Episode 157 PROOFED

Wed, Mar 27, 2024 11:49PM • 50:51

SUMMARY KEYWORDS

colony, bees, beekeeper, pollen, varroa, swarm, theresa, research, sensor, hive, mites, apiary, brood, beekeeping, great, queen, practices, bee, honey bee, honey bees

SPEAKERS

Guest, Stump The Chump, Amy, Jamie

Jamie 00:10
Welcome to Two Bees in a Podcast brought to you by the Honey Bee Research Extension Laboratory at the University of Florida's Institute of Food and Agricultural Sciences. It is our goal to advance the understanding of honey bees and beekeeping, grow the beekeeping community and improve the health of honey bees everywhere. In this podcast, you'll hear research updates, beekeeping management practices discussed and advice on beekeeping from our resident experts, beekeepers, scientists and other program guests. Join us for today's program. And thank you for listening to Two Bees in a Podcast.

Amy 00:43
Hello, everybody and welcome to this segment of Two Bees in a Podcast. Today, I'm excited to be joined by Theresa Martin, who is a Cornell master beekeeper, also the President of the Whitley County Beekeepers Association, and on the Board of Directors for the Kentucky State Beekeepers Association. We are here speaking to Theresa. Theresa, you are a backyard beekeeper, and you've had a very good success rate in your apiaries. So, I'm really excited to talk to you about some of the practices that you've implemented, just some of your experience, and we're really happy to have you on today.

Guest 01:21
Thank you so much, Amy and Dr. Ellis, for having me. I am a longtime listener to your podcast. I've been listening, I think, as long as I've been a beekeeper. I feel like I grew up listening to you. I want to say, I know I'm a better beekeeper because of your work and the different guests that you've had on over the years. So I'm really excited to be here.

Amy 01:42
That's so great. Theresa, I think you're the first person who's ever said they've grown up as a beekeeper listening to us. Jamie, what do you think?

Jamie 01:48
It sort of makes me feel old, but we haven't been doing the podcast long, so maybe it's not. Maybe it's okay. Thanks, Theresa. Appreciate the endorsement.

Guest 01:56
Well, I haven't been keeping bees that long. As Amy said, I'm a backyard beekeeper. I currently have 21 colonies, and I've only been keeping bees for just five years. I just finished my sixth summer. I do have, as Amy said, I have 21 colonies, and I'm located in Kentucky, southeastern Kentucky. In my entire time as a beekeeper, I have never once not ever had a colony die or abscond. So I have 100% survival in all my time as a beekeeper, and my bees are really pretty productive, especially the last two years. They've made more than the average honey crop for my area, which is about 50 pounds of honey per overwinter colony. So, I have those good results, if you will. But I want to start out by letting you know and your listeners know that I am far from a perfect beekeeper. My bees are not perfect, and my locations are not perfect. I make lots of mistakes. I never feel like I got this figured out, and I'm constantly learning. My bees are, genetically, nothing special. They're all locally adapted bees, and they're all caught swarms, but there's no special genetics that I'm aware of. And they get sick just like everyone's bees. I've had EFB, European foulbrood, chronic bee paralysis virus, I've had even sacbrood. I had a genetic diagnostic study done and I realized I had sacbrood, even. So my point is my bees aren't perfect. My locations are far from perfect. These 21 colonies are in four different locations. But those locations have advantages, certainly, but also some significant disadvantages. So I share all this imperfection with you all right at the beginning, so that maybe there's the realization that this survival that I'm hopefully going to share with you and that pretty good production is likely due to the methods that I'm using to keep bees. And that's great news because that means that's transferable. And my hope is that there's something of value for the listeners, in the event that there are other beekeepers, especially, backyard beekeepers or maybe even sideliners, even commercials I suppose, any other beekeepers that are interested in increasing bee health and the resulting productivity.

Amy 04:28
Absolutely. So, this year, we've wanted to focus on beekeepers, whether they're backyard beekeepers, sideliners, or commercial beekeepers and just sharing their experience with us and with the rest of the beekeepers that are part of our listenership -- and non-beekeepers. But before we move forward, Theresa, can you tell us a little bit about how you got into honey bees? What sparked your interest about keeping bees and why did you start?

Guest 04:50
I started keeping bees -- my friend basically kept saying, you need to keep bees, you need to keep bees that fit in with my paradigm and my world. I have chickens and ducks and so bees were a natural extension. And my origin story as a beekeeper starts like most beekeepers, yet, it almost ended kind of tragically about a month in. I purchased two nucs like many beekeepers start with, but they came to me pretty sick. They had chronic bee paralysis virus. I worked with my Kentucky State Apiarist, Dr. Tammy Horn Potter, and she diagnosed them with paralysis virus. There were so many dead bees outside the colony, both colonies really early on, like two to three weeks in. I did alcohol washes and found out that both of them were very heavily infested with mites. I was pretty devastated as a brand-new beekeeper and almost thought about getting out of beekeeping. But I decided I had nothing to lose. So I used that as an opportunity to learn as much as I could about how to keep bees alive and healthy. I spent that summer working with my colony to restore their health, and I started studying honey bee immune systems, all the methods to increase bee health, I was learning really early on about Varroa reproduction and integrated pest management, horizontal pathogen transmission. So my start as a

beekeeper was fundamental in how I ended up being more focused on bee health early on, than maybe some beekeepers, and that sort of informs how I arrived where I am today. The two colonies that I started with, one of them I gave back to the beekeeper that I got them from and he didn't know he sold me sick bees, it really wasn't something that he planned or meant to do. But the colony that I kept, I kept one of them, that colony, I still have today. They are alive, they have requeened themselves multiple times, the genetics have changed. So my point is, that's how I started in bees. And that's probably why my focus has always been on bee health. To me, it's almost a prerequisite. You have to have healthy bees to have surviving bees and only surviving bees are going to make your honey. To me, it's a natural linkage between health and productivity. And so that's sort of the focus that I've had as a beekeeper for this entire five years.

Jamie 07:25
So, Theresa, your report good survival rates in your hobbyist operation. And you've also mentioned to us a little bit behind the scenes, and we read a paper that you provided to us and saw the presentation that you base a lot of your management practices on peer-reviewed scientific papers or research. Can you tell us a little bit about the scientific papers or books or individuals who've inspired you most? Whose research, what research has inspired your management practice?

Guest 07:49
You bet. Yes, I really do gravitate very heavily towards a science-based approach. My methods are largely an adaptation of Dr. Seeley's work. He's he's probably the scientist that I follow the most, and of course, many people know he published a book in 2019 called "The Lives of Bees," which is a combination of his 50 years of research and beekeeping practices and his study of, especially, the adaptations of wild or unmanaged bees. I've modeled my practices, to a large degree, of using his methods and, yet, there is so much new research that is very exciting that has come out recently that builds on a lot of the methods of Dr. Seeley. Recently, I can't hardly keep up with all the science that's coming out and it's super exciting. But even after Dr. Seeley's book came out in 2019, there's more coming out that supports this idea of healthy bees translating into productive colonies because sick bees are just simply not going to make as much honey as healthy ones. So, for example, I've got several ideas to share and articles that I've recently read. For example, a 2019 article, peer-reviewed science by Dr. Dines and his colleagues, where they looked at colony spacing and how to create a more visually complex apiary and they put their colonies in a circle and they had them facing out, they were different colors and they were spread relatively far apart. And this peer-reviewed research, there was a control and everything else, they found that there were three times lower forager drift, lower mite levels in the brood, greater honey production, and reduced overwintered mortality, and that just came out recently. I want to talk about Dr. Cameron Jack's research that he did in 2020 where he did that amazing, complex and comprehensive integrated pest management review of all the sampling and the cultural and chemical methods and the efficacy of all of that. That is so hugely valuable to beekeepers like myself who are trying to figure out how do I manage and reduce the impact of Varroa destructor. So that one is hugely helpful. Another one, Dr. Lamas just started publishing research that he's been doing about Varroa aggregation on drones, and how they're aggregated on the drones until fall when the drones are kicked out, and then they're possibly moving to workers. I literally, I feel like I saw that yesterday on one of my colonies where I had done a mite sample, just in September, and here October, all of a sudden, there's a pop and a spike in the mites, and I'm wondering if it doesn't have something to do with his findings there. Another one is 2022, again, hot off the press research by Dr. Yang, and Dr.

Wei, I think is the name, there are some international researchers. And they found that eggs laid in queen swarm cells are larger and produce larger queens than eggs laid in worker cells. And that is just so informative to a beekeeper because we already know a lot of the benefits of swarming and how that improves the health and the productivity of a colony. So, now we know, maybe, one more tiny factor of why swarming benefits the colony and why they work so gosh darn hard to reproduce and to swarm and to raise their own queens. My point is, there's just so much and it all fits together, for me, at least, in a cohesive way that helps me understand what I need to do as a beekeeper to enable my bees to thrive, despite the fact that I am managing them, and actively, how do I create the most optimal environment that I can to enable them to express their innate immunity to keep themselves healthy, so that they are also productive, both for themselves and for me.

Amy 12:20
Theresa, I love that you have been able to just take a look at scientific papers, that you've been keeping up with peer-reviewed research. That's part of my job to make sure that I know what's going on. And it's a lot of work. So I applaud you for knowing the research and using that research to make the best-informed practices for your apiary. So good job.

Guest 12:41
Thank you. And it's exciting and fun. I mean, it's really neat. I have a great admiration for, I'll just say it, I mean, these are some wicked smart people out there, the people doing genetics and doing this research and making sure that there's a control, and that they can isolate the changes that they're making so that they can draw true conclusions. I'll go out and I'll say, Well, this happened, therefore, it means this, but I don't really know that because there's so many variables at play. That's why I really do admire and gravitate towards peer-reviewed science. It helps me kind of cut through what I think is happening with what the researchers believe is happening. It is evolving. That's what else. I could talk about this, probably, for quite some time. But it evolves. And I love how science builds on science. There'll be a study that's done and it will answer maybe part of the question, but it'll expose these other five things we don't know. And so a new researcher will come and build on it and build on it. And to me, that's just super fascinating. It's really interesting.

Amy 13:53
Yeah, definitely. So I'm going to switch gears a little bit. So you've got these practices that work for your apiaries. So there's this idea in beekeeping where we have treatment-free methods, right? I think in a perfect world, and I think you've probably mentioned this in your document, in a perfect world, all beekeepers would be treatment-free, right? We wouldn't have to treat, we wouldn't have these pests and diseases, we wouldn't have all these problems in our colonies. But you have something that you call treatment-less. And so can you describe that a little bit for us?

Guest 14:23
Sure. So one of the reasons I call myself treatment-less is because when I share with people that I practice natural beekeeping or sustainable or Darwinian or permaculture, whatever word, organic, that's another one, people sometimes assume that I'm treatment-free, and then they're shocked when they learn that I'm not. So, maybe, that's why I say treatment-less. It clarifies that I am not treatment-free and so I want that made clear. I did study, early on, I really wanted to be treatment-free. I know we all do, like you said, Amy. But due to my close proximity to other beekeepers, I'm not isolated at all. We've

got all that we know about, at least, the current science tells us about polyandry and the great distances queens and drones fly to mate. We know a lot about Varroa-resistant genes of which many of them are recessive. I just determined that I am not in a position, my environment and my situation will not allow me to be treatment-free in any way that will allow my bees to go through that genetic bottleneck and natural selection to take hold, and then that natural selection to be preserved. It'll get diluted so quickly when the queens go out to mate, unless I'm replacing those queens, purposefully, with those traits. And I think again, I've heard Jamie say this before, if you're attempting to do Varroa resistance, you really need to replace those queens with rigor and with discipline with those traits or it gets diluted very quickly. So the long and the short of it is, for those reasons, I'm not a treatment-free beekeeper. So treatment-less means that I work really hard to ensure that I'm increasing and maximizing the natural immunity and the reduced Varroa impact on my colonies by the practices that I'm speaking about. So I have all locally adapted bees. I enable my bees to create a propolis envelope by roughening up the inside of their hives, my hive bodies. I don't overly disrupt the brood nest, I don't reverse boxes, I don't move frames around, I attempt to keep my my colonies smaller, which reduces Varroa reproduction. My bees do swarm and they replace their queen naturally. So there are brood breaks that are happening naturally. I insulate in the winter, so they're not cold-stressed coming out of winter. So my point is all these activities allow the bees to have higher immunity, increased immunity and higher ability to combat any pathogens that are occurring inside the colony and it reduces the Varroa load, which translates into, hopefully, reduced viral transmission. Those up to 20 viruses or so, I don't know where we're at these days, that are vectored by mites. So that's how I do it. I space my colonies, I don't know if I said this earlier, but I space them very far apart from each other. That's the number one criteria I have for when I'm placing colonies in a location is how far apart can I keep my colonies. And so that right there means I don't have to treat an entire quote-unquote apiary because I don't really have an apiary. I treat individual colonies when that colony's thresholds are exceeded. And I can be pretty sure that there's not a lot of drift, especially worker drift between colonies because they're so far spaced far apart. So I do attempt to treat as little as possible through these methods. And that's what I mean by treatment-less. I do rotate, and I do use three of the organics, and I rotate them. I use Formic Pro, Apiguard, and oxalic acid vaporization. And I follow the law, the label is the law. Again, Jamie is famous for saying this, and I really and truly follow the label. I use the products when you're supposed to. And I very carefully watch the temperature and things like that. I don't use Apiguard, except when there are no honey supers on for human consumption. OAV, I only use during broodless periods. And I don't do the repeated OA treatments when there's brood. I save that for when there's no brood. So that's how I treat, and I do treat. I guess I can say it this way: Each year I have colonies that will have 0, 1, 2, or three treatments each. But there's so much individual that I'm treating as little as possible, and only when the thresholds are exceeded on individual colonies following integrated pest management.

Jamie 19:25
So, Theresa, that's a lot of good advice. A lot of the things that you're saying are things that are coming straight out of research. I love the fact that you're keeping up with the research and making sure that it translates into what you do. One of the things that intrigued me as I learned more about your management is how you utilize sensors of various types as part of your management. Can you tell us a little bit about the sensor types and how you use them to make management decisions?

Guest 19:50

Sure, so I use BroodMinder-T2SM temperature sensors. I want to start by saying that I receive zero compensation of any kind from BroodMinder. So, everything that I say about their sensors and my use of their technology is truly how I feel. There's no ulterior motive. I'm not I'm not being compensated in any way by BroodMinder. But I do have one of these sensors in every colony, and I have always been a beekeeper with these sensors. So I've had them in my colonies for five years now, and I've been using them all that time. And part of my 100% survival for five years and counting is due to these sensors. They're just that critical to my personal beekeeping. And the reason these sensors work and give us, as beekeepers, knowledge about what's going on inside the colony is because of the way the bees thermoregulate the internal of their home. They use heating and cooling mechanisms to hold the temperature inside the colony. For example, when there's brood being reared at approximately 95 degrees, they'll hold that brood nest at 95 degrees. And we can use that to detect different things that are going on and different events that are happening inside the brood nest. And they hold that temperature at 95, regardless of what's going on outside, assuming that they're raising brood. So there are multiple things that we can tell from the sensors. We can detect queen laying and brood rearing or lack thereof, we can detect swarming, we can understand better winter survival, and we can also understand colony stressors. So I'll start with queenless nests or queenrightness because everyone, we all know that the queenright status of a colony is like the lifeblood of the colony. And we also know that when a colony goes queenless, all sorts of bad things start happening, whether it's laying workers or a dwindling population, which can lead to the hive and the colony being vulnerable to being robbed or a secondary pest showing up. For me, that would be small hive beetles or wax moths. But we know maintaining queenright status is so super important to a colony. So the way the sensor helps me detect queen status is, if the colony goes queenless and for some time, the bees will literally stop thermoregulating the brood nest and I can see that on the temperature sensor and on the graphs that the sensor displays. For example, all my time as a beekeeper I've had not very many queenless situations, only just seven total, probably because of the practices that I use, but the long and the short of it, every one of those seven times that my colonies have gone queenless, I was first made aware that there was a problem because the sensor showed me that the bees had stopped thermoregulating the brood nest, which is huge because it gave me an indication something's wrong inside this colony, you, Theresa, need to stop whatever you're doing and make this inspection a priority. Go figure out what's going on in here. And lo and behold, multiple times, I find out that it's queenless, and I can act before all those bad things that I mentioned earlier start happening. I have an example to give you of one of these situations. My hives are named. One of them's called Bailey. And I did an inspection on June 17 of Bailey and everything looked great. There were eggs and larvae, it was well-nourished, no signs of diseases, good stores, and everything looks great. So I got busy with life. A month goes by, and around July 17, the bees gradually stopped thermoregulating, and I could see it on the sensor and on the graphs that that sensor provides on my phone. So I knew of all that I got going on in life, stop and go look and see what's going on inside Bailey, and sure enough, it was queenless. I have no idea why Bailey went queenless. It wasn't that I killed the queen. The timeline was off. But something happened to her, and they hadn't replaced her and they were hopelessly queenless. So I did a combine with a small swarm that I had caught earlier in spring that was queenright. And then, July 28, I could tell from the sensor that after the combine, they were queenright. And that's an example of how these sensors enable me to see you've got something wrong in here, go look and see, use your knowledge as a beekeeper, apply the biology that you know to resolve the problem. Another value that the BroodMinder sensor offers to the beekeeper is it can tell you when a colony has swarmed. So the way it works is there's a four-degree spike in temperature that happens just before the swarm is cast out of the colony.

The researchers think that the reason for that four-degree spike in temperature is because between half and three-quarters of the bees that are going to exit the colony with either the mated queen or the virgin queens, if it's an after swarm, but they're all warming up their flight muscles at the same time because they need to fly. And so that creates the spike and the BroodMinder sensor can detect that spike and show you that the colony has swarmed. And the way this plays out, there are so many things the beekeeper can do once you know that your colony is swarming. So, for example, and I'm a little afraid to admit this, but I don't know how many times I will walk up to a colony and I'll look at the entrance and I'll look at the activity and I'll say in my head, oh, this colony didn't swarm, that entrance activity looks just like it did three days ago. I'll kind of glance around and I won't see a swarm in the tree, and then I'll run the BroodMinder sensor on my phone and I'll see the little graph and I'll see that little tiny four-degree spike right there on my phone. And then I'll glance up, and then for some reason, my eyes will see the swarm there, and I can catch that swarm. But it's crazy how often that happens to me. And it allows me to certainly catch more swarms, but it also allows me to understand that my original colony swarmed. Therefore, I can calculate, how long until there should be a laying queen inside the colony based on queen mating biology, for example. Or if I catch the swarm, I know whether it's a primary or a secondary swarm. So I know whether or not it's the mated queen inside the colony, inside that swarm, or whether it's a virgin queen that needs to go out on a mating flight. So that informs me of how soon would it make sense for me to do an inspection to verify I've got a laying queen. So it's just extremely useful to be able to know whether our colonies are swarming. Oh, and the other thing that sensor does is it tells you the exact time the colony swarmed, which is crazy to see. So I have this data pool of exactly what time these colonies swarm. And we read the books, and it says they usually swarm between like 10 and 2 in the afternoon. But I've got colonies that are swarming, certainly, outside that window. Most of them are in that range. But I've got like one colony, it's called Sunset, and for whatever reason, they swarm at five o'clock, six o'clock at night. Over the years, they tend to swarm later for some reason. So it's just fascinating what you can learn from these sensors. And swarming is one of them. I would also offer, I have a feeling that our colonies are probably swarming more than probably what we realize.

Amy 28:28
So, Theresa, I'm also hearing that you have really great record-keeping skills. Can you tell us a little bit about how you do your record-keeping?

Guest 28:36
Yes, so, I have a freeform book that I carry around, and I make notes in it. I try really hard to document any of the events that I'm seeing, like I just mentioned, the important events. But the other thing I do, I forgot all about this, the other thing is on my phone, I've got just a little recording app. And when I'm doing an inspection, I'll talk to myself through the whole inspection and tell myself what I'm seeing whether it's, I saw the queen on frame four of the bottom box, or I saw swarm cells or I saw signs of diseases, ball brood, but I'll say that as I'm going through my inspection, because I swear it's not four minutes I'm out of that hive and I have no idea what I saw, I can't remember a gosh darn thing. And then I run it back on very high speed when I get home, and you can tell on the app that there's nothing being said so I can skip forward and I can make note of the important things that I saw. So, actually, I forgot about that. That's another use of technology that I use that helps me because I'm constantly going back in that book. Before I get in a colony, I'm like alright, what did I see in this hive last time? I

mean, I have 21, that's not a huge number but it's way too many for me to remember what's going on in each colony. So that's how I do my record keeping, Amy.

Amy 28:36
That's great. Yeah, thanks for sharing that with us. Because you've listened to the podcast a couple of times, Jamie and I are always trying to make sure that people are doing great record-keeping, and it sounds like you're definitely doing that.

Guest 30:09
I try. I really do. Yeah.

Amy 30:11
All right. So the last question that I have for you, so you make all these decisions for your apiaries, you have multiple management practices that make it work for you, if you had to choose the most important management practice that you believe has been a piece of why you've had such great survival rates, what would it be and why?

Guest 30:44
So what I would say is my overarching management practice is this holistic approach that I've mentioned of focusing on bee health as a prerequisite and almost a pathway to increased honey production. Healthy bees make more honey than sick bees, dead bees don't make anything. So by kind of prioritizing health, with that long-term goal of ensuring that I have high honey production, that is the overarching approach. And I equate it sort of to human health. To be a healthy human, we have to do a lot of things. We have to eat right, exercise, hopefully, maintain a healthy weight, we're probably not supposed to be smoking, and you need to do all of those things. And there's no one thing, if you just do this one thing, you're going to be a healthy human. And I think that's the same with beekeeping. There's no one silver bullet, and we all wish there was. That would certainly simplify everything. But that said, you were very clear in your question. If I had to pick one thing, I would pick, and the research would support this, that practicing integrated pest management is the most important factor contributing to increased health, survival, and productivity. We can read lots of research papers that will talk about why that's important, and it's important because Varroa, I know none of us want to talk about Varroa, we all wish Varroa would have never come to the US and I'm sure Australia is just, I don't know, I can't imagine what they're going through, thinking through, how they're going to deal with it, but we know Varroa is -- and this is a quote from one of the research papers, it was from 2019, Dr. Dines -- he wrote, "It's the greatest biotic threat to honey bees now worldwide, even in Australia." That, I think, is so important. And so, I follow, very closely, the Honey Bee Health Coalition Guide to Varroa Management. I also, again, digested, very heavily, the work that Dr. Cameron Jack did on IPM, and the comparison of all the cultural and sampling methods, etc. So I practice as much IPM as I can. And I think of IPM as a beekeeper, I think of it as just tackling Varroa from as many avenues as possible, because each action reduces the impact reduces the load of Varroa by at least a little bit. And those actions are cumulative. So for example, I ran screen bottom boards on all my colonies, and you'll hear, maybe, sometimes beekeepers might say, well, that 10% drop of mites out of the colony that land on that board, that's not very significant. And I would agree that 10% is not that significant by itself. But if I do five things that add 10% reduction in mites, I'm making a difference and I'm having to treat less to the point we talked earlier about treatment-less. So, that's how I do IPM and that's why I think it's so important. And then, I

would offer that my sampling method for Varroa is somewhat different than maybe what is the standard or the norm. So obviously, the alcohol wash is the gold standard of mite sampling to determine whether or not the threshold has exceeded two mites per 100 bees. And I do alcohol washes but what I also do is I do natural drops on a sticky board covered in Vaseline, and I do it across all 21 of my colonies 12 times a year at the beginning of every month. And then I calculate and I put it in a spreadsheet the per day drop, and that data is directional only. You have to factor in strength of the colony. But I think the frequency and the consistency with which I do it is probably making up for the lack of accuracy. Because, for example, that very first colony that I told you about that I have had now for a full five years, I have years of this data, and I can see trends for any given colony or that drop data over time. In a single month, when I do it, I see anomalies or a hive will pop. I had one yesterday., I just finished doing this drop data recently. And one of them went from the prior month's drop, three mites per day, and it hopped up to 37 per day. I don't think I would have caught a spike like that. I know I would have missed it if I was only doing alcohol washes four times a year. It's labor-intensive to do this, no doubt about it. I mean, I'm counting mites because I never take my eye off mites. I'm counting them in December, January and February, even in the middle of winter, I'm doing this because I just need to stay on the routine with it. It allows me to make sure that I am catching these spikes and that I am treating when the thresholds are exceeded and not allowing the mites to climb too high. And then I do these alcohol washes, especially when there are anomalies in the data or there's something I don't understand, or I need a confirmation of what I'm seeing. And I see a lot of consistency between the two data samples, which I think is a positive. But I think IPM, is the number one thing that beekeepers can do to ensure that their colonies are healthy and productive, both.

Jamie 37:05
Well, Theresa, you've really packed a lot of good information into that interview. And there's a lot of little nuggets of truth scattered throughout that I know beekeepers everywhere can benefit from. So I really just want to thank you for taking your time to share with us your management strategies in your colonies.

Guest 37:19
Thank you very much. I've enjoyed it very much.

Amy 37:27
Jamie, it's really nice to have Theresa on. It's always fun to hear how our programs or just research, in general, how that influences management. And I think Theresa had a lot of great examples of how research has directly influenced the decisions that she made in her colonies.

Jamie 37:44
Well, Amy, that's exactly how we would hope research results in beekeeper change behavior. We're learning a lot about bees all the time. There are certainly more honey bee researchers now than ever, in my experience working with bees. So there are a lot of people doing a lot of great things. And it's really great to see data-driven, research-driven individuals taking what they learn from the research, from the lectures they see, the books they read, the research papers they read, taking that information straight to colonies and acting upon it in a way that seems to be benefiting bees. And that's just a really great, great thing to see.

Amy 38:22
Another thing that I was thinking a lot about, I mean, just listening to Theresa talk about very specific dates of what has happened with which colony, I'm just like super impressed, I think, with the amount of record keeping that she has. But also, we discussed how sensors play a huge role in her record keeping and also in her decision practices. What are your thoughts on beekeepers, whether they're backyard beekeepers or commercial beekeepers using these various sensors to inform them to make different or better management practices?

Jamie 38:52
Well, I'll start with looking over the long-term. I really think sensor technology is inevitable, right? I really think with sensing technology, AI, all the things that are happening in the world around us that we already see it in the honey bee world, and I know that it's growing, and I think it's going to only grow. And I keep thinking by the time I retire and start keeping even more colonies, it's probably going to look very different 20 years from now than it does now. And so it's neat to see Theresa already using temperature data, weight data of colonies to make management decisions. I was very intrigued about the temperature change in colonies that are ready to swarm, seeing all of that type of information, that's just interesting to me. I really feel like, again, that we'll see it in more and more colonies moving forward. So it's exciting to see that there's already beekeeper adoption of that. And I know it is because I hear a lot of beekeepers talk about it, so it's a really exciting direction that the industry seems to be heading.

Amy 39:52
Yeah, definitely. So for our listeners out there, if you're using different sensors, if you're incorporating AI technology into your operations, we would love to hear what you've been doing. Of course, that's always a huge discussion point of what are beekeepers doing and what can be implemented in a very practical way?

Stump The Chump 40:18
It's everybody's favorite game show, Stump the Chump.

Amy 40:28
All right, welcome back to the question and answer segment. I had promised two honey bee nutrition Q&As, and we're going on the third one. So, Jamie, we're just gonna keep going with it as long as the questions are coming in.

Jamie 40:41
Well, I'm looking at this list of questions, and it's kind of long. So we are sticking with this nutrition theme. I'm okay with that. There are definitely some questions, not today, but some questions coming up that I'm gonna have to do some research to be able to answer, otherwise I'll be a stumped chump. Right?

Amy 40:56
Well, that's okay too. We're only human.

Jamie 40:57

Can't let that happen.

Amy 41:00
All right. So for the first question that we have, this person is asking about powder pollen, and the research into open-feeding of powder pollen versus the patties. So do the bees utilize powder? What does this look like? What is the comparison between using powder pollen versus patties?

Jamie 41:20
That's a tongue twister, powder pollen patties.

Amy 41:22
It's too much.

Jamie 41:24
I'm listening to you try to say it, and it's like --

Amy 41:27
Puh, puh, puh.

Jamie 41:28
All right. Like in recent episodes, where I've been answering questions related to this, this begs a little bit of a question. We've talked about it a lot. I've had a former master's student, Emily Nordyke, who did some research on how bees use pollen subs, and she was looking at utilization of pollen subs. She put a dye in pollen subs and then tried to follow those pollen subs throughout the colony. Did it show up in adult bees, did it show up in brood, did it show up in stored bee bread? The short story is that we found it in adult bees, but not in brood and not in bee bread. Years ago, my father-in-law got into beekeeping. And we were home visiting him and my mother-in-law over the holidays, and he had set out a device where he put dry pollen sub -- he's a beekeeper -- he put dry pollen sub into this device. And while we were there over Christmas break, he had a lot of honey bees showing up at this little device, collecting this dry pollen sub, flying it back to the hive, and that was kind of the end of the story. And so years later, Emily shows up at my lab and does all of this pollen patty tracing studies where we see it in adult bees, but we don't see it in brood and we don't see it stored as bee bread. So a couple of years ago, we started kicking around the question, well, we know that pollen subs disappear, but it doesn't show up in larvae and it doesn't show up in bee bread. I wonder if dry pollen subs do because we know the bees go out and collect it and bees aren't stupid. So, maybe that stuff, they will process differently to how they process premade pollen cells. It's got all this sugar in it. And so we are actually interested in this very question as well. If bees collect pollen subs in the dry form, in other words, if they forage for it, they leave their hive, collect this dry pollen sub and bring it back to the nest, does that stuff show up in larvae and in the bread? And we don't know. We're trying to answer that question right now.

Amy 43:44
Dang it. I was really excited for you to answer that.

Jamie 43:47

Yeah, I feel like if this were one of those TV shows, we would have cut to commercial break right then. And the jury says! But we have that question as well. I've got some hypotheses. I just, I don't know. That's the short answer. And we are looking at that. We're trying to find powdered dyes that we can put into dry pollen subs and to see if we can find this powdered dye in dry pollen subs that bees collect in our colonies. And we just don't know. We're working on those types of studies now. I've got a suspicion that they might use it differently than they use these kinds of prefab subs that already have all this sugar in it, but I just don't know. So that's a great question. We wondered the same thing. And we're going to look at it because it is very conceivable that bees need that biological trigger to end up using pollen subs the way that they would use pollen, and maybe that trigger is they just need to go forage for it. If they go forage for it, maybe they will approach its utilization differently. We just don't know. So we're going to look at that now, ourselves. So great question.

Amy 44:55
So, one of our field technicians, he always talks about how the bees just roll around in that powder pollen, right? And so, I mean, would they go out there and pack them kind of like they do if they were just to go out and forage? Do they take that powder pollen and pack it?

Jamie 45:11
Yeah. So this is along the lines of stuff we don't know. That's part of this overall question. If the bees are going and collecting dry powder pollen subs, which we know they do, I've seen it with my own eyes at my father-in-law's house for years and just this last winter, we put it out in our apiary, here at the University of Florida. We saw bees collecting it, we know they go get it. But once it crosses the hive threshold, we don't know anything about it from that point forward. And so it's possible they pack it in cells like they do be bread. It's possible that it shows up in brood. We just don't know. And until we can conduct some of those studies, it's just a big question mark. So we'll all find out together, and the moment we know, we promise we will let our Two Bees in a Podcast audience hear.

Amy 45:59
I promise I was listening to you but I was also thinking about the tongue twister again. I was thinking about Peter Piper picked a pack of powdered pollen. But then I was thinking, no, maybe we'll do Peter Neumann because that's the only Peter in the apiary. Peter Neumann picked a pack of powdered pollen, a pack of powdered pollen.

Jamie 46:19
Gotta say it faster, faster Amy. Or how much woodchuck chuck if a woodchuck could chuck wood? Well, how much powder, how much powdered pollen could a bee pack on its hind legs if a bee could pack powdered pollen on its hind -- ah, whatever.

Amy 46:21
If Peter Neumann picked powdered pollen versus pollen patties? You were close. That was pretty good.

Jamie 46:38
Listeners, if you can come up with a good tongue twister with powdered pollen patty packed in the hind legs of bees, let us know and we'll read it on the air on Two Bees in a Podcast.

Amy 46:50
All right, for our last question. Have you ever noticed bees throwing out natural pollens that they've collected? And if you have seen this behavior, I guess, what is your theory? Or, is there research that's been done on why they toss out this pollen?

Jamie 47:06
They do. I have seen bees discard what appears to be old be bread, as an example. And I can only hypothesize that maybe it's gone past its nutritive usefulness. Maybe it's stale. I've got to look in the literature to see if there's been a documented reason for this. Oftentimes, it seems to be associated with comb damage. Normally, when I see bee bread pellets on the bottom board of a hive, I'll go into the hive and notice that there's some area of the comb that's been damaged, maybe due to wax moths or small hive beetle feeding. I have seen pollen pellets on the bottom board at the nest entrance. And that's usually associated with me working the hive. Think about it. If pollen is actively being brought into the nest, then at any given time when you are working a hive, there are frames that contain pollen pellets, those hind leg pellets that just came off the bees' hind legs. These frames will contain them in real time and these pellets will not have been packed by bees. Think about it. Thousands of bees are coming in with pollen, there are going to be some loose pellets that have just been deposited into cells. So when you remove a frame and turn it on its side, as you're flipping it from one side of the frame to another, it's natural for pollen pellets to rain out of the frames of the colony. So, sometimes, it's just you dumping the pollen pellets on the bottom board of the hive. When I see pollen pellets on the bottom board, it's usually that. But when I see bee bread on the bottom board of a hive, it's usually associated with comb damage for whatever reason, wax moths, small hive beetles. It is conceivably possible, as well, that bees just detect a problem with bee bread, and that they'll throw it out of the nest. But there is definitely a behavior called entombing pollen -- entomb, like where bees will cover that bee bread with a thick layer of wax, almost to say, we're never going to look at it again. And early on in the discovery of entombed pollen, the scientists were hypothesizing, well, maybe it contained more pesticides, maybe it contained more pathogens. Well, the jury's a little bit out on that. It wasn't really conclusive. But we do know that bees will entomb bee bread as well, and apparently, not use it. But sometimes, they will discard it from the nest for whatever reason. And I think that that's an area of research that can be greatly expanded.

Amy 49:32
Definitely. Bees are just so cool. I mean, how do they know you know, like, don't use this, this is not for use?

Jamie 49:40
It is crazy, but bees sem to know what they're doing, right? And we can trust that if they're throwing it out, they're throwing it out for a reason.

Amy 49:46
Definitely. All right. Well, those questions were a lot of fun. If you have any other questions, have any comments, please feel free to reach out to us on our email or on our social media page. Hello, everyone. Thanks for listening to today's episode. This episode was edited and produced by our podcast coordinator Mitra Hamzavi. Thanks, Mitra.

Jamie 50:15
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.