculture industry in Greece. Can you tell us a little bit about the industry in Greece? What kind of honeys do you all produce? How many beekeepers? Are these primarily hobbyist backyard beekeepers? Do you have a large industry? I'm eager to know all about the industry.

Dr. Antonios Tsagkarakis

Yes, Greece is actually home to nearly 16,000 beekeepers. Most operate in small-scale, family-run enterprises, although there are also larger commercial operations. Nearly 80% of these beekeepers own more than three beehives each. I know the number is significantly lower than the states, but for Greek level, 300 beehives consider as a high level. In total, the Greek beekeepers own almost 1.5 million beehives, making Greece the third largest country in the European Union by total beehives. In the European Union, we maintain almost 18 million beehives. Greece is boasting the highest beehive density per hectare. Regarding the types of honey you asked before, about 70% of the produced honey comes from honeydew, 60% from Pine and 10% from Fir. In the pine tree, there is an oligophagous to the pine genus scale insect. The Latin name is Marchalina hellenica, which exclusively excretes the honeydew to collect and make the pine

honey. Another 5% of the Greek honey comes from citrus, and 10% is derived from various blossoms: white flowers, Heather, chestnut and other sources. However, the flagship honey of Greece is the famous thyme honey. There are more than 32 thyme species in Greece, with Thymbra capitata being the most abundant.

Jamie

I just listened to you talk about it and it sounds so amazing to taste this. I'm actually mind boggled that 70% of your honey is honeydew honey that comes from primarily pine and then a little bit fir. That's just crazy to me. It's amazing that that much would be due to honeydew secreted by these other insects feeding on trees that you don't think about producing nectar. And then you say the famous honey in Greece is thyme honey. That just sounds amazing. 30 something species of thyme you said. Can they produce honey for most of those?

Dr. Antonios Tsagkarakis

Yes, all of these are honeydew. But you know the most abundant is Thymbra capitata, which is, actually in Spain is considered as oregano and not thyme.

Jamie

Interesting.

Amy

I know. I've never thought about those, I think, here, as far as bees collecting nectar secretion and turning that into honey.

Jamie

Yeah, it's crazy. So, you've got a history keeping bees. You keep bees in Greece. There's a lot of beekeepers in Greece. It sounds like you know your industry well. So, could you share with our listeners what are some of the challenges of keeping honey bees in Greece?

Dr. Antonios Tsagkarakis

Yeah, actually beekeeping Greece comes with several challenges. One of the main threats beekeepers face is, of course, pests and diseases such as the Varroa mites and Nosema, which, of course, require constant monitoring and management. Also, American foulbrood is a significant problem, especially since there are no registered medications available for each treatment or for treating Nosema. As you know, all antibiotics are banned for apicultural use in the European Union. As a result, the primary strategy against these diseases is prevention, of course, and to tell it in Greek, Hippocrates said, το δεν προνοήν και προλαμβάνει crypton εστί του θεραπεύει. I am sure that it sounds Greek to you.

Amy

Jamie understood that.

Jamie

Yeah. But could you share it with Amy in case she didn't catch it?

Amy

Thanks, Jamie.

Dr. Antonios Tsagkarakis

In case you didn't understand, the translation is “To anticipate and prevent is better than to cure.” That’s the exact translation.

Jamie

Exactly, Amy. That's exactly what it meant.

Amy

Yep, that's what you thought it was, right? I agree with you.

Dr. Antonios Tsagkarakis

Also, Hornets are another serious threat, particularly in the central and southern Greece. From mid-July to early October, many colonies are lost due to Hornet attacks. To combat this, we use traps around the apiaries to reduce their numbers. We are also facing the risk of invasive pests such as the small hive beetle, which is currently present in Italy. The Asian Hornet, the Vespa velutina, which has spread in France, particularly in the Pyrenees, and the Tropilaelaps mite, last reported in Georgia. This invasive species poses a serious threat to honey bee populations if they reach Greece.

Above all, I think the most pressing issue is the impact of climate crisis. Rising temperatures and unpredictable weather patterns affect both floral availability and colony health, disrupting nectar flows and leading to food shortages for bees. For example, last year, due to an unusually dry winter, normally winter is the most humid season of the year, honey production was reduced by almost 70%. Moreover, another difficulty is that Greece has a highly fragmented beekeeping landscape with many small-scale beekeepers operating in close proximity. This leads to a lot of hive transportation, which leads in raising of the production cost. It can also lead to increased competition for floral resources and the higher risk of disease transmission.

Another major challenge is the improper and widespread use of pesticides which can have lethal effects on bees. However, it's worth noting that neonicotinoids are banned in the European Union, which has helped reduce the sub-lethal effects of pesticides such as impaired foraging

ability and weakened colony survival. Lastly, issues such as high theft, of course, and forest fires, particularly during the summer months, pose significant risks to beekeeping operations.

Amy

Antonios, it's really interesting hearing your list of challenges, because while we listen to researchers and beekeepers all over the world, we start to see common factors. I mean, this is what we're constantly talking about, our pests and diseases and the weather and our climate and impacts on nutrition, and the Hornets. I feel like we've had episodes on every single one of these things as well. But listening to you, I know that there aren't a lot of treatments and, of course, prevention is something that we try to practice to prevent all of these things from happening. But when beekeepers in Greece do, let's say, find something like one of the foulbrood diseases, what do beekeepers do at that point?

Dr. Antonios Tsagkarakis

Yes, actually they cannot do anything else by burning their infested beehives. We have it in our national law. If some beehives are found with American foulbrood, they have to be burned. This is the only solution to avoid contaminating the neighboring ones.

Amy

So, I was wondering if honey bees have any cultural significance in Greece and if you could tell our audience about that?

Dr. Antonios Tsagkarakis

Yes, actually. We have honey bees and honey in our culture. There is a sign back in the [inaudible]. It's a type of writing back in time, almost 10,000 Before Christ, which says we have to offer gods one jar of honey. I'm sorry, I have to speak Greek again. [Speaks in Greek]. That's the exact meaning of the aforementioned. Also, in the Minoan here, we have some very interesting signs and some very interesting drawings by having a big bee as a sign, one in front of some palaces and in some jewelry. Also, in Kea. Kea is a very small island of Greece, very close to Athens, we have the place of origin of Aristaeus. Aristaeus was the rustic God of shepherds and cheese making.

He was also the god of beekeeping, honey, meat, olive growing and olive milling, medicinal herbs, and many others. His name was derived from the Greek word aristos, which is most excellent or most useful.

Jamie

Man, I feel like I have to talk to you about this for days, Antonios. I've travelled all around the world, and Athens and in my time in Greece is really among the coolest things I've ever been

able to do. So, listening to you talk about the cultural significance, the beekeeping there, really makes me want to visit again.

So, you don't only have that direct link to beekeeping because you yourself are a beekeeper, but you also, you and your team do research on honey bees. Of course, when you were here at our lab a few months ago, you mentioned research across a variety of different insect-related topics. But I'm curious, can you share with our listeners a little bit about your research program on honey bees? What are the type of honey bee and beekeeping related projects that you guys are pursuing currently?

Dr. Antonios Tsagkarakis

Yes. First of all, we like to keep a big scientific teams. So, our research team comprised of one staff member, 6 PhDs, 3 MSCs and 15 undergraduate students and is mostly engaged in a variety of projects focused on honey bees. One of our primary research areas is pest and disease treatments. For example, to combat Nosema, we are testing some citrus extracts, which, in Greece, are registered for beekeeping use as water acid fires.

As I said before, we have not registered medicines against Nosema or other diseases. We use all these citrus extracts either on their own or in mixtures with propolis. In our efforts also to manage Varroa mites, we are experimenting with several methods using oxalic acid in many ways like sugar water solution trickles between frames as strips with plain oxalic acid, with or without glycerol, as well as exploring other innovative applications of oxalic acid. Additionally, we are evaluating techniques such as queen caging control, brood removal against Varroa, all the above in comparison with amitraz treatments which serves as positive control and without any treatment as negative controls.

We are also working on our patent pending method against American foulbrood, which is based on insect-derived extracts coming from another productive insect. Another area of our research focuses on the effects of pesticide applications on bee mortality and bee stress. We are examining both synthetic pesticides and biopesticides including organic pesticides and bio stimulants to understand their impact on bee mortality or stress. We are also exploring the mutual benefits of honey bees and crops.

In a recent experiment, we observed that the presence of honey bees significantly effects citrus production, which of course was expected, but also influences the occurrence of sucking insects such as aphids and the white flies, which was unexpected. We're currently collaborating with our partners to perform qualitative analysis of the fruits to further investigate these effects. In addition, we are researching propolis collection methods. Our primary approach involves installing screen mesh on the top of the beehive frames, and we are testing how different types of screens affect both the quantity and the quality of the collected properties. Finally, we're actively

working on mapping the beekeeping flora to better understand the interactions between bees and their environment.

Amy

Antonios, for every single research project you just stated, I had a follow-up question for every one of them, but that could probably take all day, and we could talk for the rest of the week. I guess I'll just follow up with one real quick one. So, you're talking about doing a lot of work with citrus. Do you all deal with citrus greening like we do here in the States?

Dr. Antonios Tsagkarakis

No, actually we don't have citrus greening. Thank God we don't have, till now, but it was reporting, actually not citrus greening, but the vector Diaphorina citri was reported recently in Cyprus. It migrated there from Turkey, and prior to Turkey, from Syria. I hope the Cyaprote guys will not have the citrus greening and of course, in Greece, we can avoid migrating Diaphorina citri here. In case it comes, I hope that it will not create many problems, significant problems, and I hope that it will behave like the citrus leaf miner, which, when migrated to Greece, didn't have any significant problems.

Amy

So, part of my job and part of why we do this podcast is because we work with beekeepers to identify some of their needs. We try to conduct surveys so that it really pushes our research forward. And I guess my question for you is, can you share how your laboratory works with beekeepers in Greece and what this collaboration looks like?

Dr. Antonios Tsagkarakis

First, I have to say that in many of our projects we are collaborating with beekeepers in Greece. Of course, for the rest of the beekeepers, we share our results by giving seminars to them and some national congresses we are trying to organize. We ought to have a very strong and productive relationship with the beekeepers because we're actually working for them. We are bonding very strongly with them, mainly by exporting our results with seminars.

Jamie

So Antonios, it's good to hear that you work with beekeepers. I know that beekeepers are passionately interested in any of the research that we do, and I know that's true for bee scientists around the world. So I'm not surprised to hear that you were working with beekeepers in Greece. But in addition to doing research that's kind of specifically husbandry related things, you've also conducted some technological work with honey bees and the landscape. Can you tell us a little bit about that research as well?

Dr. Antonios Tsagkarakis

Our team is involved in several projects that in the great remote sensing, machine learning and honey bee flora research in order to better understand the relationship between honey bees and the landscape. One project's about determining bee colony capacity in pine forests and orange orchards. This project uses geospatial data from optical and multispectral sensors along with field and laboratory tests to assess the colony capacity of pines and orange trees. Some key components includes the scale I referred to before, the Marchalina hellenica populations, and the laboratory analysis to determine the production of honey dew and its sugar concentration under varying temperature and relative humidity conditions. Also, by using data from unmanned air systems, flights and satellites, we map pine forests across Greece and develop algorithms to identify pine stands and the ecosystems. Based on the above data, we calculate the potential bee colony capacity in the pine forests.

Similarly, we measure nectar secretions from orange tree flowers throughout the day, map the orchards using remote sensing, and estimate the colony capacity for orange trees. Similarly to the prior and other projects about the annual mapping of beekeeping flora, in this project we employee high resolution multispectral satellite data to identify and map major honey bee flora, focusing on key species found on the Greek mainland and islands, of course [inaudible]. Our mapping also helps identify the best areas for placing honey bee colonies. To perform the aforementioned, we exploit annual moderate resolution multitemporal satellite data and apply machine learning techniques to classify and map the main honey bee flora. By processing the remote sensing data and our flora maps, we can estimate the potential nectar and honeydew secretion precision. The overall objective of these projects is to create annual apicultural maps for the beekeepers that include predictions of nectar and honeydew secretion. These maps are intended to support informed decision making, improve the efficiency and sustainability of beekeeping operations, and minimize the need for beehive transportation and the relative gas emissions. We are trying to help the beekeepers do their job in a cheaper and most environmentally friendly way.

Amy

Antonios, when we were mentioning earlier that you came to visit us, I remember you giving your presentation to the lab and the mapping systems, using this remote sensing. It was so cool to see this in use. And I feel like it's such an applicable thing to beekeepers, especially beekeepers who are either migrating or even backyard beekeepers looking for nectar sources around them. So I think, it's just really cool, the work that that you and your lab and your team are doing.

Dr. Antonios Tsagkarakis

I hope that in the very next month, my PhD will defend his PhD thesis, which is about the main beekeeping flora. So, I hope to share with you some manuscripts with all his findings. Of course, we will be very happy if we can collaborate with you or anyone else to help you by doing this for your beekeepers.

Amy

Yeah, absolutely. I can't wait for this individual to defend, and hopefully, we'll be able to read manuscripts and share that with our audience as well. So, as we start to end, is there anything else you would like to share with our audience?

Dr. Antonios Tsagkarakis

Yeah, actually I have to highlight another project we are trying to establish. We are trying to investigate the potential role of honey bees in restoring proposed wildfire forest environments. Despite some prejudices that associate beekeeping with an increasing risk of wildfires, our research aims to demonstrate that when applied correctly, beekeeping can play a positive role in restoring forest biodiversity and aiding the post fire regeneration of these ecosystems. To explore these, we are conducting field studies in burned forests, comparing areas with and without beehives. We are sampling both plant species and various insect groups, including pollinators, herbivores and other insects to assess the overall ecological impact.

Jamie

Well, Antonios, it really sounds like your team is quite busy doing a lot of very different types of research projects. And you've mentioned a lot of things that are very interesting. I like this idea about restoration after fire. I like this idea about nectar availability for carrying capacity from a honey bee perspective. It's just been really interesting to hear about beekeeping in Greece, hear about your research, hear about the cultural significance of honey bees. And I just want to thank you for joining us on this episode and sharing all of this information with our listeners. I really appreciate your time.

Dr. Antonios Tsagkarakis

Thank you very much, Jamie and Amy, for the invitation and the opportunity to share our work on beekeeping research in Greece, and of course, Go Gators.

Jamie

Thanks, Antonios.

Amy

Now I really want to go to Greece, first of all, and you know, not just to go to Greece, but I want to see the beekeeping in Greece. And now we have a contact there so I can find an excuse to get there.

Jamie

It's actually a great place. I wasn't joking when I said it's 100% one of my favorite places I've ever been. In fact, I keep telling my wife that we need to go. Athens was beautiful. The time

there was really nice. The people are great, the food's amazing. Of course, the area's gorgeous, so it was just a really cool experience.

Amy

Yeah. I mean, let's talk about the cultural part of it. Just beekeeping in Greece and just Greece in general.

Jamie

Yeah, I mean, that's a really good point. You know, here in the US, we don't have a very old country. Of course we have old land, right, our national parks, all that stuff shows you how old nature and property we have. But we don't have an old culture, old cities. We might have a few hundred years old, compared to what you see in Europe, thousands of years old. And of course, Greece is well-known for its age and its cultural contributions to societies really all around the world. And I remember being there, honey was so common in a lot of the dishes that were brought out for lunch or for dinner. It was just so nice. Beautiful place, beautiful people. I've got great collaborators there. And of course, Antonios is a fantastic individual who's able to join us and talk about all these amazing things.

Amy

So, the other thing I wanted to talk about, this was a shock to me. I don't know why I didn't know this or think about it before he came to visit us. And then when he came to visit us, he mentioned something about pine honey. And then someone had mentioned, well, does pine have nectar that comes out of it, that bees are like, collecting this nectar? And then we realized that it was a honeydew secretion from a piercing insect that would basically feed off of pine and then excrete this sugary sweet substance for the bees to go and forage. And why was that the first time I'd ever heard about bees doing that? I just felt so silly thinking, how did I not know this?

Jamie

It is a very interesting topic, right? Honeydew honey is just what you said. There's a group of insects that are piercing and sucking insects, we actually refer to them as bugs. They're the true bugs. And it's funny because these things pierce a lot of different types of plants depending on species of bug, and they suck up the sugary liquid in the plants and then out their rear end, they secrete this very concentrated sugar water. Well, bees will collect that sugar water and make honey from it. But since it's not from nectaries, it's from the rear ends of aphids and other insects, it's called honeydew. And you get this a lot when bees are making honey in forested areas. And it's just shocking to me when you hear Antonio say, yeah, 70% of the honey that we produce in grease is from honeydew. So, that means piercing and sucking insects. And he said if you were to break that 70% into its constituent parts, 60% of that 70 comes from pine trees, which is mind boggling. And the other 10 of that 70 comes from fir. So, it's just hard to think about that because

I just don't consider honeydew a major source of nectar where I live. I know it is in other parts of the US, but it's pine honey, fir honey. It's just interesting to hear that this place that has such long standing cultural significance and impact on human societies as Greece does, its primary honey is coming from trees that don't bloom in the conventional sense.

Amy

So interesting. And it's like, humans are just so weird. I mean, like, bees have made honey and now we consume honey, but how many insects is it going to go through where someone said, oh, yeah, this really tastes good, huh? Interesting.

Jamie

Once it goes through two insects, the piercing sucking insect and then the honey bee, in their place it could be called honeydew honey.

Amy

Don't think too hard about it, I guess. Yeah, so, the last thing I wanted to talk about was his research. We talked about the mapping and the nectar sources and things like that. What stuck out to you as far as some of the research that Antonios is doing? He's got such a big lab. It's huge. He's got a lot of students working for him as well.

Jamie

Yeah, I like to hear about this vigor that he is approaching a lot of honey bee related issues. And one of the things that stuck out to me was this idea of nectar carrying capacity. I think I mentioned this while we were talking to him directly. I used to get asked all the time, Jamie, you know, how many citrus trees does it take for me to make a super of honey? I'm like nobody knows that information. It's one of those things that nobody has studied. Well, that's kind of where they're headed. You look at a landscape, you can figure out the bloom density, the amount of nectar produced per bloom, and you can guesstimate, maybe using some of the research that they're doing, how much nectar is available for bee colonies to collect in the area and correspondingly make into honey.

And if we had that type of research on a more global scale across a lot more crops and a lot more conditions, then we could answer some of those questions that I've shrugged off for decades, thinking that they were unanswerable. So, it's really cool to see how he's using remote sensing to address those questions.

I also thought the fire ecology or environments rebounding after fire episodes due to the contribution honey bees make to that recovery was pretty interesting. That's a really neat ecological impact that maybe you can ascribe to honey bees. So, they're doing some cool things. Amy, that's why we bring people on from around the world, right? We get in our silo and we

know what we study and we're pretty familiar with it. But it's just so great to bring people from all around the world and talk about what they're up to, to see how many different ways people can think, ask questions about bees, and try to answer those questions.

Stump the Chump

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

Amy

All right. Welcome back to the question and answer segment. Jamie, the first question we have, this individual is asking about Formic Pro mite treatment. They use the option often in the summer and in the fall and is warned that it can kill the queen. They've used it for 5 summers now and this hasn't happened. Is there any information out there on what percentage of queens die with formic when you follow the label? Is there any breakdown of the 14 versus 20 day treatment schedule and queen mortality?

Jamie

These are all good questions, and they're a little tricky to answer. First question is, is there any information out there about what percentage of queens die with Formic when following a label? In theory, if you follow the label, you shouldn't be having queen death at all, right? The label should have been developed in a way able to get maximum control against Varroa, but with negligible damage to colonies in any way. I think a lot of people know that Formic, when used outside of the label requirements, can cause problems, especially if you're using it on the hot end outside the label requirements, because when it's hot outside, it really seems to volatilize that stuff quickly or whatever it does. It definitely can cause bees to abort brood. I've seen bees completely vacate the nest when it's too hot and there's a Formic treatment. And of course, you hear beekeepers say things like it can kill queens. I'm not aware of any research that gives quantifiable, "If you use Formic 5° above the label direction, you're going to get this amount of queen death. If you use Formic within the label direction, you're going to get this amount of queen death." I've not seen that quantified. Again, if you use it within the label directions, you shouldn't have these adverse side effects at all.

Now, you can, of course, if you get these weird spikes in Formic release, you might get young larvae death or things like that. But in theory, if you follow the label, there shouldn't be problems. The questioner themselves basically makes the comment that I'm using it accordingly and I've not seen any queen problems. Well, that's exactly what we would hope to see. And brood kills and things like that are things that we have seen reported in the literature and maybe even mention of queen deaths as well. But it's not quantified in a way that I can say here's the percentage of queens that you can expect to die.

Amy

All right, so the second question, we know that bees dance. They dance to tell where good food source is. The question is asking, do they also dance to communicate that a food source is gone or used up? The bees are so smart. It seems pretty inefficient for them to tell somebody, OK, there's a good food source over there and then only for those bees to discover that the food source is gone. So, is there any research on this?

Jamie

So that's a good question. And if you think about it, I would say more like a bell curve, where when bees discover that resource, they go collect the resource and they come back and dance excitedly for it. And more bees watch those dances go, get that food, come back and dance excitedly for it. So, you get this ramping up period where you go from very few foragers to a lot of foragers because the resources are good. As those resources begin to wane, you get increasingly fewer and fewer bees dancing for because they just went back out and noticed the resources were waning. So, they come back and dance less excitedly and you get this kind of ramp down period. It's not like there is a dance that they say, hey, I just went and there's no more resources. And you've got to think about these nectar flows and this nectar availability, it's not like an on/off light switch. It's not like it's on and then all of a sudden off, and so now you've got this whole cohort of bees that are going out there when it's off because they didn't know any better. It's really this kind of ramp down period. We believe they wouldn't need a stop signal. They would just know because they themselves went and there were fewer resources available and they come back and dance less excited. There are fewer bees dancing for the resource, so fewer recruits are going to those resources, etc. So, this kind of ramp up period and then ramp down period as the resources exhausted for the day.

Amy

So for the third question that we have, when we go in and do a hive inspection, sometimes we're breaking that propolis, right? So, how disruptive is it for the bees to break the propolis every time we go and do an inspection?

Jamie

So, we don't know this. So, I'm going to just give a healthy dose of Jamie speculation. I would say from a propolis envelope perspective, it's probably not that big of a deal because the propolis is still where it is when you put everything back together. It rejoins kind of seamlessly. So, I would argue it's not such a big deal from a propolis standpoint. I will give one quick caveat. A lot of folks probably are aware that small hive beetles, where they occur, when they go into hives, bees are pretty good at pushing them to the periphery of the nest on the outer edges of the boxes and cracks and crevices around the nest, etc. And if you've got a lot of propolis in these areas, it gives these natural places where the beetles can just go behind. When you go into a nest and you open it and you see beetles running around, you're under the false impression that beetles are

always running around in the nest just kind of willy nilly. Well, that's not the case. What happened is when you opened up that hive, you broke open these propolis sites and other prison sites where these beetles were imprisoned, and you've released all of these beetles in the nest. So what looks like to use something that runs around the whole time was actually imprisoned, and then you broke open those prisons and the beetles go free running.

I could see where that would cause a problem from the quote, breaking the propolis envelope perspective. A bigger problem deals not so much with the propolis, but more so when we go into a hive, we are doing a lot of things. We're usually moving combs to places where they were not. We're messing with the thermoregulatory capacity, right? If they're keeping it a nice toasty 94° or Fahrenheit or 34° centigrade in that cluster, we go and break it open. There's absolutely some time that it takes to recover that nest homeostasis. Now, it doesn't seem to aggravate them senselessly because they continue forging throughout all of our movement of the combs and movement of the boxes. But I would say that that would have a lot more chaotic impact on the colony than simply breaking open that propolis envelope.

Obviously, it's not overly detrimental either way in either case because when we put everything back together, the bees get on about their business.

Amy

All right. Thank you so much, listeners, for sending us these questions. Don't forget to send us questions on our social media pages or send us an e-mail.

Hey everyone, thanks for listening today. We would like to give an extra special thank you to our podcast coordinator, Jeffrey Carmichael. Without his hard work, Two Bees in a Podcast would not be possible.

Jamie

Visit the UF/IFAS Honey Bee Research and Extension Laboratory's website, UFhoneybee.com, for additional information and resources for today's episode. Email any questions that you want answered on air to honeybee@ifas.ufl.edu. You can also submit questions to us on X, Instagram, or Facebook @UFhoneybeelab. Don't forget to follow us while you're visiting our social media sites. Thank you for listening to Two Bees in a Podcast.