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SPEAKERS

Jamie, Guest, Amy, Honey Bee, Stump The Chump

Jamie 00:05
Welcome to Two Bees in a Podcast brought to you by the Honey Bee Research and 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. In this episode of Two Bees in a Podcast, we will be interviewing Dr. Jeff Williams, who's an assistant professor from Auburn University. Dr. Williams will be discussing the Bee Informed Partnership's preliminary survey data on colony losses in the United States. Amy and I will follow that with a segment where we discuss queen longevity and quality. What makes a good queen? What are some issues that beekeepers are seeing with their queens these days? Of course, we will end today's episode of Two Bees in a Podcast with our question and answer series. So thank you for joining us for this episode of Two Bees in a Podcast. In 2006, we started hearing reports of elevated loss rates with our managed honey bee colonies. Out of those reports came this concept of Colony Collapse Disorder. Lots of people were scrambling to figure out what was going on, and through all of this an organization was born, the Bee Informed Partnership. The Bee Informed Partnership is largely responsible for collecting loss survey data. If you've heard that we're losing 30% to 40% of our colonies every year, you've heard it because of those reports from the Bee Informed Partnership. So in this segment of Two Bees in a Podcast, we're very fortunate to be joined by Dr. Jeff Williams, who manages the Bee Informed Partnership annual loss survey. Dr. Williams is an Assistant Professor in the Entomology and Plant Pathology Department at Auburn University. Dr. Jeff Williams, thank you for joining us on Two Bees in a Podcast.

Guest 02:13
Thanks for having me.

Jamie 02:14
It's good to have you aboard, Jeff. I know we met some time ago, I can't remember -- I guess it must have been as part of COLOSS when we were in Europe at some point.

Guest 02:23
Yeah, must have been sipping some sparkling water in front of the Pantheon in Athens, Greece, maybe?

Amy 02:30
Was it made by SodaStream?

Guest 02:33
I'm not gonna say.

Jamie 02:35
Our listeners are struggling to follow right now because what they don't know is that all of this was a discussion we had right before we came on. Amy and Jeff are making fun of me for not knowing much about SodaStream and sparkling water and all that stuff. Nevertheless, I'm from Georgia. We only drink Coke.

Guest 02:52
Before we get into the Bee Informed, I'll give a quick plug to COLOSS, which is an international research association. We're preparing an annual conference that both scientists and beekeepers will be invited to. Perhaps when this is aired, that call will be out. Look for that COLOSS conference.

Jamie 03:11
Jeff, you make a really good point. We absolutely have to have you and maybe Dr. Peter Neumann on to talk about COLOSS, because I think it's a wonderful organization I've been fortunate to be involved in for many years. I think it would make a great Two Bees in a Podcast segment.

Guest 03:26
Yeah, I agree.

Jamie 03:27
Thanks for plugging that. When you said, if I have to put a plug in, I just knew you were going to talk about Coca-Cola. I thought that's what was next. Anyway --

Guest 03:36
Yeah, it's a great organization, I really gained a lot from participating in it as the executive committee member and actually a vice president there, but somehow I've also found myself as the president of the Bee Informed Partnership as of maybe two or three weeks ago.

Jamie 03:51
Wow, that sounds important. Let's talk about that a little bit. Usually what we do when we bring in our guests, we ask them to tell us about themselves, etc. Can you just give us a brief overview of how you got where you are, and what you do at your lab before we get straight into the Bee Informed Partnership survey?

Guest 04:12
Sure. If our audience can't tell, I'm living in Alabama, but do not have a typical southern accent such as yourself, Jamie. I grew up in Canada, did all my studies up there and then I jumped across the pond and lived in Switzerland for almost seven years and there was dealing with a lot of honey bee health issues, also helping to run COLOSS. About three, four or five years ago, who's counting? I moved to Auburn University, and now I'm running the bee lab there, kind of equivalent to what you've got in Florida. We're dealing with research, instruction, also some extension activities, not only with honey bees, but also looking at native bees and the flowers they're visiting, for example.

Jamie 04:55
Well, Jeff, I don't think our listeners thought you were from Canada until you said "about" and then we heard it.

Guest 05:01
Did I say "aboot" or "abowt?"

Jamie 05:02
"Out" kind of sound, but that's okay, I love it because I'm sure I'm the one who says it wrong.

Guest 05:08
I'm not the only Canadian bee researcher down in the US. There's actually quite a few of us, and I'm not going to reveal if we have a secret bee society for Canadians or not.

Jamie 05:18
You are totally infiltrating.

Amy 05:22
Oh my goodness. Alright, so Jeff, our lab manager just had this news reporter come out to talk about the Bee Informed Partnership survey. There was a survey that just came out, was this an official report? Or can you tell us I guess a little bit about the report that just came out?

Guest 05:40
Sure. So that report came out, I guess two months ago now. The last survey is open to beekeepers to participate for the entire month of April. We try to have a fairly quick turnaround to reveal those results to beekeepers, usually, by mid-May, late May. I wouldn't say we rush to put it out, but we really try to move forward to get those results out. We always put a disclaimer there that it is preliminary data

because we have to do some more data checking, and looking for duplicates, and these kinds of things, cleaning up the data a little bit, so to speak. We always have that little disclaimer, but more or less, those results don't really vary after we go through those final processes. In fact, I'm actually looking at the Bee Informed Partnership website. Now, it does have a research portal, and as of a few days ago, I would say the final results are now up on the interactive portal. It actually reveals all our state specific results. I can go and have a look at that, and look at Florida, and say that your losses were 29.2% last winter. Data are up and should be final.

Amy 06:51
Great. That's something that anyone could go and access and look at, right?

Guest 06:56
Exactly, yep. It's completely open to the public and there's a lot of other interesting tools there on the Bee Informed platform, looking at anything from the last survey, but also management actions that beekeepers are saying that they're doing.

Jamie 07:10
So Jeff, this is important. I've actually got a scripted question that I'm supposed to ask you, but I'll get there in a moment. What I want our listeners to know is I want them to have some background about this survey, the types of questions that are on it because if you're listening, wherever you're listening from around the world, you're aware that American beekeepers are facing lots of issues with their colonies. We know that it's the event that happened in the United States that resonated through the world. In fact, you mentioned COLOSS a little earlier, Jeff. I would argue the reason COLOSS exists is because of the loss rates that we were first seeing in the US that people started talking about and these efforts grew around the world. A lot of what's happening now with honey bees, honey bee research, extension, and instruction everywhere is a result of those loss rates that we're reported to have in the US. In other words, from those data generated by the Bee Informed Partnership, so how do you get those numbers? How do you get those data? You mentioned that there's a survey open every April. Could you give us a little bit more background about that so that we know where these numbers come from, what they mean, all that kind of thing?

Guest 08:18
I would certainly agree just to take a step back that a lot of the things that we see now relating to bee health really were born from maybe 10 years ago when Colony Collapse Disorder was first described and those really high losses that several commercial beekeepers were facing. So the Bee Informed Partnership also was born from those CCD days. It initially started as just a survey to document losses that beekeepers were experiencing and as that survey developed over four or five years, the Bee Informed Partnership thought, what other survey questions could they ask of beekeepers that would help to explain those losses? That's why today our survey's composed of primarily two parts. One is to assess colony losses in the United States, but the other is to connect those losses with potential management actions. Of course, there are other things that potentially are affecting our bees negatively, like parasites or pesticides or lack of forage. Some of those things are very difficult to

assess without actually going to colonies and sampling for Varroa mites or Nosema, for example. What we did was try to make the best of the situation that we could, through beekeepers surveys and ask them what beekeepers are actually doing, and see if there's any kind of connection with colony loss. Today, our survey opens in April, it's open for 30 days. Sometimes we give a bonus day or two depending on how we feel, and beekeepers can go there and answer a series of questions. It is pretty lengthy. The colony loss questions are about 20 questions, and then there's an additional 60 or 70 questions on management actions, [and] we really need those level of questions. We tried to simplify them as much as possible, but we need that level or number of questions to really start to distill and understand what's going on.

Jamie 10:14
I think that's what's so great about the data is that they actually come from beekeepers. It's beekeepers, going online, filling out these loss reports, and so when scientists like me or you or others are out there talking about 30% to 40% loss rates, these are actually reported from beekeepers. Let's talk then specifically about the data. I happen to follow this a lot, because there's this particular talk that I give as I've traveled around the world that talks about losses, honey bee losses, what happened, so I'm relatively familiar with the data. When BIP first started doing loss reports, they were really looking at overwinter losses. Some of our early numbers are coming just from winter losses, and then they added summer losses somewhere around 2012 / 2013, which allowed them to talk about annual losses. Rather than going from year to year to year, could you give us just a brief overview of what those levels of summer and winter, and then combined annual losses tend to be for American beekeepers on average.

Guest 11:12
Typically speaking, our winter losses are always hovering around 20%, 25% to 30%, depending on the year. In some cases, we really have elevated losses, like two winters ago, those losses went up to nearly 40%. There were some reports back in around 2010, that beekeepers were actually experiencing losses in the summer, too. That's when we started to collect those summer data as well. Usually speaking, those summer losses are lower than winter losses, although something very special happened last year, and it appears like summer losses were much higher compared to winter losses. So in fact, winter losses were quite low relative to our 10 year average last year. Those summer losses kind of spiked, which, as a result, increased colony mortality overall. Last year for American beekeepers, I do want to make a statement that the bulk of the beekeepers filling out these surveys are backyard beekeepers. They tend to have less than 50 colonies by our definition. We're really working towards including more commercial beekeepers in the future as we revise our survey. Right now our survey is definitely more biased towards backyard beekeepers.

Amy 12:29
Sure. And you're talking about the data as far as annual losses around the entire country. Overall summer losses in the entire United States, overall winter loss in the entire United States for this survey, right?

Guest 12:43
Exactly. We've included all beekeepers in those statements, but again, there's 5000 backyard beekeepers filling out the survey, and fewer than 100 commercial beekeepers. Mind you, just like the general population of the US, a minority of beekeepers are managing the majority of the colonies in the country.

Jamie 13:05
Let me just add a statement to that idea, as well. Even though that's the case, Jeff, your surveys represent a lot of colonies. Still, you only really need a few key commercial beekeepers to answer the survey; you've got lots of colonies represented. You usually hover, if I'm not mistaken, between 10%, 15%, 20% of the colonies in the US are represented in the survey.

Guest 13:28
Exactly. That's true. We're pretty happy with those numbers. Of course, we'd like more. The more beekeepers [who] fill out that survey, the more representative they actually are, especially in some of these states that don't get much representation. For example, in Alabama, we're roughly at about 80 to 100 beekeepers participating, but if you go over to Mississippi, fewer than five or 10 beekeepers are filling out that survey. As we move forward, we're really going to start advertising and promoting the surveys in these underrepresented areas.

Jamie 13:59
Amy, you mentioned the national data. The beauty of it is if you go to BIP's website, and we'll make sure to link this in our show notes, if you go to this website, they've got a map of the US and you can click on the states and see the data specific for your state. While Jeff was reporting, just like what you said, these national loss averages, you can see how good or bad it is relative to that by clicking on your state. So it's a really great resource, the website. I endorse it all the time when I'm talking about good websites to go to. so I think it provides a good opportunity for beekeepers to know what's going on in their own state.

Guest 14:34
It's pretty interactive. You can go back and click several years and you can just sort of flip through the map and see how those mortality rates are changing according to state or region. It's actually pretty revealing; there's certain areas in the north up along the Great Lakes, for example, that are regularly experiencing higher mortality, and so that sort of gives clues to researchers in where to go for next steps and experiment, so to speak.

Amy 15:02
Absolutely. I'm not trying to throw anyone under the bus, but the last time I had spoken to someone that was writing an article there, there was something that came out basically saying, "Hey, look, the bees are doing completely fine," because last year, the BIP preliminary results said that there were less winter losses. I know you had just mentioned that, but the thing is, they weren't looking at the annual overall losses. I think when you look at the data, you have to look at the summer, winter, and annual

losses. You can't just say there are less colonies that we lost in the winter, so that must mean that the bees are doing totally fine and we don't have to worry anymore, because I think the annual losses, from my understanding, they were pretty similar in previous years.

Guest 15:46
Yeah, annual losses were slightly higher, I would say last year. I would completely agree with you that you definitely need to look at losses that are occurring throughout the year. I'd further add the power of the Bee Informed survey is that it's been going on for over a decade. You can have a good year, you can have a bad year, but we want to look at these trends over time over many, many years. That's why those data are so powerful, because, yeah, we could have a great winter last year, beekeepers maybe become complacent, we have no idea what the virus mite levels were like, or virus levels and next year could be completely different. Maybe we have the worst winter mortality on record. Really looking at these long-term trends are what's most important for us, I would say.

Amy 15:51
Yeah, that makes sense. You had kind of mentioned this earlier, but what are some of the reasons that beekeepers are reporting for the loss of their colonies? Why are beekeepers losing their colonies?

Guest 16:44
I want to have like a bit of a disclaimer here because our loss survey is really focused on just highlighting what the mortality results or the loss rates are. We do allow some beekeeper perceived reasons for losses. Some of those are related to mites. While many are related to mites and other parasites, some state that their bees are starving to death. Food, parasites, and also queen health, seem to be reasons why colony mortality or colony losses is occurring. Connected to our management survey, we're still going through the data now, and I think our coordinator, Natalie, up at the University of Maryland is is getting close to being able to publish these results, but there are management actions that seem to be related to colony loss as well. One of them, go figure, is the connection between Varroa treatments, and not. It seems like regardless of if you're up in Washington, or in Florida, if you treat for mites using chemicals, and they can be organic acids, for example, or synthetics, you have a much lower chance of losing your colonies. So yeah, I want to have this little bit of a disclaimer, because, we're not out there collecting mite samples, so we don't have those hardcore data, but it definitely points us and other researchers in the direction to target both from a research point of view, but also from an extension point of view. I know you all in Florida have been targeting your extension activities and Bee College to sort of hit on these important topics that beekeepers are identifying as related to colony mortality.

Jamie 18:29
Jeff, the data that you guys use is only as good as the people who put it in there, so really, beekeepers can help you guys by getting on there and filling out the surveys. What can they do to make that happen? You mentioned every April, it's open, they can go online and complete it. You encourage beekeepers around the country to do that. If they're doing this, what benefits do they feel they will get in return for providing this information on your surveys?

Guest 19:01
I think from a management point of view, again, we've got a research portal where beekeepers can go online and look at these trends. I think again, the more beekeepers that are filling out these surveys, especially in the different regions, you can go and click which state you want to look at data for. It really gives you a good insight into what actions you should take when doing your miticide treatments. There's a lot of examples going on to that being for a research platform, that you can see what beekeepers are doing that or losing the fewest number of colonies. That's something direct for the beekeepers and of course all of those data are very important for researchers to move forward with, looking at performing specific experiments.

Jamie 19:45
If you're a beekeeper in the United States listening to us right now, I strongly encourage you every April to make sure you go to the Bee Informed Partnership website and fill out the survey. The more data the Bee Informed Partnership has, the better their reports are, the more predictions they can make about what management practices are linked to colony health and survival. Again, I know we have a lot of international listeners as well. I happen to think a lot of the results that are coming out from the Bee Informed Partnership are applicable internationally. A lot of times when I go give talks internationally, I ask beekeepers what's killing their bees, they say the same things. We talk about management, they say the same thing. I think if you're an international listener, you need to go hang out on the Bee Informed Partnership website, because there's a lot you can learn. Jeff, is there anything else you'd like to share about the Bee Informed Partnership?

Guest 20:34
Well, I really want to give a shout out to all the people that work behind the scenes. I guess in this case, I'm the voice of the survey for our 10 minutes here, but there's several individuals like Selena, who's my PhD student at Auburn, we also have Natalie and Michaela at the Bee Informed Partnership and as well, Dan Eurail, over at Texas A&M, and he's coming over to Auburn actually, to be a grad student. They've been really vital to making this survey happen this past year. I really want to give them the credit that they deserve.

Jamie 21:04
Yeah, Jeff, that's a good point. We've had Bee Informed represented at least three times on our podcast, with you today. We've had Dan and Matt talk about the principal reasons behind losses [and] what they're seeing. We had Natalie and Emery as well, talking about their respective programs. The Bee Informed Partnership's a really great organization helping beekeepers out a lot. I think just visiting the website, you listeners out there can gain a lot of information about how to manage bees and see all the resources the Bee Informed Partnership puts out on behalf of beekeepers, really in the US, but also around the world. Well, Jeff, I thank you so much for joining us today on Two Bees in a Podcast.

Guest 21:42
Well, thanks, Jamie and Amy for inviting me and having me.

Jamie 21:45
Absolutely. Everyone, that was Dr. Jeff Williams, an Assistant Professor in the Entomology and Plant Pathology Department at Auburn University. He's here today representing the Bee Informed Partnership talking about the annual loss survey. Thank you so much, Dr. Williams. Take care.

Honey Bee 22:03
For more information about this podcast, check out our website at UFhoneybee.com.

Amy 22:12
Now that we are starting to do our podcast episodes with one guest and one segment between Jamie and I, we've been talking a lot about queens, but we're also still receiving even more questions about queens. We figured, why not do just a general assignment on queens and what's going on and why we care. I feel like beekeepers care and I feel like they know why queens are important, that they're really the ones keeping the hive alive and reproducing. There's some talk, Jamie, about how queens are not lasting as long as they used to. I guess my first question to you is, how long did they used to last? How long do people expect them to last? And what's the deal? And what's the talk about why they're not lasting as long?

Jamie 22:58
Amy, all of this is kind of very confusing. It's even confusing to me, and I'll tell you why. Okay, oftentimes, especially in the last 10 or 15 years, since we've had these elevated colony loss rates, people have made proclamations about well, we're losing 30%, but 20% is what we consider normal, but there's really no records prior to 2006 that are as detailed as the records after 2006.

Amy 23:25
And you're talking about colonies overall?

Jamie 23:26
Oh, yeah, colonies overall. The reason I start there is because I feel like this discussion about queens is very similar. They're not living as long as they used to. Well, what does that mean? How long did they live? I mean, all the questions that you are asking me, I've been asking beekeepers and the problem is, is you can't really find that information in the literature. What you can find in the literature is some anecdotal saying, I knew a beekeeper who kept a marked queen in his hive, and it survived five years. That's always been an outlier. That's not what queens are supposed to do. My sneaky suspicion is that the average queen, this is just a suspicion because it's not based on data. But the average queen lives somewhere between a year to two years, and that's because they will swarm with the old queen. When they move to a new nest site, the old queen is usually pretty quickly replaced and given that most colonies swarm every year, most colonies will requeen every year. I don't think it's ever realistic to have a queen that's over a year or two, even though you will get those odd occurrences that they will live three, four or five years. That's just not the normal situation with queens. Then what's happening today that beekeepers think is abnormal? Well, what's happening is that they're claiming

queens, as you've already stated, aren't living as long as they used to and as I've identified, I have no clue what that means. I will tell you when I was up in Georgia as a postdoc, I was working with six commercial beekeepers and for two years, we marked and clipped the queens in the study and I think we had, if I'm not mistaken, somewhere around 180 colonies in the study, again, this was 15 years ago. I forget, but the reason we clip them is because marks can come off. You can't actually know that you have the original queen unless you clip it because the wing doesn't grow back and you know she's there. When I was doing that study, I was seeing a large number of queens actually dying, or disappearing is probably a better word, in as quick as six months. I would see some that lasted a year and a half, and maybe a few that lasted the whole two-year study. I never mapped out the bell curve for these data, but if I had to guess, just based on my memory, that the bell curve would peak somewhere around eight months to 16 months. They were living on average about a year. It's easy to have a knee jerk reaction and say there's a lot of queens dying within six to eight to 10 months of being put into that colony. That's not normal. My question is, is it not normal? Because we don't have these kinds of studies from 40 years ago. So we can't really know. I know, it's tough to start a conversation about queen loss with "I'm not sure what normal is." Let's just assume that all the talk about underperforming queens is in fact true. Let's say that they're not living as long as it's normal. Let's say that according to the data I have, from that study, 15 years ago, that it's not okay, for a large percentage of our queens to be replaced in six months to 12 months. I would argue that that's the case, I would argue that you should be able to get a year of life out of the queen. So then the question is, what's happening? What would be responsible for this large percentage of supersedures or replacement that early in the requeening cycle? The simple truth is, we don't really know.

Amy 23:38
How do we even go about this? I mean, is it better to start now and look at the data and just move forward from this point, or?

Jamie 27:07
Well, your questions are very timely, because a lot of this boils down to a lot of the data that we're seeing from the Bee Informed Partnership that suggests Varroa, nutrition, and queen issues that beekeepers are having. So queen issues are a large focus of our team's extension. I know that listeners who are listening to this particular episode won't know when it's recorded. I'll tell you, it's being recorded in mid August 2020. We're in the midst of some virtual bee colleges, and this past weekend, I spoke for four hours on queen quality, what does it mean? What are these issues, what's leading up to these issues that we're seeing, and a lot of it's just supposition. If you've been following our podcast for any length of time, you'll know in the past month, we've released a couple of episodes, one from Keith Delaplane, at University of Georgia, one with Dave Tarpy at NC State. We talked about queen issues, Dave Tarpy and his team especially, do a lot of research on queen quality. They run a queen and disease diagnostic clinic, so he even has what he considers to be some measures of queen quality. If we had to summarize things that we feel may be impacting queens at the moment, it could be viruses, nutritional issues, maybe perhaps some management stresses, perhaps exposure to pesticides. The way that I'll usually explain it with queens, if the average worker is living six weeks in spring and summer, and they may be living six months over winter, and the average drone lives a few months, the

queen lives a year, perhaps longer. That means of all the individuals in the hive, she's the one who's exposed most to the stressors that are in the hives. There's any number of things that could be impacting this kind of broad category that we refer to as queen quality and a lot of people are beginning to look at it. There's a lot of investigations on pesticides, a lot of investigations on nutrition, and viruses, and so on. People are trying to unravel this mystery of what's really happening to queens at this moment.

Amy 29:15
This is not part of the script that we had planned, but I'm going to ask you anyway, I think the ultimate question is, do I requeen every year?

Jamie 29:23
My official opinion about that is yes, I recommend to beekeepers that they requeen yearly. To have a young vigorous queen in there that has a high egg output, that's really good. I think for the colony, you always want to make sure that you're maintaining stock, the appropriate stock in your colony. That can be a discussion for another day, how do you determine what stock you want. I prefer purchasing queens and requeening yearly. My principal reason for that is I like to keep a young vigorous queen in the hive, and given that there's a fairly reasonable turnover of queens in the nest if you do nothing at all (in other words, every year to a year and a half, you're going to lose that queen), I like to ensure that I've got appropriately selected stock in that hive. That's one of the reasons I prefer to requeen yearly and that's why it's my recommendation as well.

Amy 30:14
We'll talk about that in a different segment, as far as appropriate stock and where to find that. Another question that we have is, what are some factors that go into queen quality? I know we kind of spoke about this when we were talking about the queen clinic. What factors go into queen quality?

Jamie 30:33
I think that's a very important question. In fact, I give a talk on identifying queen events. A queen event basically means an issue that your hive is experiencing, because of something going on with the queen. When we've been talking up until this point, we're talking mainly about queens quote, "lasting," how long are they living in the hive, and what might affect their longevity, but in reality, there's lots of things that kind of roll into this topic of queen quality. I actually have a bullet list of things that when I'm usually teaching about queen quality, these are the things that I tell people that they need to watch out for as they're managing their queens. The obvious one, first, is that you have a dead or missing queen. Obviously, if the queen is dead, there's a quality-related issue there. Another issue with queens is just poor quality, she's laying too few eggs, or perhaps she has run out of semen, and she's only producing drones, or she never made it in the first place and she only ever produced drones, or perhaps you've left her in a couple of months and it's very clear that her offspring are defensive, or not productive. A lot of the things that you would expect to see if your queen was underperforming, perhaps your queen is missing altogether, and your colony has failed to requeen themselves. Now you have laying workers. To me, this is an issue that's upstream ultimate cause is related to queen quality. Then there's

supersedure, which is simply the bees desire to replace their queen or fix a situation where they're queenless. Supersedure really kind of occurs two ways: it's emergency queen replacement, when they've lost their queen altogether, or the bees themselves detect an issue that they have with the queen so they're trying to replace her. You can even have multiple queens in a colony, and believe it or not, that's a fairly common problem, maybe 5% to 10% of the colonies actually have two queens. This can be related to queen quality. When I talk about queen management rather than queen quality, one of the things I also throw in there as well is swarming, because when your colony swarms, you lose your queen for a period of time, and it often happens during production season, when you most need her there. Then of course in our area, in Florida, we have issues with African honey bees, if our colonies requeen themselves and our queens go out on their mating flights and mate with drones that are from African bee colonies, we can have those issues. To me, when I'm talking about managing queens, again, I'll do the quick list, dead or missing queens, poor queen quality, or queen failure, laying workers, supersedure, multiple queen swarming, and African bees, and all of these things kind of roll into things that I try to manage against or manage for when I'm trying to make sure that I have the best queen possible in that hive, to make my colony as productive as possible.

Amy 33:30
Awesome, and we're actually putting together a fact sheet to put these factors together on the list so that it makes it a little bit easier for beekeepers to be able to go into their hive and then look at this list to say, okay, what are the possibilities that may have been going on as far as queen quality goes? So I'm pretty excited to share that with our audience.

Jamie 33:49
Amy, one of the cool things that's come out of this podcast is that we get to interview people that I like to hear from as well. Perhaps the most eye opening interview I've had recently was with Dr. Tarpy, from NC State, where he was talking about how some of the things we often blame queens for, for example, for brood patterns, aren't necessarily related to queen. So when I talk about queen quality notice I didn't say brood pattern. Well, that's because of us talking to him and us reading some of the research related to that. It was very interesting to me that oftentimes he would say the queens are being blamed for things in colonies that are not their fault and I don't know if our listeners caught one little tidbit that he mentioned, but this idea that if you've got an underperforming queen in one colony, and right beside it another colony where the queen is doing well, he said that sometimes you can switch queens and that underperforming queen all of a sudden gets better, so she pops out of whatever the issues are happening in that first hive or nest that you were blaming on her, when it wasn't her fault at all. Sometimes removing her from that environment can make her better and isn't it funny, that's the same thing when you say with kids, get them out of that environment. They all of a sudden perform better. Well, maybe the case is true with queens as well, maybe a lot of our issues are just we need to move them around to get them out of the bad situation. There's so much to know, is what I'm trying to stress, and that's why I think it's a great budding field [in which] a lot more is going to be uncovered in the coming years and decades.

Amy 35:16

Yeah, absolutely. This isn't our first segment on queens, it probably won't be our last segment on queens, but I agree, I think that the people that we've interviewed have been really great. I mean, I feel like I've met so many people just by hearing their voice and asking them questions about their research. I think that's been fun. I hope all of the listeners have been enjoying some of the guest speakers that we've had, and also the topic. Don't forget, again, if you have any suggestions on who you'd like to hear, and what topics you'd like us to speak about, just let us know.

Stump The Chump 35:54
It's everybody's favorite game show, Stump the Chumnp!

Amy 36:04
All right, it is a question and answer time, we've got three questions. Jamie probably has 50 answers.

Jamie 36:10
Probably so, or more.

Amy 36:12
That's the goal. That is the goal. Okay. Our first question is, someone had contacted us and said that they have a hive that they need to expand, but the bees aren't making comb on the new frames. There's a little bit of burr comb that this person has, they've melted it down, they're wondering, should they melt it and then try applying it to the frames above to get them to start building in the super?

Jamie 36:36
Okay, that's a really interesting question. Basically, the beekeeper wants the colony to expand, the bees are not expanding in response, but the beekeeper did say the bees need to expand. I'm going to give the beekeeper the benefit of the doubt under this idea that the colony is fully occupying its box. There's probably a couple things at play here. Anytime bees aren't building comb, it's because they don't have the resources to do it. Okay, so a colony can fully occupy a box so much so that if you take off the lid and the bees boil out of it, I mean, that looks like a lot of bees. The hive's completely full, the colony's filling it to the utmost, and you put on a box and the bees move into that box. You go to yourself, oh, there's bees everywhere, why aren't they building comb? They need to build comb. It has less to do with what the beekeeper's mentioning, in this case, the beekeeper's proposing to melt some comb and perhaps paint it on foundation, I'm assuming that they put up in that uppermost box. But even if you do that, the bees won't build wax if they don't have the resources to do it and so they need incoming nectar or you need to feed them and they will use that incoming nectar or use that food that you provide, that sugar water that you provide, to produce wax and therefore produce comb. The reason I believe the beekeeper's asking the question, if I can read between the lines, is there are certain types of foundation that we have today, this hard plastic foundation as an example, that bees can be slow to build on, and so a lot of beekeepers will actually melt wax and kind of paint that wax onto that foundation, in an effort to coerce the bees to want to use that wax sugar. Of course that does help, but it doesn't help if there's no energy resources available to build that comb in the first place. So in reality when I suspect we're recording this episode in August, my guess is the question came in very

recently. I would suggest it's because there's just no incoming resources to trigger the bees to produce wax in the first place, even if the colony's fully occupying that box. I would say you got to feed those bees if there's no incoming nectar if you expect them to pull comb.

Amy 38:56
Yep. That was the first thing I asked him, actually, was whether he was feeding them or not. As far as a burr comb and melting, I know that you had mentioned that people do that pretty regularly. Is that hygienic? I mean, is there an issue with using burr comb overall?

Jamie 39:12
Here's the deal. In this particular case, the beekeeper's proposing to use burr comb that the bees already have in hive. Most beekeepers I know don't necessarily do that. What they'll do, is they'll have a block of wax that they'll maybe paint that on to the frame, but essentially melting burr comb is accomplishing the same thing. So burr comb, for those of you listening who may not know that term, basically that's just the extra wax that bees stick places that you don't want it, maybe on the bottom of frames, or between two frames, or on top of a frame, between the frames, while the lower box or uppermost box. It's okay to melt that wax and spread it on to foundation from other hives. I would argue it's not necessary but it's okay from a hygienic perspective. Usually the temperature that you have to melt wax will be enough to kill all the microorganisms except the American foulbrood spores, and frankly, you'd have to superheat it or melt it with like, a true fire in order to get rid of the spores. It will address American foulbrood problems, but it will address all the other things that could be along with the wax.

Amy 40:19
Got it? Alright, the second question, this was my question. Somebody called me the other day and said "zombee," and they were like, oh, my bees kind of looked like they were zombies. And I'm like, what? And they're like, yeah, you've never heard that term before? And I'm like, no, I haven't! I'll have to ask Jamie about it.

Jamie 40:39
As if we don't have enough problems with colony collapse disorder, and dying bees, and Varroa, now we've got zombie apocalypse.

Amy 40:47
Well, we have the murder hornet, so now the zombies are coming too.

Jamie 40:50
Why not? The funny thing is, is there were zombies before they were murder hornets. At least in the US, let me talk about what this means. Your caller may have been referring to a lot of different things. So let's get the thing out of the way that I think is less likely. There are lots of things that bees can encounter that will cause them to have erratic behavior, to behave like zombies, as it were. Pesticide exposure can cause erratic behavior, there's some viruses and other pathogens that can cause erratic

behavior, you might imagine that if you were being parasitized upon by Varroa, you might have strange behavior as well. There's a lot of things that can cause these changes in behavior that you might say, oh, these are zombies, but I really don't think that's the context for what's being talked about most, because there is actually something called a zombie fly that does, in fact, cause really strange behaviors in bees and about five to six years ago, it really became the news in the bee world. What it is, is there is a family of flies called phoridae. There we refer to it shorthand, phorids, and a lot of these flies are parasites. There is one species in particular, that will use her ovipositor, egg laying appendage, and lay eggs inside of honey bees and - I don't want to use the word sting because only Hymenoptera, bees, wasps, and ants sting, but it's almost like a sting. They sting the honey bee's abdomen and then they will lay their eggs, two to four eggs or so, inside the honey bee.

Amy 42:36
Does the honey bee die at that point?

Jamie 42:37
Not yet. They don't die at the sting. It's actually worse than that, Amy. What happens is these larvae that come out of these eggs, fly larva are called maggots. These maggots go through the honey bee, eating honey bees alive from the inside out and when these honey bees are parasitized in this way, they start displaying erratic behavior. They do things that we don't expect worker honey bees to do normally. As these larvae are growing and developing, the honey bees' behavior gets more erratic. Then once these maggots want to pupate, they pupate outside of the bee. So what they will do is they tend to exit the bee usually around the head region, which will cause the bees head to just pop off. These maggots come out and then start pupating. They produce adult flies and start the process over again. We actually have a document, an EDIS document, on zombie flies that we wrote about the time that hysteria and the craze was really popular. If you look in our show notes, we'll make sure to link it. You can search also EDIS zombie fly and you'll find it. You can read all about this fly and about the zombie-like behavior that it causes in bees. There's a lot of things like I said that can cause these erratic behaviors. But probably when people hear the word zombies, they're really hearing that word as a result of this craze about the zombie fly that was associated with honey bees. We have these flies here in Florida. I know there's labs out in California looking at them as well. So they actually have a pretty wide distribution, and if you're listening from outside the US, you probably have your own version of these flies as well. It's a really interesting fly. It's interesting thing it does to bees, check it out. You'll learn all about it.

Amy 44:24
We're going into August now, or I guess we're in August now, and I'm just thinking, every month there's been something so I hope that this podcast segment doesn't start the Zom-Bees, and it's like a headline news article I read.

Jamie 44:39
I've been at UF since 2006 and it has been one catastrophe after another. I'm almost numb to it. It's sad to say, but zombie flies, murder hornets, I almost hate to say, what will life throw at us next?

Amy 44:55
Yeah, I mean, what would we do? We would be so bored. The third question I had was that someone said that they liked foundationless frames, because that made smaller worker bees, which led to less Varroa. Is that true?

Jamie 45:14
This is born out of about a 10 to 15 year old belief that using what we call small cell foundation can be a good control for Varroa. About the time that I got the job at the University of Florida around 2006, there was a huge craze about small cell foundation, and for those of you don't understand what that means, it's exactly what it sounds like. If we buy a foundation from an equipment supplier, it is going to be a certain size, we'll call this the normal size, and there were people who were believing, at the time, that if we give them smaller cell foundation, in other words foundation with smaller size cells imprinted on them, the bees would make smaller cells as a result. Honestly, when it first came out, people were touting that it would cure everything. It would cure nosema, but usually when people were talking about it, they were mainly mentioning it from a Varroa perspective. "If you use small cell foundation, your bees will make small cells, you will get smaller bees and you'll get fewer Varroa, a significantly lower overall population. It cures everything, but it really helps against Varroa." My wife, Amanda, when she was working at the Florida Department of Agriculture and Consumer Services, actually did a project on this, she gave half of her colonies regular sized foundation, the other half small cell size foundation and long story short, there was no impact on overall population. Since she published that work, four or five labs around the US have done similar work. None of them found an impact of smaller cells on Varroa population. To make a long story short, I don't think it does anything of any consequence to Varroa, but the listener did make an interesting point, saying I don't use foundations, so the bees themselves will make smaller cells. It is true, or at least that appears to be true that if you leave bees alone, they will make slightly smaller cells in diameter to the cells that we provide them by virtue of providing them foundation. It does appear to be true that our foundation will lead to slightly bigger cells than the types of cells bees would make on their own. I believe there is no consequence to the Varroa population or for that matter to the disease and pest pressures in general. The good news is if data come out to suggest otherwise, I'll be the first to believe it, but all the reports that I have seen, not only from my wife, but others around the country doing this type of work, I've just seen no evidence that there's anything at all to this small cell.

Amy 47:53
The theory, in my mind, would have made sense just because, I mean, part of the integrated pest management is to have bigger drone cells, because that's what Varroa like to feed on, so maybe that was the idea behind having a smaller cells, smaller bees, but it's interesting that the science has not shown that to be true.

Jamie 48:16
Here's the deal. I've actually heard it explained from a lot of different perspectives. Idea number one, well, they're smaller cells, the Varroa don't have space in those smaller cells. Idea number two, there

was some evidence that if bees are developing smaller cells, they develop maybe half a day to a day quicker. If you take half a day to a day off of the developmental cycle of a honey bee, Varroa will have less time in that cell to reproduce. You may go from Varroa producing an offspring and a half in a standard 21-day worker brood cycle, to a Varroa producing an offspring in a quarter, on average. That might be enough to slow the reproductive rate of Varroa, but this just hasn't led, in the research papers I've seen, this hasn't led to fewer Varroa in the colony. It's an interesting thing to talk about and I will tell you a lot of commercial beekeepers I knew at the time were getting involved with it, but it's kind of slowed down, it fizzled out. These things tend to rear their heads every decade, and like I said, if there's plenty of refereed research to suggest that this is the case, I think scientists and beekeepers will be happy to adopt it, but I've just not seen that support.

Amy 49:30
On that note, part of my job is to make sure that I'm updating everyone on the most up to date science that comes out so I'd encourage everyone, if there's something on our website that you can't find and a question that you have, feel free to email us, because we'll have to do some research just looking and browsing to see if we can find the latest research, so that I can share that with everyone. Thank you very much and don't forget to like and follow our Social Media pages. If you have any questions, feel free to contact us. I think a lot of people know how to contact us at this point, if you're listening to this podcast, you likely, are on our listserv or following our social media. We really appreciate everyone and Jamie and I are probably going to do a quick segment sometime just to update everyone on how many listeners we have, who's listening and really just an update on our podcast in general. Hey, Jamie, guess what?

Jamie 50:34
What, Amy?

Amy 50:37
I thought that it'd be fun -- well, you and I were both talking about this, and we thought it'd be fun to share with our listeners, all the numbers that are coming in with the podcast since we started in January. I can't believe it's been eight months now that we are into it. I think we've got a couple of fans out there.

Jamie 50:56
Just a few. Amy, how many episodes have we done? Are we around 30 at this point?

Amy 51:00
Oh, you would ask me that question. I don't know. Yeah, I think it's about 30. We're about to put out number 30. And we had two special episodes that we didn't count.

Jamie 51:09
Okay, I didn't know that. So we're around 32.

Amy 51:12
Yeah, well, yeah, exactly.

Jamie 51:14
I'm not exactly. By the time this comes out, we don't even know. So we're around 30. Let's just say that.

Amy 51:19
Yeah. It's kind of funny, because for the first time the other day, I got a speaker request, and they had specifically asked for me, and I'm like, what do I have to tell? I feel like I'm at my peak, in my life. So, goal has been reached. But yeah, people are saying that they really like the podcast, they really like what we talked about, and so I guess they just wanted to hear more of my voice. I'm not sure. We did want to update everyone on the numbers that we have. So far, between the 32 episodes that we have, we've had over 43,000 plays. I mean, that's pretty incredible.

Jamie 52:00
That is. It's amazing that people would listen to what we say 43,689 times, in fact.

Amy 52:08
Each of that is about an hour long, right? This number doesn't take into account, whether someone has listened to us 40,000 times or whether someone's listened to us one time, but I still think that number is pretty unique. And it's pretty big, considering there's probably never an opportunity for us to have a workshop where we'd be able to present that many hours of content.

Jamie 52:32
Yeah, and the beauty of this stuff, too, though, Amy, is that it's online into perpetuity. Even if we never recorded another episode, it would still be there and people can refer back to it well into the future. Those hits will just keep going up. It's like posting a document online that can just be read forever. That's one of the neat things about this. This is 43,000 listens, just in the first eight months, but what about a year and a half from now, when more people become aware? Five years from now, once this stuff's been up for a while. It's pretty exciting that this podcast is having reach. I think one of the most encouraging things to me about it, is that it's not just hobbyist beekeepers, we've had a lot of commercial beekeepers as well, I've had a few email me and say how much they appreciate it. It's not just people from the US, but it literally is people from all around the world. In fact, I think on this data sheet that you have here, we're able to look and see, obviously, being based in the US, many, maybe most, of our listeners are from the United States, ninety percent of our listeners, which of course makes sense. But 2% of our listeners are in Canada, 1% from the UK and Australia, then we've got listeners from Ireland, Guam, and you just scrolling down the list here. There's dozens and dozens of countries represented here. So literally beekeepers from all over the world. It's hard for me to guess based on this list, but I'm going to say there's 30, 40 countries represented. So there's literally beekeepers from all around the world, every continent, listening to this, and that's exciting. Which tells me that a lot of the content that we are producing is in fact relevant to beekeepers, not only in the US, but beekeepers all over the place.

Amy 54:08
Yeah, people have been messaging me saying it's really great to listen to your podcasts while we're working bees, and while we're putting equipment together, while we're just taking our morning walk with our dog. I think that's kind of cool and I hope that everyone continues to keep listening in and to definitely share with your neighbors, with your friends. I feel like some of our podcast episodes are really important for people who are non beekeepers as well. The landscaping for pollinators is just one that comes to the top of my head. Then we were looking at some of the top episodes that we have, and Jamie I think the people really like listening to your advice, whether or not it's made up.

Jamie 54:54
It looks like our top episode was when I was discussing my top 10 tips for beekeepers. In other words, if you are getting into beekeeping, or you are a beekeeper, here are the 10 things, that if you can address these 10 things, chronically and consistently, you'll have healthy productive colonies. So it's really neat to see that our listeners responded to that. It looks like the average episode's being listened to around 1500 times. That's exciting. And I think you've got this. What's second here on this list? I'm curious.

Amy 55:25
Second is the social immunity and swarm.

Jamie 55:28
Dr. Marla Spivak? Yeah, she's obviously one of those people everybody loves so I'm not surprised to see her up there as well. And what are some of the other top ones?

Amy 55:39
Some of the other top ones, the queen duets, I think they liked your toot-off.

Jamie 55:43
They liked hearing me make the queen tooting sound?

Amy 55:47
Yeah, and of course, just the best management practices. I think a lot of the segments that have just practical information that we can share and applicable information that we can share, people really tend to like that.

Jamie 55:59
To me, what's neat about this is some of these episodes that are among our most listened to are relatively recent. I mean, they're in July, maybe even some of them even now in August, that tells me that the podcast is gaining steam, and more and more people are listening. As an episode comes out, literally within a few weeks, it's been listened to lots and lots and lots of times, and that's really neat. It's humbling. Like you mentioned earlier, we make no money from this, there's no advertisements on this, we're just trying to report information that beekeepers can use. Not only information from the US, but

research from around the world, so we really need beekeeper help spreading the news. We need you to go into your favorite podcast platform and rate us, we need you to tell your beekeeper friends and neighbors about this, so that we can get more people to listen. Literally, it's just our effort to share what's going on in the beekeeping world so we can make your colonies healthier, perhaps give you some ideas that you can use in your beekeeping operations to make it more profitable, your colonies survive more, and you just enjoy the craft more. Honestly, we talk a lot about research as well and I bet we have listeners out there, especially individuals who are considering going to college or graduate school who might be listening to the types of projects that we mentioned and other scientists mentioned, and might be coming up with their own ideas. Maybe this is one of those things that's an impetus for future ideas and future research topics on beekeeping, and that's really neat. The last point I'll make in this regard, is that we want this podcast to be for the listeners. In order to do that, you have to tell us who you want to hear us interview, what topics you want us to cover, and you have to be the one who asks us questions, so that we can have those even in our q&a segment at the end of every podcast. This is listener driven. When we don't get ideas from you, we're kind of forced to come up with our own. So please tell us through our social media accounts @UFhoneybeelab, how we can make this podcast better and how we can make sure to cover topics that will help you be better beekeepers.

Amy 58:03
I was in a talk the other day with the Florida State Beekeepers Association. The topic was just about my job and what I do. I was telling them, we're gonna continue this as long as we have listeners. So as long as people are listening, as long as they like the content, as long as they like the information that we're providing in the way that we're providing it, we'll continue doing it, and as soon as those numbers start to plummet, we'll try to be creative and move on and try to find something else on how we can educate everyone out there.

Jamie 58:35
Absolutely. Could you go back to the list of countries or people listening from different countries? I see a lot of places, we've got the Philippines, Japan, Somalia, Macedonia, Colombia, Poland, etc. If you're in another country and you're listening to this podcast, what are some topics we can discuss that would benefit you where you are? Or some scientists in your region of the world who you think we should interview? Or perhaps commercial beekeepers, or someone who just knows really a lot about beekeeping in your area that might be able to share something that we can spread around the world? We've got a lot of listeners all over the place. Help us help you; help us do our job better. We got to hear from you to make that possible.

Amy 59:18
Hi, everyone. Thank you so much for listening to this week's episode of Two Bees in a Podcast. We would like to give an extra special thank you to our audio engineer James Weaver, and to our podcast coordinator Jacqueline Allenje. Without their hard work, Two Bees in a Podcast would not be possible.

Jamie 59:36

For more information and additional resources for today's episode, don't forget to visit the UF IFAS Honey Bee Research and Extension Laboratory's website UFhoneybee.com. Do you have questions you want answered on air? If so, email them to honeybee@ifas.ufl.edu or message us on twitter, instagram, or facebook @UFhoneybeelab. While they're, don't forget to follow us. Thank you for listening to Two Bees in a Podcast.