Episode 172_mixdown PROOFED

Wed, Jul 03, 2024 1:45AM • 45:23

SUMMARY KEYWORDS

bees, colonies, queens, mite, varroa, brood, beekeeping, marla, question, frame, breeding, beekeepers, resistance, traits, hear, hive, stock, honey, research, commercial beekeepers

SPEAKERS

Guest, Jamie, Stump The Chump, Amy

Jamie 00:10
Welcome to Two Bees in a Podcast brought to you by the Honey Bee Research Extension Laboratory at the University of Florida's Institute of Food and Agricultural Sciences. It is our goal to advance the understanding of honey bees and beekeeping, grow the beekeeping community and improve the health of honey bees everywhere. In this podcast, you'll hear research updates, beekeeping management practices discussed and advice on beekeeping from our resident experts, beekeepers, scientists and other program guests. Join us for today's program. And thank you for listening to Two Bees in a Podcast. Hello, everyone, and welcome to another episode of Two Bees in a Podcast. We are incredibly fortunate today to be joined by absolutely one of the best, and that's Dr. Marla Spivak, who is a distinguished McKnight Professor in the Department of Entomology at the University of Minnesota. We can bring Dr. Spivak back on to talk about so many topics but we brought her in today to talk about breeding for Varroa resistance since it's such an important theme, really, around the world. Marla, thank you so much for joining us on this episode.

Guest 01:19
My pleasure. Thanks for having me.

Jamie 01:21
You are a repeat guest. We had you back in 2020 to discuss some social immunity with us, and that was a very popular podcast. So we thank you for that. But now we want to get back to some of your roots and talk to you a bit about breeding for Varroa resistance. But before we get there, even though you're a repeat guest, could you tell us a little bit about yourself and how you ended up where you are, and especially how you ended up linked to honey bees?

Guest 01:44
Sure. Let's see. So I got interested in bees when I was 18 years old, just by reading a book. And then I worked for different commercial beekeepers here and there and as a research assistant, and then

ended up going to graduate school. It carried me through, and I fortunately got this job at University of Minnesota in 1992.

Amy 02:07
That's great. So like Jamie mentioned, we brought you on to talk about Varroa resistance. I feel like we've been to a lot of local, we've been a lot of state, we've been to a lot of national and international conferences here in the past couple of years, especially after we had kind of a shutdown during COVID. But we hear about Varroa resistance, we hear about queen breeding, and we keep hearing about it. We just wanted to talk about what this actually means. What does it mean to have Varroa resistant bees? And then we'll probably go a little bit more into the breeding aspect after that. But what does it mean to have Varroa resistant bees?

Guest 02:43
That's a great question. For me, right now, Varroa resistant bees are colonies of bees that can keep mite levels low over season after season just over a long period of time. And so they're actively fighting, they're actively resisting, but I don't think you ever really get there. It's not like when you have a resistant line of bees or colonies of bees that you can just forget about them and they'll be fine. You'll always need to be doing some selection and culling in particular, and by culling I mean removing some colonies from their program. So it's something you have to keep working at and that the bees have to keep working at. It's not a goal that you're ever really going to reach.

Jamie 03:36
So that's interesting, Marla. I'm going to ask a follow-up question. When you were answering that question, I was thinking to myself about this growing idea of local bees and bees developing resistance on their own and never having to treat and treatment-free. But you're hinting it's an active process. Breeding for resistance is an active process, and it takes the bees' cooperation and your cooperation. Are these other strategies flawed? Are they reliable? Can they produce results?

Guest 04:03
By other strategies, you mean survival stock? Like that?

Jamie 04:06
Survival or even, yeah, treatment-free. I mean, if breeding sort of gets you close but never there, can doing nothing at all get you there?

Guest 04:15
Really evolved, evolved and continue to evolve on this. Right now, we're in the middle of -- I don't know if I would call it a breeding program and I can explain why shortly. But I have to keep paying attention. I can't just let everybody go treatment-free because you lose a lot of colonies and you can lose really great traits. If a colony robbed out another and they gained a lot of mites all of a sudden, they could be really resistant but got those mites and if you let them go for a while, they could either live with the mites or they can succumb to mites. But I don't know if I'm giving a very clear answer. I don't think the solution is just leaving everybody treatment-free. I don't think that's a great path forward.

Jamie 05:03
So I tend to agree. And it's really neat to hear you say that. I think what your answer boils down to is that it's kind of complex. It's a complex issue, which leads me into the next question. You're using the term "resistance." And I hear people use the term "tolerance," and they might use those interchangeably. And maybe it's a point of semantics. Do you recognize a difference between resistance and tolerance? And do you think either or both is achievable?

Guest 05:31
I do think there's a difference, and I do think both are achievable. I'm more interested in the resistance traits, those where the bees are doing active resistance against mites through some behaviors. Tolerance is more that they're able to live with high levels of mites and/or viruses. And I think you see that in, for example, the bees from Cuba, from what I've heard about from Dr. Stephen Martin from the UK. He talks about those European colonies surviving without treatment, and they have kind of high mite loads. That would probably be tolerance.

Amy 06:08
So I'd love to get into some of those characteristics. What are the traits that are associated with resistance? So what are you looking for, specifically, when you're going into your breeding programs? What are some of those traits and what are some of the behaviors that you're looking for?

Guest 06:25
Right. In the past, I was looking for hygienic behavior, based on results of a freeze-kill brood assay. I'm not doing that, per se, anymore. What I'm doing is looking for colonies that don't grow mites over the season. And by grow mites, I mean that we look at the mites on adult bees and the percent of mites in worker brood in spring and then in late summer, and of course we're in Minnesota, we have a short season. By September, the queens are not laying, so you have to take this into consideration with our timing and what we do. But we're looking for colonies that keep the mite levels low over that summer. Then, if they do have low mite levels, we would not treat those, see how they winter, which, usually, we have a big, long, snowy winter, and then how they grow in the spring. And then can they get through a second year of keeping mite levels low? And if they can go through two years like that, two winters and two summers with keeping the mite levels low surrounded by colonies that may have high levels of mites, then I breed from them. I would raise queens from them. But here, I'm giving them two years. It's a long cycle.

Jamie 07:44
So, Marla, that's interesting because what you say you're essentially selecting for is just low mite levels, these colonies that could keep low mite levels over two winters. You mentioned in the past, you've specifically looked at hygienic behavior, which of course led to the Minnesota hygienic queens that have been so popular. So I'm curious, when you find these colonies that have done well over these two winters, are you ever interested in knowing why they did well, how they were able to maintain low Varroa populations over those two seasons?

Guest 08:17
Yes. We do the freeze-killed brood test for hygienic behavior. We do Kaira Wagoner's UBO assay. I did it last year, but we will this summer again. And we look at Harbo's mite infertility scores. We're looking at all the measures we can take: colony health measures, frames of brood, honey production, propolis collection. We're looking at everything to see if we can figure out from the phenotype of the colony why they might be surviving. We take samples of bees and they're stored in our minus 80 for someone in the future if they want to do any genomics or omics studies on these to see if they can figure out why some survive and why some don't. I keep very, very careful pedigrees, lineages of every queen and her daughters, whether they mated or not. The colonies I'm working with are all open-mated, breeding with each other. I'm not doing any inseminations. So yes, we do look for traits. And I would say yes, over time, they've become very hygenic based on the freeze-killed brood test. Many of them have high rates of recapping, another measure I didn't mention earlier. But I don't understand that trait, but they do a lot of this recapping of brood. They score well on Kaira's UBO. Not all of them, but some of them do. Some of them are getting more and more mite infertility where you open up a cell and there's a foundress mite in there and maybe a male, but the daughter mites are not of sufficient age or they're not there in order to mate and carry on. So they do have these traits but I'm not selecting for them. They're emerging on their own, if you will.

Amy 10:05
It's always fun to hear you listing all the different methods you're using, all the things you're looking at. There's so many factors that go into it. There's so much that happens with the research going on. So I applaud you for that. And I'm excited to hear what you all find in the next summer or two. But my next question for you is what do you all do with the colonies that do keep Varroa populations low? And how do you breed for these resistant bees?

10:31
Right. So this comes back to what I mentioned earlier. So I would not say that I'm actually breeding for resistance. I'm doing some really careful selection. And the reason I say this is because I started in about 2018, and I was looking at different queens I would get from all over the place. Some local stuff, a lot of stuff from the Baton Rouge lab, POL queens, Russian queens, I got some Saska Trez, both from California and from Canada, Hilo queens from Hawaii, Sue Cobey sent me some of her Caucasian backcrosses that she has. I have some from Washington State from Steve Shepherd's lab that he had not treated his colonies for 14 years and he sent me queens. So I started with stock where some of them were actually carefully bred, or others were showing signs of resistance already. And I would bring in these queens and look at them, evaluate them, or watch their mite levels over time. I breed from the colonies, in other words, I raise queens from the colonies that keep the mite levels low. I wait for at least a year, and now, two years, before I raise queens from these colonies. But an important part of this is the colonies that cannot keep mite levels low, and there are a lot of them, even when getting POL and Russian and Hilo stocks that are supposed to be resistant, I can't give you a percentage, but about half, at least half, I would say, somewhere around there, grow mites. They're not completely resistant, I would say. So we treat those, and if they show any sign of disease, we move them out of the area completely. So if they need to be treated, or if they show any signs of a European foulbrood or chalkbrood or virus in the brood, we move them out. And so we're only keeping colonies in this one

location that look healthy and have low mite levels, and we're looking at their virus loads too. We keep their virus loads low. So if we started with 200 colonies, it gets whittled down quite fast to those that can keep these mite levels low and stay healthy over two years. Right now, we wintered over 100 colonies, and about 60 of them are in these five frame nucs that we can't get into because they're wrapped together, five nucs together. We won't open those up until April. But the big colonies that we wintered without treatment, we wintered 40 of those, and because our winter has been so warm here, unusually warm, we were able to pop lids and look at a few of them. Well, we looked at all of the 40, and there's 30 of them that are looking great right now. And this is their second, if not more, winters without treatment.

Jamie 10:45
I want to follow-up with this question then. So you've got this X number of colonies that survive winter. And I'm assuming in this selection program of yours, you're still picking winners somehow and grafting from those queens and requeening everybody to do all this over again. I mean, how are you moving the winning stocks forward in the selection program?

13:46
These are great questions, you guys. I struggle with these questions. Every time, what is the best? How do you choose the best? How do you choose the colonies from which to raise queens? We've been looking at those because I keep careful records on Excel, and then these pedigrees, I can look at their histories and tell you how they've done over time, and how they look coming out of winter. That's a big one for me. Are they on time with the season? Are they struggling? How do they look in the spring, for me? And if they're looking good, then we would raise queens from them. But I would like to move into another idea. I've taken a lot of inspiration lately that came from some commercial beekeepers in trying to answer this question, who's the best queens? How do you choose colonies to rear queens from? So I was struggling with this question, this very question. Who do I breed from? We'll just see how it goes. And then these beekeepers that are actually based in Minneapolis, and I've known them and their dad for many, many years, but their bees are Run from North Dakota over to almonds, and then down to Southeast Texas for the winter after almonds. And their last name is Lamb. Ryan Lamb and Mike Lamb run the operation now, and they have 8000 colonies. And years ago, the Baton Rouge lab wanted to improve their VSH stock, so the VSH line of bees that they had bred down in Baton Rouge. Beekeepers were saying, "We don't really like this line in a commercial setting and for almond pollination." Whatever the problems were. Bob Danka and others from the Baton Rouge lab went to some three commercial apiaries, and the Lambs were one of them. And they took the VSH queens and they started introducing them into the Lamb's operation and the Lambs would raise queens from them. Baton Rouge did some very careful selection and inseminations to increase honey production and whatever else they were looking for. And they ended up renaming the VSH line POL, for pollination. And then, the Baton Rouge land got what they want. They left the Lambs, and the Lambs were sitting there going, well, that was fun, our stock looks great, it looks better. But we cannot continue to do that same kind of selection that they were doing with microscopic work and microscope work mites and brood and introducing mites and inseminations. So they came up with this really ingenious, what I think is really ingenious idea. They have their crew mark the three best colonies in every yard. So their crew would go out in June, and they find the best one in June, what they deem the best, whatever they like for their operation.

Maybe spring growth. And then a different best one in July, their top honey producer, probably, and another one, a third one in August. So every yard has tagged a permanent tag on there, the three best colonies. And then at the end of the season, when the queen stops laying eggs in North Dakota, they're getting everybody ready to take to almonds, but those best ones they leave behind. So they'll treat everybody else in every yard. They leave those three best right where they are all summer. But they don't treat those. They treat everybody else, take them to almonds, it turns out to be around 300 of their best. They do mite washes in October when there's no more brood in the colonies here. They do mite washes, and so they get a fairly accurate count of how many mites are in these colonies. And they move the good ones down, the good ones meaning they have the lowest mite counts, straight down to to Southeast Texas. And they remain untreated, and they do might washes again in February, probably around now, maybe a little before this. They're looking for about 25 to 40 colonies of their best colonies that still have little mite loads, and they raise queens from those. And when everybody comes back from almonds, they split everybody and put queen cells in everybody from these 25 to 40. They've been doing this for about 10 years. And they've shown me some of their stock, and it's looking pretty good for mite resistance. So I think the main points are their best are whoever works best in their operation for what they need, and for them, it's honey production in North Dakota. And then from those best, it's about 3 to 4% of their total population of bees, they don't treat those, and they raise queens from those. And I think that's really smart. So they're raising queens from the best colonies with low mite loads over time.

Amy 13:59
We've kind of already answered it, actually, but it leads me into the next question that I had for you. And that was how do we continue the line of Varroa resistance in our production apiary? So you kind of touched on that. And then I would like to also hear, I think, just from, maybe, a non-queen breeder's perspective of that or non-queen producer's perspective on that. Let's say we've got a hobbyist or sideline operation that would like to keep this line. What are your recommendations of what they should do to continue the line of Varroa resistance in their apiaries?

19:29
Right. So the first thing they need to do is understand that getting these bees doesn't mean their work is done. It's going to be constant selection. First of all, this is what I'm thinking now, and if you ask me next year, I may have changed my thinking somewhat. So this is where I'm at right now. I'm just gonna give that caveat. I think beekeepers can -- I'm going to use a term that's not normally used in bee breeding but -- infuse their stock with some genes for resistance. In other words, they can introduce some POL stocks, some Russian stocks, some Hilo, some stocks that have already been shown to have resistant traits, raise queens from those just with queen cells and get them into their operation so those genes are in their operation. And then do something like the Lamb brothers are doing to continue to select for the best colonies that keep the mite levels the lowest. So I think that could work for larger scale commercial beekeepers. And for smaller scale, it would be the same thing. You can introduce some of these resistant genes through the queens into your operation. But it's a lot of work to continue to find the queens colonies that continue to keep mite levels low that you like, and raise queens from those and cull others. The treating and culling the rest is just as important as breeding from the best.

Jamie 21:03
So Marla, I've been watching this for a very long time, and when I was a postdoc at University of Georgia, I did some work with Russian bees that we never published. But it was very clear to me that using, in this case, a resistance stock really, really did reduce the need for pesticide use. The colonies had greater survival rates, etc, etc. Alright, so, you were able to show that with your Minnesota hygenic. We've seen that subsequently with other lines of bees and Amy's question is so important for that reason. I feel like I've watched folks proverbially bang their head against the wall the last 30 years trying to get these stocks in the hands of beekeepers who, for whatever reason, often don't adopt them. So I'm curious, you're so experienced in this field. I'm curious, where do you think all of this is headed? Are you optimistic in 50 years it will be an afterthought because everybody's using very good Varroa resistant stock, or do you think the academics, the breeders, the selectors will still be struggling to get these stocks into the hands of beekeepers and get widespread adoption?

22:08
These are great questions. Well, I'm an optimist. So I'm gonna go with there will still be beekeepers that don't adopt these, but there will be more and more that do. But what we really need are simple methods to help beekeepers continue the selection. So I think the idea now is that they want to buy a particular line of bees and requeen their whole population and keep that line pure, or keep the line. That is not necessarily the best way to go. I think we can -- I'm gonna go back to this word -- infuse people's stocks that they like in their area, their local stocks or whatever bees they're using. Just infuse some genes into it through introducing queens, and then continue to select. The trick is what to select for. I'm thinking like Randy Oliver has done and others have done recently, just monitoring mite levels, and some selecting for colonies that keep mite levels low in your area, that's probably the best way to do it.

Amy 22:41
I think that's fair. So I've been giving a talk lately on just hot topics in beekeeping. Of course, a hot topic is related to breeding, and again, just having that Varroa resistance. Can you tell us, just to end off this segment, other research going on right now related to breeding that people should know about?

23:37
Oh, there's a lot going on right now. I think it's very exciting. I mentioned a few of them earlier, Kaira Wagoner's UBO assays. So spritzing the odor of mite-infested pupi on the cell toppings and cappings and seeing how quickly the bees detect that there might be something wrong, even though there's nothing wrong with the brood they sprayed. People looking at recapping, that's mostly Europe and the UK where they're looking at that. The grooming and the ankle biters still out of Purdue, that still has a lot of promise, I think. So I think people are all over the world looking at all these resistant traits. Again, there's another surge in research on this, which makes me very, very happy. What we're still missing is this easy way to get all of this research to beekeepers in a way that they can use it. And that's the big puzzle that I think about probably every day.

Jamie 24:39
So, Marla, you mentioned early on that you've been at the University of Minnesota now, I guess, over 30 years, and I listen to you talk and don't hear someone who's bored of bees. This is not a breeding

question, this is not of all that. Could you just talk a little bit about your clear love and fascination for bees even after running a research program for three decades? Because I hear it in your voice, I know it's there. So let's divorce ourselves from the fact that we're trying to save bees and all that stuff. Tell us a little bit about your fascination and love.

25:15
Well, they do still fascinate me. And what I like most about it is they still have their mysteries, and that I can't know everything. They're very humbling, as you probably know. And I like that aspect of it. I just like, as always, being out in the bee yard, opening up colonies of bees and looking at them, smelling them. It's just both relaxing and challenging and humbling and mysterious, I guess. I guess that's my answer.

Jamie 25:50
I think that's well said. Well, Marla, thank you so much for joining us. Is there anything else you'd want to add to what we discussed today? It was incredibly helpful. We have struggled with the same issues here, Marla, and for many reasons, we've kind of resisted even having a breeding or selecting program at Florida just because the amount of work and the fault and energy. You've just done it so faithfully over these years. And so it's really nice to hear your stream of consciousness approach to "This is what I'm thinking now. This is what I used to think. That may change. But here's where I'm headed." I really liked that story associated with that. I think our listeners are going to appreciate that too. So thank you, thank you, thank you so much for what you've done on behalf of beekeepers, for all your years serving the industry, but also for joining us on this episode and sharing a little bit of your insight with our audience.

25:57
No, thank you for directing me as I struggle with these questions that you've been asking. They were really good questions, and I struggle with how to answer them. So I feel, still, a little bit mumble-jumbled in my thinking about how to do this breeding for resistance. But it's becoming clear. So I hope this was helpful to your audience.

Guest 27:03
All right, thank you very much.

Amy 27:10
So, Jamie, we had Marla on in 2020. She's like one of the original guests that we had. We were so excited to have her. We were really excited to bring her back on today. It's always so fun to pick her brain and talk to her because she's so well-known in the beekeeping community for all the work that she's done in the community.

Jamie 27:38
Amy, she's really kind of the best of the best. I was at a meeting years ago in Europe, and I was with a lady colleague of mine, and we were referring to another scientist in Europe. The colleague said, she said, "Yeah, that guy's an alpha male here in the bee research world." Marla's an alpha scientist, right?

She's just fantastic. Her passion has always been to help beekeepers. She works very closely with commercial beekeepers. She thinks and works really hard on their behalf. I think our listeners, thinking back to just that interview, will appreciate that about her. She puts a lot of her not just physical work into this, but she's putting a lot of mental work thinking on behalf of how to improve bee health for the betterment of the bees themselves, but also for the betterment of beekeeping and sustainability of beekeeping.

Amy 28:25
Definitely. I'm a little biased because I think that all research should be applied practical. I think that there has to be that communication between the researcher and our stakeholders. And of course, that's my job. But that doesn't have to be everybody's job. So I do applaud Marla for being able to take feedback, to work with commercial beekeepers, ask them exactly what do you need and how can we help you, and I think that's just a really great approach to making a difference and having an impact in our community. So that's pretty neat.

Jamie 28:53
Yeah, I mean, even when I introduced her, it was a very basic introduction, but she's got so many accolades that we could have gone on forever just talking about all the things that she's won and that she's accomplished. She really is a stellar individual, and really a good role model, both for beekeepers and scientists, especially budding scientists. She's a good person to model one's career trajectory after because she's so accomplished.

Amy 29:16
I wanted to kind of bring up just quickly about Varroa resistance, just this whole idea of it. Again, it's just one of those things that people will listen to, they hear it all the time, oh, Varroa resistance, Varroa resistance, and just generally what that means. So let's talk about that a little bit.

Jamie 29:32
Yeah, I really like the fact that Marla has gone through a lot of different strategies to improve bees. She had mentioned early on that she specifically was selecting for the hygenic trait where the bees can detect Varroa in capped brood cells, uncap those cells, abort the developing brood as well as the Varroa, and then this ultimately leads to lower Varroa population. So it's clear selection for a trait, breeding then further for that trait. Alright, now she's more of a "Let's let the colonies do what the colonies do. And the ones that have low mite levels, let's breed from those. We're selecting that stock and breeding from those." And then she goes back to look for what traits might those bees have that could be contributing to those lower mite populations? And she expressed that, right? Because when I asked her about that, she said, "Well, I went back and looked at some of these ones that had low mite levels for a couple years. And it turns out, they score high on the hygienic trait." But she told us off the air, she doesn't believe hygienic behavior is the only thing that bees are using. Of course, she referred to that stock out of Purdue, the ankle biters that will bite, basically, an enhanced type of grooming behavior. They will bite the mites that are on them, bite off their legs, etc. We see that. She even mentioned this capping-uncapping behavior that's kind of the latest craze, especially in Europe at the moment. So she acknowledges there are traits for which one can select, but there's also allowing the

bees to tell you, hey, here are the colonies that are doing well with Varroa. Choose us, and then you can figure out what they're doing to do well. So it's really neat to hear that strategy. I think the daunting issue here is getting it in the hands of beekeepers, them using it correctly so that it's common enough that that's what people use. They just use Varroa resistance stock. I think that's going to be the hurdle to overcome. But Amy, that's where extension comes in. You're an extension specialist, so that's where extension comes in and convincing beekeepers that it's worth a try, worth their effort.

Amy 31:32
So I guess this is our podcast to try to convince people to do that.

Jamie 31:36
This is one of the ways that we try to get the information out and we hope that people listening will change their behavior as a result of this. Having Marla on really gives some credibility and some data to the recommendations that are being made in this field. It's really how extension is done.

Stump The Chump 31:57
it's everybody's favorite game show, Stump the Chump.

Amy 32:09
Welcome back to the question and answer segment. Jamie, the first question, this is an interesting one. They're all interesting, but this is very interesting. What are good ways to get people close to me interested in bees when they are otherwise scared of them?

Jamie 32:25
Well, I want to answer this question two different ways. The first way is going to be contrary, I think, to how the questioner, hopefully, thought that I would answer it. And I would say it's not necessary to get someone who is scared to death of bees to like bees the same way you do. Everybody has different interests. Bees do have that added fear. It's probably innate in humans to be scared of stinging insects. So I would ask myself first, is it worth trying to condition this individual to like bees? It's okay if they don't like bees, it's okay not to force it. So don't feel like just because you like bees that everybody in your circle has to as well. So that's the first answer. The second answer would be if, though, you feel that it's necessary to do, I would personally first want to know if they're allergic to bees because I wouldn't want to force something on someone who could have a deadly reaction to bees if they're stung. But assuming that they are not, then I would just do the very slow introduction. For example, I would probably watch a number of beekeeping and bee-related videos online, Amy. You might know that we have this amazing YouTube series called Beekeeping Academy we produce here at the University of Florida. So watching videos like that is a good way for folks to see how bees are handled, how they react to humans working with them, things like that. The next thing I would do is fully suit those individuals and allow them to stand at a distance with you watching bees fly in and out of the colony with you calmly explaining what's happening. And then maybe stay at that equal distance while you, suited, go up to a colony and work it appropriately. You smoke it, you show them from a distance how calm bees can be. And then you do this again as a third step where they're now getting closer in the full bee suit watching you handle bees, watching you react to their behavior. So essentially, the way

that I would do it is that slow introduction. It's through education. Watch videos together, fully suit them, let them stand at a distance, you tell them what's happening, and then bring them slowly over time close to where you are when you work bees. But if there's clear fear, and that clear tentative, scared, apprehensive behavior, then don't force the issue. If it takes time for them to get accustomed and ready to receive bees into their life, then that's okay. I wouldn't rush it.

Amy 34:51
You know what I do before all of that?

Jamie 34:53
What's that?

Amy 34:53
Give them a jar of honey or do a honey tasting. People always love eating honey, right? That's always like their "in" to the beekeeping world.

Jamie 35:00
It's a great way to get people introduced, for sure.

Amy 35:03
Definitely. So for the second question that we have for today, someone's asking, what do you recommend doing if you have multiple queens in a swarm?

Jamie 35:11
This is a bit of a tricky question. I tend to be one of those folks who doesn't try to solve a problem until I really have one. And so in this particular case, if you can absolutely demonstrate that there are two queens in a swarm, I would hive the swarm as if it were a single queen swarm, and then hope that this corrects itself over time. I mean, the best case scenario is the queens, in theory, can live harmoniously or the colony itself will do away with one of the queens. The worst case scenario is you hive that swarm, and then one of those two queens takes half of the bees with them in a second swarm. I don't think that's going to happen. My guess is that more often than not, if there are two queens in a swarm, when you hive it, it will sort itself out and you'll just have one queen at the end of the day, maybe just a couple of weeks, maybe a month later. So what I would say in this particular instance, if you go and try to solve the problem on the front end, you may be leading a queen that is improperly mated or not one that's optimally suited to be the mother of the bees in that nest. So I would hive it, see what happens. If it's still two queens about a month later, I'm not even sure I would do anything, then. I mean, we've talked before on this podcast about the possible frequency of naturally managed colonies having two queens. I've made the point that at certain times of the year, if you look closely at your colonies, maybe 10-20% of colonies will have two queens, and I've talked about how that seems to be natural, and I've offered hypotheses for why that may happen. Maybe the old queen's pheromone output is decreased to the point that the colony doesn't recognize it as that queen so they replace her. And colonies can kind of go with two queens, that second queen flying under the radar, so to speak, for weeks or months. And all of a sudden that colony seems to remedy the problem itself. So all that to say, I think, more often

than not, that swarm is going to solve the problem on their own. Once you put it in the nest, the only time I would intervene is if a month later, two weeks later, there are no queens left in that swarm, and you have to do something to get one in there. But I think having two queens is not really a problem.

Amy 37:33
Sounds good. For the third question we have, when you're doing a hive inspection, how important is it to put the frames back in the same exact order that they were in? I ask this question while our beekeepers are probably out there, like moving frames around.

Jamie 37:48
Exactly, exactly. I know that they are listening to us right now. So no matter what I say, someone's going to have to change their behavior based on what I say. Okay, I'm going to answer this question as beekeeper Jamie and not bee scientist Jamie because I've never seen a research paper on this topic. Now, let's back up and talk about the original intent of this question. If left alone, bees move into a cavity, they build their comb, and they tend, in a brood nest, to store a lot of honey and pollen on the outermost frames. And then the honey would be over the top of the brood area. So let's put this natural arrangement into a managed brood box of about 10 frames. Let's just say that I go into this deep box, it's 10 frames. What I am likely to see is a lot of honey and pollen on the outermost of those frames. That'd be frames one and 10 and a lot of brood with less honey and pollen on frames two through nine. So the questioner is basically saying, as I stand beside a hive and I work a colony from frames one to 10, how important is it that frame one returned to frame one position and two return to frame two position and so forth. And I would argue it's really not that important during spring, summer and fall. In winter, it may matter a little bit because you want the honey right on the side of the clusters. But in spring, summer and fall, I've done all sorts of things to frames and a brood box and the bees be seemingly no worse for the winter. So let me tell you what I do, though, that takes the colony's natural comb arrangement in mind when I work hive. Okay, so I stand beside a hive. I do not work frame one. That'd be the one nearest me. I don't work frame one first. I take out frame two, which more often than not is going to be more brood than honey and pollen. I take out frame two. I look at it to see whatever I'm going in the hive to see and also confirm that the queen is not on it. If she's not on it, I leave that frame out of the nest. So now, I've created a one frame space in my hive where frame two used to be. Then, I remove frame one. That's the one nearest to me. It's the one that should have more honey and pollen than brood. I look at that frame for whatever reason I'm in there to look at it, and then I return it back to position one. So I'm leaving it where it was, then I proceed to work frames three through nine as mostly brood frames. I will take out frame three, I'll look at it for whatever reason I'm in there to look at it for, and I will return it to frame two position. Alright, so frame three is now where two was because where two was was that empty spot. And then I do four and put it in three's spot and five and put it in four's spot. So if you think about it, Amy, I've removed frame two which is mostly brood, set it out of the hive, that gives me a frame space in the nest to work. Then, I work frames three through nine, scooting them towards me one frame space over so that when I've gone through frames two through nine, I now have a gap where frame nine used to be. Okay, so then, I know this sounds complex, but I'll try to summarize at the end.

Amy 41:30

I'm watching it in my head. I can see it. I can envision it.

Jamie 41:34
Good. So, now I've got frame 10, which is predominantly honey and pollen, right? It's one of the outer frames. I look at it, and I return it to frame 10 position. So if you're following, frame one went back where frame one was, frame 10 went back where frame 10 was, but three through nine have all scooted one frame space closer to me. So after I've looked at all the frames, the gap that remains is where frame nine was, and that's where I return frame two. So the way that I think about it is essentially frames two through nine, because they're predominantly brood, are interchangeable. They can just be wherever I end up having the hole in the hive. But I tend to leave frames one and 10 in their original spots. And again, the way that I work frames makes that easy to do. I do frame two first, leave it out, work frame one, put frame one back where I got it, and now, I work frames three through nine scooting them towards me one frame space. Then, I'll work frame 10, put it back where 10 was and return frame two to frame nine's position. But I have, plenty of times, rotated frames one and 10 just into that natural rotation of all the frames in the brood box. But more often than not, I will leave them at frames one and 10 position because they are predominantly honey and pollen, and I don't want to cycle them into the middle of the brood nest. I don't think the bees care that much. But that's just what I do to avoid at least moving those predominantly honey pollen frames into the brood nest and creating that broken brood nest as it were.

Amy 43:13
Yeah, that makes sense. It makes all the sense in the world. And I hope you have a YouTube series on our Beekeeping Academy just to show our listeners what this looks like.

Jamie 43:23
I think what we need to do is I think we need to create some of these AI kind of honey bee hive working things where people can put goggles on and work beehives and do what I'm describing in real time.

Amy 43:35
Oh my God.

Jamie 43:35
Maybe we'll get there someday.

Amy 43:37
And we'll do like fake stings and stuff like that too.

Jamie 43:39
Oh, absolutely. Then, you have to wear a full suit that gives you that sensation. So if a bee fakes stings you on the arm, the suit has got to pinch you on your arm so that you're aware of the sting.

Amy 43:49
Yeah, just a tiny pinch. Not a big one.

Jamie 43:52
Complete submersion.

Amy 43:54
Definitely. All right, listeners. So we've received feedback from some of our listeners, we've answered your questions on air. Jamie and I, when we first started podcasting back in 2020, we used to call people's names out and we would say something like, Dan from High Springs has asked this question, and blah, blah, blah. So if you all want to, please send us an email with your questions, let us know where you're from, let us know if you're okay with us calling you out, and we'll be sure to do that just so that you can get some recognition for your great questions. Thanks for listening to today's episode. This episode was edited and produced by our podcast coordinator Mitra Hamzavi. Thanks, Mitra.

Jamie 44:47
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.