



EPISODE 210 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, Welcome to another segment of Two Bees and a podcast. Today, we are joined by Professor Dr. Irfan Kandemir from the Department of Biology and the Faculty of Science at Ankara University in Turkey. I met Irfan a year and a half ago when he and I were working together on the World Honey Bee Health. And Irfan, it's just been really great to get to know you. You're, you're fun to be around. It's nice to interact with you. You're such a productive faculty member on this committee. Now, we're excited to have you on the podcast, Irfan. So, thanks for joining us.

Dr. Irfan Kandemir

Thanks a lot.

Jamie

Gosh, there's really so much, Irfan, that we want to talk to you about today. So, what we're going to do is we're going to kind of split it broadly into two sections. The first of those is we've got some questions about beekeeping in Turkey, and then the second thing we're going to talk to you is about your specific program at Ankara University. But before we do any of that, Irfan, since this is your first time on the podcast, we would love for you to talk a little bit about how you ended up, where you are, how you ended up working with honey bees, how you ended up at Ankara University. Our listeners want to know your history and how you got to honey bees.

Dr. Irfan Kandemir

Well, I'll try to make it as short as possible. In Turkey, we have a university examination. So, when I finished high school, I entered this university examination and then I won a university in Ankara. But I am from Adana, which is a southern city in Turkey. Actually, we have in that city in my hometown there is, I think, the largest air base of United States, Incirlik is the name. So, I won the university and I came to Ankara, studied for 5 years and then continued to do my masters.



In my masters, I started to work with the bees, but actually not the academican, academic carrier, but at the beginning, my professor, who passed away eight or nine years ago, also alumni from United States, Stony Brook University in New York, so he's a really a great guy and asked me to work with population genetics but not with the bees, at the beginning, because at those days there is a biochemical variation, the allozymes.

He wanted to apply this allozyme research in Turkey, and I said, well, you know, if you accept me in your laboratory, sure, I will try. And I was successful. And then he told me why don't we write a project and you do the master and become an assistant in the university and work with the bees. Till that time, no one really did any kind of scientific research on bees. And then I ended up working with the bees, but at that time not with any kind of application part of bees like rearing them or breeding them, whatever. My goal was to find genetic variation in honey bees. So, I was just visiting different areas in Turkey and trying to collect samples and then do allozyme work. That was my master of thesis subject, and I studied and maybe for the first time with *Apis mellifera anatoliaca* in Ankara. That is how I ended up working with the bees, Jamie.

Amy

And so, the rest of it is history, Irfan. You became obsessed with honey bees after that and decided to go full on bee research.

Dr. Irfan Kandemir

That's true. That's true. When I finished my master and actually before finishing my masters, I wrote the first paper and sent it to *Apidologie*. And at that time, Steve Sheppard, professor, he was one of the editors of the *Apidologie*, and he helped a lot even at that time, without knowing him. He corrected my English, he corrected my manuscript, and then it is published that year. And then I obsessed more because you know, when you get rewards for what you're doing, then you want to continue. So, it was a really nice paper at the time and also nice work for me to learn all aspects of genetic variation studies and also try to understand population genetics and also the evolution at the end. You are doing what you are reading or what you are learning from the books and you are applying them in the laboratory. That was, I think, the drive of me to continue further and then I continue with my PhD and my PhD subject was the genetic variation of honey bee populations all over Turkey.

So, Turkey is a pretty big country. Luckily, the other thing about the beauty of Turkey, there are lots of different subspecies all over Turkey. I mean, the European part of Turkey, the northeast, the southeast, on the western part of Turkey and also in the Central Anatolian Plateau, there is a great diversity. And I continued to do my PhD, and during my PhD work, I got a scholarship from Turkey Scientific and Research Council, which is really a prestigious institution, so, everybody wants to get a scholarship from that, and I started to look for where to go. In 1995, there was an Apimondia in Switzerland. So, I checked the attendees of that meeting and I saw

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that Steve Sheppard is over there and I straightforward decided to go to that meeting and find him and try to talk and you know, go his lab to study the more about bees, because at those years in 1995, DNA work is just started because in Turkey, you know, you cannot really do recent studies at the time. And I told myself that if I want to learn more and continue, then I need to go outside. So, luckily on one of the excursion trips in that meeting, we end up in the same bus with Steve. And then I was like a honey badger holding his legs. And I said, like, hey, I want to come to your lab. I mean, he was, I guess at that time he says, who is this guy? I mean, he knows me. But at the end he said, OK, once you get your scholarship, you can come and visit, and you can work with me in the lab. That is really the luckiest day of my life and also a starting point of the academic career, I guess. So, I end up in the United States in 1995, like September or October in that year. I mean, it's incredible for, you know, someone to dream something and then, you know, in really short time having that dream. Incredible. And I learned a lot in his lab and really work a lot. But, of course, this is a scholarship that you need to learn something from outside and you need to come to your own country and teach these things to the next coming scientists, and I did, but never lost my contact. We always be really good friends, still though. I frequently got different scholarships, either Steve supported or a NATO scholarship or Fulbright scholarship, whatever. You know, if I had a chance, I applied and tried to get the scholarship and visit the United States. And also, I did my post-doctoral research after finishing PhD with Steve Sheppard in 2000 and 2001 for like a year and a half and learn more aspects of beekeeping actually in United States. And I tried to bring all that information to Turkish beekeepers I never saw before, for example, the package bees, no idea about package bees or I never do any kind of breeding work.

So, I learned how to transfer larvae, how to rear queens, and mating stations, isolated mating stations, you know, I learned a lot there and tried to apply in our own country. And I think right now the position that I have is pretty much devoted to the work that I did in United States and to my good friend Steve Sheppard.

Amy

That's a great story. It's fun to listen to the process that you went through and all the things that you learn. It actually takes me to my next question about beekeeping in Turkey. So, you worked and collected bees throughout the entire country, you went to the United States, you learned about beekeeping here, you brought some of those practices and things that you learn from here back to Turkey. I'm intrigued by the beekeeping in Turkey in general. Can you talk about beekeeping in Turkey, maybe talk about some of the subspecies there are in Turkey? What are the honey bees used for there?

Dr. Irfan Kandemir

Well, starting from the last question that you asked, what the people use honey bees for. What do you think? The honey. I mean, that's the only thing all the beekeepers are trying to do, produce



more honey, more honey and more honey. But what I learned in the United States, how it is important to, you know, use honey bees in pollination. So, that's what I really appreciate to learn and try to apply it in Turkey. And nowadays, orchard donors are paying honey bees for pollination. That was really good. But, when I first finished and returned back to Turkey and gave a couple of seminars, everybody was looking at me and says, what am I talking about? I mean, orchard owners aren't going to pay money to beekeepers. No, that's not correct. So, beekeepers should pay money to get honey or pollen from the orchard. That was just the reverse in Turkey. But nowadays, because there are lots of seed producing companies and they are requiring honey bees to have better seed production, good quality seeds. So, at least the companies learned that pollination is required to have quality seeds. That's the last thing. But the first thing still in Turkey is honey. I mean, the beekeepers would like to produce honey. That was the only thing, I guess, to keep the bees.

But when it comes to your first question about beekeeping in Turkey, Eva Crane wrote a lot books on honey bees, and in his book, there are some historical evidences or some stories about Turkish beekeeping really dating back to thousands of years. And also, there are 2 great scientists, well one of them is not a scientist but he did a lot with the bees. The first one is Frederick Simon Bodenheimer who came to Turkey from Germany and that scientist professor actually established the first entomology institute in Turkey in Ankara and worked in my current university. Also, he wrote like 4 books about insects and one of them is Beekeeping in Turkey. That was really incredible. In 1942, that book is published, and I had the book, and incredible statistical information is collected at those years, really.

So, historical beekeeping we can divide into two parts when we talk about Turkey: The Ottoman period and the Republic period. In Ottoman period, of course, we have beekeeping and there are lots of historical evidences, also archaeological sites where you can find some writings about bees, some rules about beekeeping, and the prices. So, there are lots of findings in archaeological excavations. But in the Republic part, I think the best study is done by Frederick Simon Bodenheimer. After that, there is another great person that everybody knows, Brother Adam from England. And Brother Adam visited Turkey three times in 1950s, 60s, and 70s. Actually, I guess he was the first person pay attention to the behavior of bees in Turkey. And again, another thing that everybody knows, Buckfast bees is a great hybrid, I guess. And in one of the parents of that hybrid is Anatolian bees that comes from one of the provinces in Turkey.

So, brother Adam took some of the queens and take it with him and produce Buckfast and use Anatolian bees at that time. So, these are the historical, I can say, notable developments. Not many scientists worked with bees in Turkey. Maybe I was the one who published internationally for the first time about bees. But later I was aware of the bee diversity because Turkey is a great geography and there are lots of isolated places and also geographically divided with some mountains, faults and seas, rivers. It creates a great opportunity for any species actually to evolve into different races or different subspecies. And I think the bees find Turkish geography very nice

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so that they evolved or you know, differentiated into several subspecies. One is in Syria on the side of Turkey, but the population reaches to one of the Turkish provinces, Hatay. Then, there is an Iranian bee, *Apis mellifera meda*, which, one of the arms of this bee, because it consists of like 6 different arms of *Apis mellifera meda*, and one of the arms comes to Turkey, Southeast Anatolia. The Caucasian bee on the North East of Turkey, because the Caucasus mountains enter to Turkey from northeast. And of course, the Caucasus bees come as well. And in our 3 or 4 provinces, this bee you can easily find, the pure *Apis mellifera caucasica*. I can tell more stories about *Apis mellifera caucasica*. The central Anatolia is *Apis mellifera anatoliaca*, and on the western side, the coastline of the agency, we have actually another bee which we call Muğla bee, but it is not recognized internationally. But according to some work done by one scientist with Ruttner, he's thinking that the bees of that area are different than *Apis mellifera anatoliaca*. But maybe it's a different race of *Apis mellifera anatoliaca* adapted to the Aegean coast.

And in 1999, when I was doing my PhD, I collected lots of bees from the European part of Turkey and I analyzed them, and I saw that the bees of that area are totally different because when you look at some biochemical markers, the alleles frequencies of those bees look more like the bees in Europe. And I said, wow, this is really different. So, I thought at that time, because you know, *carnica*, *lingustica* group, right? And there are lots of bees within this group. I thought the bees of the European part of Turkey is somehow related to *lingustica/carnica* group. *Carnica* group maybe more looks like a Carniolan. But Macedonians are Carniolan and *cecropians* are Carniolan, they are in the same group. So, I thought it was a kind of a Carniolan group. And later with the work done by myself, and also some other work, the bee is recognized as a different bee and registered by the Ministry of Agriculture. Also, right now in Turkey, *Apis mellifera caucasica*, *anatoliaca*, the bees in the western part on the Asian coast, the bees in some other places are all registered in the registry system in Ministry of Agriculture. So, currently, we have I can tell you like 6 or 7 different types of bees in Turkey.

But among these I can easily tell *Apis mellifera syriaca*, *Apis mellifera meda*, *Apis mellifera anatoliaca*, and *Apis mellifera caucasica* is present and in European Turkey, *Apis mellifera carniolan* group is found there too. So, I can say 5 different subspecies are aggregated in a really small area, you know, if you think globally.

Jamie

That's absolutely fascinating. My team and I have been doing a little bit of subspecies work over the last few years. I've just come to just love the different subspecies of *mellifera* and listening to you talk about all those subspecies that converge in Turkey sounds just amazing to me. To have all of those bees naturally occurring sounds fantastic, Irfan. I want to ask two more beekeeping questions. You said a lot of beekeepers there use their bees to produce honey. What are your major honeys? And then the second question is, I'm sure *mellifera* has some stress somehow in Turkey, maybe *Varroa* or nutrition. So, could you talk about the major threats to beekeeping in Turkey? So, the honeys in Turkey and the threats to beekeeping in Turkey?

Dr. Irfan Kandemir

Okay, it's a good question. Honey. There are, I don't know how many different honeys in Turkey, but I can tell you the two most, I can say, exported honey. One of them is pine honey. That is really crazy because all over the world, pine honey is only produced in Greece and Turkey, and I think close to 90% is produced by Turkish beekeepers and like 15%, maybe a little less than 15% is produced by Greek beekeepers. So that is one other advantage, right? But this pine honey solely depends on one insect, *Melissodes hellenicus*. So, pine honey first, and then what I like a lot, the chestnut honey, especially on the black seacoast and also some in Marmara region in Turkey and also in Asian region, there are lots of chestnut forests and chestnut honey, maybe one of the [inaudible] honey in Turkey. And then the rest, where beekeepers produce lavender honey, sunflower honey. Also, we have really nice plantations of citrus plants on the Mediterranean coast. So, there is a citrus honey, maybe a Tilia honey, also highland honey, we call it a, you know, on the really upper places on the mountains, it is like a polyfloral honey. But it is really nice. In different parts of Turkey, they can produce.

Specifically, some of the beekeepers are producers, not really much quantity but in small quantities of different type of plant sources they use, even they use parsley to produce a parsley honey. I mean, it is a great diversity of honey as well in Turkey. But one of the maybe expensive honey comes from one Black Sea coast province, which is called Rize on the Black Sea. And there is a district in Rize called Anzer. Anzer honey is, I think, the most expensive honey in Turkey. I don't know how much right now, but I can tell you that it is more than \$100 U.S. dollar, I guess. And the second expensive honey is chestnut honey. I think chestnut honey is a little more than \$50.00. The other produced honey is around \$15 to \$20 in Turkey per kilogram, I can say. So, there is a great diversity in terms of honey production as well. But the most two, I guess, pine honey, sunflower honey, and the chestnut honey and also, the 4th one is the polyfloral honey of different parts. But among these, the most expensive one is the Anzer honey from the Black Sea called Rize.

Coming to the second question about the threats, I think you know, nowadays, even in Turkey, everybody is talking about the climate change. But I am little skeptical, and you know, thinking a lot about climate change. The climate is not changing this year. The climate is changing last year. The climate is changing, I don't know, for the last 20,000 years, I guess. And if the bees survived all these fluctuations and changes in the climate, I am sure they will adapt, otherwise they will be lost, right? But in one of our research, back to like 2006 or 2007, one of the reason of massive honey colony losses was the loss of genetic variation. But at the time, there are several works done on genetic variation and published in really nice journals like Nature or Science, but they didn't find any trace of reduction in genetic variation. So, I was right now doing some research with limited budget and trying to understand the genetic variation because last year there was lots of colony losses in Turkey, and we lost some colonies. So, I'm trying to understand the reason for such losses. So, what I'm saying, climate change, yes, somehow, you know, threaten



the bees. But climate change did not only threaten the bees itself, but mostly the plants. And of course, bees depend on the plants for pollen or for nectar or some other sources like propolis. So of course, it'll affect the bees as well eventually. But, if you know how to keep up with the climate change and how to do more than beekeeping to overcome the effect of climate change, I think we will be fine. But I don't think that climate change will, you know, sweep away all the bees. That's not my thought, actually, because scientifically I'm working with the genetic variation and I didn't see any effect of loss of bees due to genetic variation. So, there is a variation, and you know what will happen? Some of the alleles will be eliminated from the population and the other alleles become dominant, and they will survive anyway.

But more than climate change, I think the biggest problem, as in everywhere in the world like we did, you know, the first pathogen of bees is the Varroa. I think that's the biggest problem. And I think, to my experience, the chemicals that we use to get rid of Varroa, I think we are giving more harm to honey bees than the climate change because we are making them vulnerable to any kind of other pathogens using such great diversity and amount of chemicals exerted on the honey bee colonies. I think that is a bigger problem than maybe Varroa itself. So, Varroa is one of the big problems, then I can say climate change.

The other one most of the beekeepers thought is the Nosema. But I am also, you know, thinking differently for the Nosema case, because without checking Nosema and counting the spores or whatever, everybody is saying if the colony is dead, they blaming straightforward whether it is Nosema or whether it is Varroa. But when you check the colonies, there is no Varroa at all and there is no Nosema at all. So, there is something wrong in this case, right? So, I am checking our colonies frequently, at least twice in a year, one in spring, one in fall before going into the winter. But I never see a huge load of Nosema spores. Well, Varroa is one of the biggest problem right now in Turkey, as any other places in the world, I guess. What else we have in terms of threats, we have, of course, 2 foulbrood diseases, American foulbrood and European foulbrood. Sometimes you have chalkbrood. Well, I saw maybe you know, when I visited the colonies, I saw one or two colonies in like, I don't know, 400, 500 colonies. I don't think that is a big threat to honey bee colonies. And other than these, this year I heard a lot about *Vespa*. We have two *Vespa* in Turkey, *Vespa orientalis* and *Vespa crabro*. Unfortunately, these two Hornets damage a lot to honey bee colonies in Turkey. Of course, yellow jackets are another threat but not really too much. We have *Merops apiaster*, which is a bee-eater, a bird. Sometimes beekeepers also blame that bird. But well, you know, sometimes, okay, it gives you a hard time, but I don't know, I cannot blame them for dying out of the colonies, but it will do some damage. There is virus research. I have a friend that he did some virus, but I never heard a specific virus really killing lots of colonies. But, like around 8 to 10 different viruses or virus load that every colony has almost. And we have the same viruses in Turkey. I didn't hear anything about or any threat due to viruses in Turkey. But mostly what I heard is Varroa all the time, you know, when I talk with the beekeepers in Turkey.

Amy

It's always interesting, you know, to interview beekeepers and researchers all over the world because we all deal with very similar threats, right? We have Varroa, you have the foulbroods, Vespa, you know, all those things that you brought up are all the things that I think just everywhere around the world is kind of dealing with. So, it's always – not good that we have it, but good that we can interact and communicate to see what else is out there.

So, I want to take a little bit of a different route while we end this episode. I know that you've discussed your research a bit with us, some of the work that you've done throughout your career. And I'm wondering if you wanted to elaborate a little bit more about other types of research that you do related to honey bees?

Dr. Irfan Kandemir

Well, that's one of the side jobs, I guess, because, you know, I'm in Department of Biology and not really working in a bee institute. So, I need to, you know, do different researches as well. So, at the beginning, before the bees, I started working with house flies, actually *Musca domestica*. So, I learned researching in my supervisor's lab in Ankara and did the house fly genetic variation and also continued with *Drosophila* as a model organism. And then comes honey bees, really. And besides honey bees, OK, I learned all the techniques, right to detect the genetic variation in one species, *Apis mellifera*, I can apply easily to different species as well. So, I work, really, with a variety of organisms. I mean, if I tell you the names, you'll be surprised. One of them, for example, you know, small mammal known as *Nannospalax xanthodon*, which is a mole rat. So, I work with a genetic variation in that species. I work with *Bactrocera oleae*, which is an olive fly. I work with a *Culex pipiens* group, a mosquito. I work with *Leptinotarsa decemlineata*, which is a potato beetle color, other potato beetles. So, I work a variety of organisms, and I got projects from Turkey Scientific and Research Council, published a lot of papers related to those organisms. But of course, my main subject is honey bees, and I've work with honey bees since 1990s. And I worked with the population genetics of honey bees, working with morphometry, working with Alzheimer variation and then sequencing a basic sequencing of different mitochondrial genes. Then I did microsatellites, a lot, to find the extent of genetic variation and to discriminate different subspecies or different populations in Turkey.

Sometimes, we used to find if there was any gene flow from one region to another region. So, it was really great. If you know the tools, then you can apply to different subspecies of honey bees or different species of insects. I also work with plants as well because one time I worked with one project and that project is related to black pine and red pine, *Pinus sylvestris* and *Pinus nigra*. So, I work with those two pine species as well in Turkey. So, these are the main, I can say, organisms that I work, but in the United States I also studied different organisms or, I help two different friends who has different projects. One of them is *Lygus hesperus*, which is a pest of a strawberry in Washington state, Idaho, and California. So, I somehow contributed to their work



as well when they were studying that pest. Other than that, I also work with some other rodent species, but my contribution to those researches are not really that high. But mostly I studied bees in the Middle East. So, I visited Iran three times, visited Azerbaijan three times, went to Cyprus, the northern part, of course, and collected a lot of bees, and also to Africa, Tanzania and collected bees from Tanzania, and I work with different subspecies. Also, I have good communication and friendship with different people in different countries because I was attending all the COLOSS RNSBB meetings till the COVID-19 and later. Unfortunately, I didn't attend any, but even in attending those meetings, I had really good friends and we collaborated a lot and worked with different subspecies.

I think I already have, like, I don't know, 20 different subspecies or samples of 20 different subspecies in my lab. And we are sometimes, you know, using and comparing those subspecies with each other. But one of my, maybe, good contributions to honey bee research is the geometric morphometry of honey bee subspecies collaborating with Stefan Fuchs in 2011 or something. In Germany, there is a BNN Kunde, right, institute for BNN Kunde and they have all the subspecies already. You can say, you know, already the wings are mounted on the slides and already digitized. And I wrote to Stefan Fuchs back to like, I don't know, 2007 or 2008. I said why don't we collaborate, and I will write a project and let's do all these morphometries again, but in this time why don't we do it in a geometric morphometric way? So, we did it and I published Re-examination of honey bee subspecies using geometric morphometry in Apidologie. That was one of the really great contributions because when I got a phylogeny or I can say a morphological dendrogram, a tree of different subspecies, it is exactly the same when you use synapse, the molecular tools to construct the phylogeny, it is exactly the same. One cost, I don't know, millions of dollars, maybe, if you do it and the other one, if you do a morphometry, you may only need microscope with a video and lots of, I can say, workers to mount the wings. I mean, if you do this, you know, you can get exactly the same results at the end. So, these are the work that I did, you know, until now and still continuing if someone asked me to do analysis. So I can say I'm good at population engineering analysis also, so I can help them to analyze their data and try to, you know, hypothesize or write the papers with them. So, that's what I am, I did till now and what I am doing right now. Maybe I can add one other thing.

Jamie

Sure, please.

Dr. Irfan Kandemir

I found it really important because until recently, I mean I didn't see any examples till, I mean 2000. And then at 2000, year 2000, I contributed to do work to save the bees starting with Caucasian bees. So, we have an isolated place in northeast of Turkey, which is called as Hamidiye. And if you guys would like to come, you will be my guest. Great place. So, we are keeping have been keeping *Apis mellifera caucasica* over there since 1998. So, the bees are

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conserved over there by the effort of one NGO called ANG, actually the name of a person Ali Nihad Gurkit, who donated really huge amount of money for the conservation of *Apis mellifera caucasica* in Turkey. And then, once that work is somehow successful, it is not just the conservation of the bees in one village but also teach the villagers how to produce queen bees so they can also make money, get an extra income from keeping bees. And this was successful. Now I don't know how many people in that village are keeping bees and producing queen bees for their household. And also, once the project is successfully started and still going on, we asked him to do the same in Ankara. Because I was in Ankara and it's not really easy to travel thousands of kilometers. So, I said, you know, we have *Apis mellifera anatoliaca* in Central Anatolia and in Ankara. Why don't we conserve that subspecies as well? Now, we have an apiary close to Ankara. It is like, I don't know, 100 kilometers north of my place. So, I am supervising these two initiative apiaries and we are conserving two subspecies, one of them since 1998 and the other one since 2015. So, I am really proud of, you know, involved in these two conservation studies. We are publishing one book from COLOSS about beekeeping for the European beekeepers. And I also mentioned all these stories in that book. I hope the book is going to be out soon this year. I haven't heard any new news yet, but soon this year it will be published, I guess.

So, these two things are really important for me to conserve the bees. We are doing this in Turkey, of course, without the help of ANG Foundation that is not going to be realized. But their help and their support is still continuing. And what we are doing, we are producing queen bees and also the new colonies in order to subsidize some of the expenditure in our apiaries. So, that is the last thing that I would like to add actually.

Jamie

Well, Irfan, thanks for that. That's just really fascinating. And again, I appreciate you joining us on the podcast. It's just an amazing story to hear all that you've been able to do over the years, and I look forward to continued success well into your future. So, thanks again, Irfan.

Dr. Irfan Kandemir

I thank you. Thanks a lot for inviting me and giving me this chance to talk about bees in Turkey.

Amy

So, Jamie, while we were interviewing Irfan, first of all, I love the fact that we interview people all over the world, right? That's like one of my favorite things about our podcast is that there's just so many researchers out there and to hear the research and then to hear about the beekeeping in different countries outside of the US, and it is really fun to hear about the different subspecies, the different geography. And then what I thought was interesting for those listeners out there is we did have Dr. Antonios from Greece who was talking about the honeys and how they were both kind of talking about how similar the honeys are, right? That pine honey that we talked



about, and I've not tried chestnut, but looking at pine honey and chestnut and how similar the countries are with their honey production. But what did you think about that episode?

Jamie

Yeah, it was good. I could go on for days about this because I've met and am currently working with Irfan for just over a year, and he's been a real delight to have around. And as I learned more about him, you know, his link to Steve Sheppard at Washington State University and all the research that he did on honey bee diversity, and then how he took that with him back to Turkey and continued to study the remarkable diversity of *Apis mellifera* subspecies that they have there in Turkey. And then of course, just like what you said, how his answers about pine honey and other things really integrated well with our colleague from Greece, Antonios, who was talking similarly about things since they share a lot in that region, of course. And I've had a postdoc from Iran who was doing some research, including on *Apis mellifera meda*, and of course, Irfan mentions that as well. So, that was just really interesting how his discussion linked a lot of different things for me and other interactions that I had. So, it was really neat to hear him bring it together in Turkey. Turkey's a place I've always wanted to visit. I've never been there. I want to visit for many reasons, for the history, of course, for the food, of course, for the people, of course. But as a bee person, I would also love to go there just to see some of these subspecies I've not ever seen do their thing in their native habitat.

Stump the Chump

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

Amy

Welcome back to the question-and-answer segment, everybody. We've got, I want to say we have three questions, but I think there's a lot of questions in the second question. So, Jamie, let's get started. The first question that we have today, this person generally doesn't like using plastic foundation, they believe that the bees kind of seem reluctant to draw out wax, but it still ends up in equipment when you purchase from other people. So, the question here is when you're reusing plastic foundation, do you recommend coating it with beeswax? And if you're doing that, what do you use? Is using a small paint roller okay for this?

Jamie

Yeah, I really like this question because I'm actually experiencing this very issue myself. It's funny, but I'll elaborate on that in a second. Okay, so for all of our listeners out there who may not be familiar with what we're talking about here, beekeepers have historically used pure beeswax foundation to put in their frames. Bees like that. We know. Then, of course, the last 3-4 decades, maybe even longer, bee equipment supply companies have been experimenting with making foundation stronger, right? If you buy pure beeswax foundation, especially for deep



frames, it's going to come with wires that go up and down in it. Also, you really need to put wires that go across in it because those wires help support that comb. Bees never turn their comb sideways in the wild, right? So, they never have to have that comb support the weight of the honey or the brood in it with that comb oriented horizontally. But we'll pick up a frame that's oriented vertically, and we'll flip it both ways and foundation that has to be reinforced to ensure that that comb doesn't break out. Well, pure beeswax foundation has wires. So, equipment supply companies have been really focusing on making foundation stronger. Ergo, this thick plastic foundation that's now so popular came out actually in my time as a beekeeper. Originally, it was like a thin sheet of plastic on which a fair amount of beeswax was placed. Now, it's just thick plastic with a thin layer of beeswax on it.

And I've heard a lot of beekeepers, commercial beekeepers as well, who will purchase that foundation and, in fact, do just what the questioner says: melt beeswax and use the paintbrush, roller or paintbrush or a sprayer of some sort and apply an extra coating of beeswax onto that already beeswax coated plastic foundation under the premise that bees are going to pull it out better. Well, I have never done that before. Even in our lab, we'll use this plastic foundation that has a thin layer of beeswax on it. We'll put it into bee colonies and bees seem to do just fine with it. And so we've never really had to do that here at University of Florida. I know a lot of beekeepers who do this. They'll state, well, maybe it's not necessary, but it's certainly something that encourages the bees to pull out this beeswax faster. I've never really thought about it because we've never had to do it.

But earlier this year in my own personal two colonies, I had old brood comb in the nest that I wanted to switch out, so I took out all of that brood comb and replaced it with new frames of plastic foundation that have that traditional thin layer of beeswax on it. And the bees have built out a critical amount of comb on it because they're raising brood, they're storing honey. But I, through feeding sugar water, have not been able to get them to pull out all ten of the combs in the nest all of the way, you know, thoroughly throughout that entire brood nest. And honestly, I'm just waiting on the next honey flow because it seems like through nectar flows, they'll do this readily. I'm constantly asking myself, shoot, should I have applied a thin layer of beeswax using a paint roller, which is exactly what this question is saying. In hindsight, I think it would have helped. I know that a lot of beekeepers say that it's useful for them, and I think it would have helped. I do feel the bees are going to be able to pull out the rest of it when a strong nectar flow comes on, so I'm not really that worried about it, but I do think it would have helped a little bit. So, the questioner saying, should I do that kind of de facto, I still probably as a hobbyist beekeeper wouldn't de facto do that. I would probably just let the bees pull it out on their own, try to feed them if we're outside of a honey flow to get them to pull it out. If they don't pull it out all the way, you know, they pull out only say 80% of the comb, I'd be OK with that because the next honey flow, they'll fix it on their own.



But if I was a commercial operator or sideline beekeeper and really needed it all done now, just based on this anecdotal experience with two colonies and hearing what other beekeepers say, I might actually take the time to spread an extra thin layer of beeswax on these frames of foundation.

Amy

Very cool. All right. So, the second question is kind of a two or three-part question. I feel like multiple times in our Q&A's in the past, we always kind of talk about that. When moving colonies, do we move them three feet, 3 inches or three miles, you know, and so when we're moving it, what does that look like? So, these questions are kind of related to that whole idea of how do we move beehives and is there a technique to it. So, I guess the question really is, is there any research that supports, you know, moving those colonies over 3 miles versus colonies just a couple of feet?

Jamie

We talked about this recently on one of our podcasts, and I think, you know, that's why people had this continued interest in this idea. There's a saying here in the US, three feet or three miles, and I'm sure people have similar sayings around the world except they don't use miles, they use kilometers. And I've heard it 2 feet, 2 miles. But the premise is really simple. Just to kind of reiterate, let's just say that you're keeping bees in a small backyard and you've got a colony one place, but you don't want it to be one place. You want it to be somewhere else because after keeping bees there for a few weeks, you've decided that's not the best placement. How do you move the bees you've oriented to that hive in that one spot, you know, say 30 feet away, to put them in a better spot where you actually want them? If you just move them, say, 30 feet one night, the next morning the foragers that come out of that newly moved hive are going to go back to the original hive stand.

So, the idea is you move that hive slowly over a few days or weeks, you know, maybe two feet or three feet a day. So, that's just less than a meter a day. You do this for a few weeks and you're orienting bees to that new spot daily, carefully and slowly, so that by the time you've moved them where you want them ultimately to be, they've kind of got that gradual movement and it's not throwing them off at all, and they now accept this new spot as their new hive. There are tons of anecdotal support for this. Beekeepers have been doing this for decades, probably even longer. Questioner is asking, is there research to support this? I'm not aware of any research to support this, but there's clear anecdotal evidence for this. And honestly, bees are good orienteers, but they're not as amazing as we give them credit for. If it's the only hive in that spot, if you move it two to three feet, they're easily going to be able to reorient to that, no problems at all. If you move it 20 feet, now it's a much bigger problem.



So, there's tons of anecdotal support for moving at this gradual space and you're not going to lose large volumes of bees if you do put it this way. Now, there's the flip side, which is you can just simply move them away 3 miles or more for a few weeks before moving them back to your yard and putting them where you ultimately want them to go. And when you do that, you are absolutely making a significant impact on reorienting speeds. The reason it's 3 miles is because the standard foraging range goes up to about 3 miles. Bees can forage 5 miles or even further, but they do most of their foraging within actually about a one-mile radius, but they'll do a fair amount within that two-to-three-mile radius. So, if you move them 3 miles or more, you really are pushing a hard reset button on that colony and your bees aren't – you're not really losing an appreciable amount of bees, maybe any bees at all going back to that original nest site.

So, is there research to support this? You know, are there research studies that have looked at this and have tried to look at the loss of bees doing one of these two methods? I'm not aware of any, but honestly, I'm very comfortable making that recommendation from a very solid perspective.

Amy

So, the follow-up in the second part of the question, we just talked about moving them a couple of feet. They should be okay, should be able to reorient and then you know, potentially moving them away for a couple of weeks and then bringing them back. The follow-up from the questioner was also asking about the commercial industry, you know, because it's very common for the commercial industry to be migratory beekeepers to just take the bees, load them up and move them to different locations. This is also something that we do within research, right, Jamie? I mean, we've got colonies that are all around as well. Are these things that may affect or there are things that we should consider when we're just up and moving the bees to a different location?

Jamie

Yeah. What I find is that we hobbyists tend to worry about things that commercial beekeepers just don't worry about. And this is kind of one of those things. Commercial beekeepers just move bees when they need to move bees. Now, they're conscious of the fact that they can lose bees, which is why commercial beekeepers move bees at night time, right? They work hard throughout the night using forklifts that have red lights that minimize bee flight from the hive. They're moving these things in the cover of darkness, loading colonies. They're conscious of this to the point that they want to minimize bee loss by moving bees at night. That's absolutely true. But if you've got 100 colonies in a holding yard and you load them all on a truck at night, every one of them, and you move and you're gone, like you're gone, gone, gone, gone for good, not coming back, etc. The next day you will see plenty of bees flying around in that former apiary with all the colonies gone. Conscious of this fact, commercial beekeepers will often put out what we call dummy hives or catch hives, which will be one or two boxes left behind in the apiary to catch all of those bees that are now homeless. And then they might come back a day or two later, close

them up at night time and move them. But even with that system, you might still lose a couple of bees. But they're also commercial beekeepers who just move, right? They just anticipate the loss of those bees, you know, the next morning who just come back and don't have homes to go to, but they consider that an acceptable loss in the context. But there are plenty, plenty, plenty commercial beekeepers who are very conscious of the fact that they're not going to capture all of them. So, they leave behind these dummy hives or catch hives to try to make up the difference.

So, you know, again, if I had to try to find research papers to support these practices, it'd probably be very difficult for me to do. But there's overwhelming practical and anecdotal support for these kind of best management recommendations of two feet, two miles, three feet, three mile type thing.

Amy

All right. So, the last question that we have today in the Q&A. This is a non-management question. Someone asked why is the podcast called Two Bees in a Podcast?

Jamie

Well, the older I get, the worse my memory is. So, I'm just going to tell the general story. And Amy, you can fill in any blanks, but our lab tries to be creative with the things that it does. And it's really a play on the phrase two peas in a pod, right? Two peas in a pod. The idea is that two people are very similar who have very similar likes. You guys are two peas in a pod, right? So, that's this idea. So, we thought a play on two peas in a pod would be two bees in a pod. And it worked out. You know, if you go back and listen to our first episode, it's quite different than our current episode.

I believe, at the time, we had multiple lab members maybe who were going to help us co-host throughout, but it just the way laboratories work at universities and inertia, etc. It kind of filtered down to me and you. So, it kind of worked out that you and I are the Two Bees in a Pod, as it were. And since this is a podcast, you know, we discussed at great length at the beginning of the should we call it Two Bees in a Pod... cast? Two Bees in a Pod-cast? Two Bees in a Podcast? And we ultimately just settled on that name, and there were similar names out there. Amy, you can fill in those blanks. In fact, I think we even talked about it recently on one of our episodes. But, ultimately, that's why we called it Two Bees in a Podcast. It was kind of this cool play on the fact that this was a podcast and this English saying, two peas in a pod. And it just kind of all worked out and became quite memorable. Actually, oftentimes, when we get emails from listeners, they'll even abbreviate it. So, there's like this kind of following out there who's kind of shorthanded at TBIP, right? Two Bees in a Podcast. So, yeah, that's kind of where we ended up.

Amy



I remember actually the questioner was not living in the United States, right? So, then I was thinking, oh my gosh, when we started this podcast, I don't think we ever really thought that it was going to be international, right, Jamie? So, we kind of just named it Two Bees in a Podcast, Two Bees in a Pod, and then realized that for our international listeners, that name made zero sense to them because, you know, they may not have been familiar with the two peas in a pod.

Jamie

Yeah, I know. It's an English saying. I'm not certainly well-versed enough to know if there are foreign translations of that in similar sayings. But it just plays on this idea that two peas in a pod or two people who are just very similar have similar likes. There are two peas in the same pod. Well, two bees, me and you in the podcast. I don't know. We thought we were clever. I don't know. It's clearly not if we're having to explain it.

Amy

We thought we were clever. Maybe not. All right, Well, thank you so much, listeners, for sending in your questions. We've had a lot of fun these past, you know, five years answering these questions. Keep them coming. As long as you all have questions, we can keep recording.

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.