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# EPISODE 216 TRANSCRIPT

**Jamie**

Welcome to Two Bees in a Podcast brought to you by the Honey Bee Research Extension Laboratory at the University of Florida's Institute of Food and Agricultural Sciences. It is our goal to advance the understanding of honey bees and beekeeping, grow the beekeeping community and improve the health of honey bees everywhere.

In this podcast, you'll hear research updates, beekeeping management practices discussed and advice on beekeeping from our resident experts, beekeepers, scientists and other program guests. Join us for today's program. And thank you for listening to Two Bees in a Podcast.

Hello everyone, and welcome to another episode of Two Bees in a Podcast. Today, we have two guests who are here to discuss with us Varroa destructor in Australia. Australia has the unfortunate occurrence that Varroa has now found its way there and their massive efforts to try to address it. And we have two individuals from Australia to join us to discuss this issue. The first of those individuals is Dave Fairhall. He's the Senior Varroa Development Officer for New South Wales, Australia and he coordinates the New South Wales Varroa Development Officers. And the second would be Emily Noordyke, who is a Varroa Project Officer for New South Wales in Australia, and she works for the Department of Primary Industries, the New South Wales Government. Dave and Emily, thank you guys so much for joining us on Two Bees in a Podcast.

**Dave Fairhall**

Thank you, lovely to be here.

**Emily Noordyke**

Yeah. Thank you for having us.

**Jamie**

And Emily, this is not your first time on the podcast. You were actually a student here at the University of Florida in our lab. So, we can go on for days about that, but we've brought you on because you were specifically in Australia as well. And, Dave, you too. So, I'm just going to ask you both if you could take turns introducing yourselves and talking a little bit about how you got into the beekeeping industry. And Emily, since you've done this before, I'll just ask you to go first.

**Emily Noordyke**

Sounds good. Thanks. Yeah. So, it's great to be back. I got into beekeeping when I was in undergrad, actually studying biology, and I got into the beekeeping club. I thought it sounded

like the most interesting thing. There, I met Anne Marie Fovell, and she mentored me initially and currently as well through beekeeping research. And then that really just got me hooked. I was very inspired and decided to study entomology formally. And that's when I joined the UF Honey Bee Lab, doing my master's with Jamie and focusing on honey bee nutrition research.

And I've taken on various jobs in the industry. I worked for Bee Informed Partnership for a bit as well, so I traveled the US collecting data with commercial beekeepers, which was an amazing experience. And worked with Cameron Jack a little bit as well on some online coursework. And now I find myself in Australia. I've been here for three years and currently working with Varroa.

**Dave Fairhall**

And I first got interested in bees in early high school with a school field trip where we were taken out with a queen breeder in Australia. And I was hooked straight away. But unfortunately, my family decided that I was not able to have beehives at my home. And I read a lot, and I learned a lot. And I went off into another career in the mining industry. It really wasn't until around about 2009, 2010 that I finally was able to get some beehives. And yeah, from that time on, it's just it's sort of a hobby that's become a bit of an addiction, really. It's got out of control. But yeah, I love it. Absolutely hooked.

**Amy**

You know, it's interesting. A couple of years ago, I can't even remember, and so I'm excited to hear what you all respond. But a couple of years ago we heard that Varroa had ended up in Australia, had been confirmed and found that it was there. I'm impressed that it took that long, I think, to get to Australia. But I would love to hear the history about Varroa, who discovered it. And you know, how you all realize that it was on the continent?

**Dave Fairhall**

Yeah, I mean, Australia, for a long time, there's always been the talk about, you know, it's not if, it's when we get Varroa, in spite of our best efforts to keep it out. I think everyone thought it was probably inevitable that we would eventually have Varroa in Australia. It was first discovered in June 2022 in Sentinel Hives at the Port of Newcastle in New South Wales. And that was discovered by DPI staff doing their regular surveillance of those Sentinel Hives. And after that, they then started a surveillance program and identified that there was in fact Varroa in many of the hives, commercial and recreational hives to the north of the Port of Newcastle.

And from that point on, we entered an eradication program in an attempt to try and eradicate the pest. That went through until September 2023 when it was no longer deemed to be feasible to eradicate it in New South Wales.

And after that, we transitioned into the National Varroa Mite Management Program, which is about arming beekeepers with the skills and knowledge to manage Varroa going forward. And also, you know, there was, there's still some efforts to slow the spread across Australia, but in New South Wales, it's certainly spreading. You know, it's pretty well everywhere now.

**Jamie**

So, Dave, I remember when I heard the news about Varroa being discovered in Australia, because I knew that, you know, Australia was kind of the last holdout. I know that there are other areas around the world that don't have Varroa, but much smaller areas. And you guys were really that big continent/country that had beekeeping everywhere and very close to Asia, and it just, like you said, it seemed like a matter of time. You mentioned that there were some initial efforts to eradicate it. So, I'd like to start with that. I'd like to elaborate on some of those things you said. So, it was found, you said, in Sentinel colonies, and then you searched other areas, the staff searched other areas and found it elsewhere. And you mentioned even in commercial colonies. At that point, what was triggered, like what happened next?

**Dave Fairhall**

Yeah. So, there's an emergency plant pest response deed, which the signatories to those deeds are the federal government in Australia, all the States and territories. And then there's also any affected industry bodies. So, AHBI, which is the Australian Honey Bee Industry Council, is 1 of 16 signatories to that deed for the Varroa response and all the rest are planned industries like almonds and macadamias and any of the other industries that are affected or potentially affected by the lack of pollination in the future that honey bees provide. So that's triggered an eradication attempt and there was an emergency response in place led by New South Wales DPI, New South Wales DPI with the boots on the ground. When I say lead, I mean we're at the coalface in terms of doing the work on the ground.

But all the decisions were made by groups of representatives from the funding parties and all of the government agencies. The eradication attempt initially involved quite heavy surveillance, and whenever a positive site was detected, there was a 10 kilometer radius or eradication zone put around those sites.

And then, beyond that, from 10 to 25 kilometers, there was movement restrictions and more increased surveillance in those areas. The way that our plan was designed to work was that you would find where Varroa was, you'd set up these zones within that 10-kilometer radius, any managed honey bees were euthanized. and outside that zone, as I said, just continuous monitoring. And then that was followed up with a baiting program to attempt to remove all the feral colonies and any unknown managed colonies from those areas as well.

However, as we did more surveillance and there were lockdowns in terms of beehive movements as well, but eventually it continued to spread and it popped up in a few other locations, and it eventually got to the point after those 15 months that it was deemed no longer able to be eradicated. So, everything then transitioned across to the management phase of the program.

**Amy**

So, this was a total coincidence, but we actually just released an episode with a commercial beekeeper in Australia who currently does not have Varroa, which is a good thing for him. But you know, as you mentioned, Dave, it's probably a matter of when. And so, I'm wondering, from your view and what you all know, what is the current status of Varroa?

**Emily Noordyke**

Yeah, I'm happy to talk on that. So, it's definitely spreading around the eastern part of Australia quite quickly. It's pretty well all over New South Wales, as Dave had mentioned. We really monitored the spread. We have a heat map where beekeepers could submit their positive Varroa detections and kind of track where we at least knew it had been.

Of course, it's only as good as the data that's put in, so we had a general idea of how it was spreading and where it was spreading. But there have also now been some detections in the Australian Capital Territory, which sits within New South Wales, and then also, now in Victoria to the South and more recently in Queensland to the north. So yeah, it's definitely on the move and we're trying to keep track of it through our program as much as possible and be there for beekeepers, especially when it arrives in their area.

**Jamie**

I know that must be a devastating feeling because, you know, I started keeping bees in the early 1990s, and by that point, we had Varroa in the US and so I've kind of always lived with it. But I know looking at Australia and kind of watching this unfold from our side of the world, I know it was troubling to beekeepers, and it just seemed imminent. And the spread seemed kind of quick as well. I guess, Emily, you told us the current status across New South Wales and other parts of Australia. So how do you guys work with beekeepers at this point to continue monitoring or treating? What is your action plan now with the beekeepers who are having to deal with this?

**Emily Noordyke**

Yeah, that's a great question. It's been an absolutely huge effort, and we've been really fortunate to be part of it. So, we have this national Varroa Mite Management Program and it's all about basically helping beekeepers in Australia be more resilient in the face of Varroa. And there are so many unknowns as well because, you know, we're looking to research findings overseas, of

course, where Varroa has been established for a long time, but it's new in the Australian environment and context.

So, we're really all learning together. So, it's been really amazing to partner with beekeepers and learn from them and figure out what they've gone through and also meet them where they're at. So, with this national program, it's a two year long program with free resources for industry. So, one branch of our program has rolled out so many basic and advanced Varroa workshops. They just wrapped those up just this month. And then, of course, Dave and I are part of the Varroa Development Officer Program and there are coordinators and teams of Varroa development officers. We might refer to them as VDOs for short, but we have those teams in every state and territory as well. So, our role has basically been just to upskill beekeepers in their own apiaries. So, we call up beekeepers or beekeepers reach out to us to either go to them or just answer questions over the phone.

And I think some of our really amazing experiences have come from working with bees' hands-on and helping beekeepers learn how to do integrated pest management, essentially, for Varroa. And so, we talked through all of the registered or allowed miticides in Australia and how they can rotate those and use those and also all of the non-chemical controls that they might be able to use as well and talk about Varroa biology, basically anything that comes up.

So, it's been really awesome. We also have a branch that's in charge of pollination industry support because, of course, our pollination industries could be heavily impacted. A lot of them have also been fairly reliant on feral honey bee populations for pollination rather than hired pollination.

So, there's a lot of support going into the future there where the feral colonies are dying out because of Varroa spreading, so they won't be able to rely on those as much in the future. So that's a big part of the program too. The New South Wales VDO team in particular has met with nearly 5700 individual beekeepers in the last year and a half, so we've really just gone full out and tried to gather as many experiences and help as many people as we possibly can.

**Dave Fairhall**

Yeah, I'd like to back up what Emily said. It's been really a very, very fulfilling role working with the beekeepers in Australia. There's a real unity amongst the industry and our program. I feel anyway that this Varroa is a common enemy, and it's been very fulfilling working with them. I think one of the important parts of it is that the beekeepers have been very, very open to share their learnings and their experience. Many of the things that we learn have come from the beekeepers themselves. So, there's been this really positive relationship, you know, and seeing us as a combined entity working together to try and get to the point where we manage Varroa and it becomes our new norm.

**Amy**

Yeah, I think it's great that you're providing this training. I heard Emily say, oh, we've been teaching over 5000, almost 6000 beekeepers, and it started to make me think about the industry that you have there. And so, can you tell us a little bit about the beekeeping industry? Beekeepers, do they need to be registered? How many beekeepers are there? And if you have a number of, you know, colonies and really, what do they use their bees for primarily?

**Emily Noordyke**

Yeah, the Australian beekeeping industry definitely has some similar and some different focuses from the US beekeeping industry. I just think about it in those terms just because I'm, you know, somewhat familiar with both. But to answer your question about registration, yes, beekeepers are required to be registered whether they're recreational or hobbyist beekeepers or commercial. And Dave might be able to talk a little bit more on some of the numbers and scale.

But essentially, I think one of the biggest points I wanted to make was that the Australian beekeeping industry is very honey focused. So, many, many honey producers. And there are a lot of people chasing pollination contracts as well. But I'd say that at this point in time, honey is really the driving force. The honey resources here are amazing. All of the eucalypt species and the huge honey flows from all of the trees here, I think makes it a pretty amazing place to produce honey. But of course, there are beekeepers producing nucs, producing queens, breeding queens, so there's all that variety here as well.

**Dave Fairhall**

Yeah, we do. You know, in Australia, outside of drought periods, we do get very regular honey flows. The industry being quite honey focused, it relies on a lot of migratory beekeeping. Beekeepers move from honey flow to honey flow pretty well all year round. They might stay in an area for three to four weeks and then they're up and gone again. It's going to be interesting going forward, I think, to see how much that sort of changes across to a more pollination focus as the pollination demand picks up with the loss of the feral colonies.

And also, it's probably becoming harder to be a honey producer in Australia or certainly will become harder with the increased costs associated with the Varroa treatments and the labor costs for management of Varroa. I understand that in other countries, the honey bee industries moved more towards pollination type work as appeared in other countries.

And yeah. I think Australia is starting to move that way. We're certainly hearing that beekeepers are talking more about pollination and, you know, if they're honey producers, maybe taking on some pollination as well, and if they're already largely pollinators with some honey, maybe going exclusively into pollination.

**Jamie**

So, with that overview of the beekeeping industry in Australia, I'd like to kind of pivot back to Varroa. Dave, you mentioned that in your answer, and I can imagine that there are some unique challenges to dealing with Varroa in Australia. Could one of you elaborate on that?

**Dave Fairhall**

Australia is very unique. When we were in the emergency response phase and as our eradication attempt continued, we would quite often hear, well, look, it's time to just let it go. No other country has managed to eradicate it and everybody else in the world manages it and so will Australia.

I mean, we're also realizing that although we have a lot of resources and information and knowledge from decades of Varroa in other countries, we really needed to adapt that to the Australian climate and the Australian beekeeping environment. And some of those challenges are, you know, substantially different.

So, I mentioned that we have almost continuous honey flows. So that then places challenges on us, on beekeepers in Australia to be able to time treatment when they're not on a honey flow. We have great weather for a lot of the year. Bee colonies are quite large, so it is quite hard to pack bees down to just brood boxes to apply treatments when you're not allowed to have honey supers on. And we have a lot of issues with small hive beetles, particularly in the warmer areas along the coast and sometimes inland when we do get rain periods and the humidity picks up inland, but particularly on the coast, small hive beetle numbers through the roof.

It's something that you have to manage all the time. The other thing that we're finding as Varroa spreads, and we don't have any data for most of New South Wales or Australia, but we believe that the feral hive density is quite high in Australia. There was a study done by Ben Oldroyd from the University of Sydney in the late ‘90s in northwest Victoria, where he surveyed 50 to 150 feral colonies per square kilometer. And I think Emily's done the calculations to convert that to feral colonies per square mile for your American listeners. But essentially, what we're seeing anecdotally on the ground is that I think that almost all of the feral colonies are dying out. And so the level of reinfestation as you get that first wave of Varroa moving through is very, very high.

And on top of that, the feral colonies then get slimed out and the small hive beetle pressure is really high. And so, beekeepers are finding that having to intensely manage both pests in order to get through that initial build up phase. It's essentially meaning continuous treatment, back-to-back treatments, rotating through different modes of action, but very, very, very intense management to keep colonies alive during that initial phase.

**Amy**

Yeah, I think we can definitely understand that. We also have a similar environment where small hive beetles like to take over at certain times of the year as well.

**Dave Fairhall**

Yeah. I think, you know, as I mentioned earlier on, we don't have deformed wing virus. There is a program at the moment where we've sampled bees from all over the country just to have another look at it and determine the viral landscape. And I think Emily will be able to talk a little bit more about that. But even in the absence of deformed wing virus, we're finding that our colonies can be killed by Varroa in very, very short time frames under that intense reinfestation. The shortest time frame that we've had so far – Emily worked on this case – was 66 days from 0 mites detected in alcohol washes to the colony's dead, basically, which is quite scary.

We've educated beekeepers to check their mite loads monthly just because their reinfestation can be so high. It's one of those things that it hasn't just come in – Initially, we were told that, oh, Varroa it could be in your hives for two to three years before we see an effect.

But during that build up phase, it's just much, much shorter time frames. Even without deformed wing virus, we can handle much, much higher mite loads than what you would see here in America. But then the colonies seem to crash very, very quickly after that.

**Emily Noordyke**

Yeah. And I'm happy also to give some context to some of the mite loads that we're seeing in Australia kind of compared to, I think, what we're used to seeing in places where Varroa is well-established. So, in our New South Wales Varroa Development Program, I'd say that it wasn't unusual at all to go to beekeepers who hadn't monitored monthly and weren't totally aware of what was going on in their hives. And you know, I understand that as well because it's a new thing and also moving very quickly. But it was not unusual to see 150 or more mites in alcohol washes and in some cases, you know, 300 or more.

And Dave can talk to some numbers, too, I think, from one of our Varroa Development Officers who recovered, I think, our record of mites in an alcohol wash as well. But essentially, that just goes to show that this, you know, reinfestation of mites from feral colonies or unmanaged colonies is pretty intense.

So yeah, it does take a lot of effort to keep those mites in check at the moment. But one thing we did find that was really interesting, I think there are multiple factors at play. And so we don't know this for certain, but it does seem like in the absence of deformed wing virus, like Dave mentioned, that the colonies are able to tolerate higher mite loads.

But because the conditions are so good for breeding mites, the mites do skyrocket pretty quickly and then the colonies decline. But we actually have one of our initial cases. It was the first case

that we saw parasitic mite syndrome in colonies in New South Wales. And three of our overseas VDOs, including me, visited a beekeeper who had a couple hives, and they haven't done alcohol washes recently. In the weaker of the two hives, they recovered 365 mites per about 300 bees. And we thought, oh, man, you know, the brood looks bad. There are bees all over the ground, like, there are mites all over the bees. They're probably not going to be able to survive. But the beekeepers had Bayvarol all and they wanted to – they just wanted to see what would happen. So, we helped them place the Bayvarol. And, you know, one of our VDOs taught them to baby the hives and whatnot throughout the winter, and it was a mild winter with lovely resources at the time, and somehow in spring they were already strong enough to be split again.

So, this wouldn't be the scenario in every case. It depends on a lot of factors like nutrition and the conditions and whatnot, but we were pretty surprised to see those colonies survive that high of a mite load.

**Dave Fairhall**

The highest mite load that we found was found by one of our former VDOs who's now a bee biosecurity officer in New South Wales. That was 1189 mites on 290 bees, and that colony, it was not going to survive. It had a lot of parasitic mite syndrome, but there was still enough population of bees to be able to undertake an alcohol wash. So, you'll understand from that very, very high mite loads.

**Amy**

I am like in awe. That's insane. That's so many mites per bee. Wow.

**Dave Fairhall**

Yeah, it's pretty incredible. I think it's shocked everyone. I should add too, the thing that makes Australia's such a wonderful environment for mites to breed up and for small hive beetle to breed up. There's probably a silver lining there. We're finding anecdotally from beekeepers that when that initial reinfestation starts, around about the nine-month mark, give or take, they say that it then drops right off and that the reinfestation pressure is, you know, substantially reduced.

We actually have some information from the University of Western Sydney about the impact of Varroa on the feral colonies. They had around about 20 or 30 feral colonies that they were aware of in the area. And they were contacted by an overseas researcher who was interested in sampling the feral colonies.

And when they went and checked, there was only one colony left. And they also do a drone ballooning exercise or practical with their students every year where they go to, I think, six drone congregation areas. And every year they routinely get in excess of 500 drones at each of those drone congregation areas.

This last season in Australia, they only did three. At one of them, they got six drones and at the other two they got none at all. So, that very, very, very heavily points towards that the federal colonies are being wiped out in high 90%.

**Amy**

Yeah. So, that kind of leads me into the next question that I have is the type of research that's being conducted on Varroa. And Dave, before we started recording, you were kind of talking about mite resistance and some testing on that. So, I would love to hear about some of the research that's happening right now on Varroa in Australia.

**Emily Noordyke**

Yeah, that's a great question. It's definitely early days in terms of Varroa research in Australia, but there are lots of projects being planned currently. One thing that's interesting is that we do have to be a bit careful about which questions we ask now and that's just because results can be easily confounded by this intense Varroa reinfestation that we're experiencing.

So, like, in the case of trying to breed stock for Varroa resistance because of that intense reinfestation, it's really hard to pick out which colonies might already have those resistant traits, or especially, in the case of tolerance as well because the mite reinfestation is just really high.

But there's definitely lots of talk for future breeding for Varroa resistance as well as assessing miticide efficacy in different Australian climates. There are so many questions there just because it's new in Australia and also beekeepers are having challenges just finding different chemicals that they can rotate with, especially given the year-round honey flows.

That's a huge challenge. And also looking at whether certain miticides are potentially more effective in humid areas versus drier areas. Just so many questions that we have, and Dave touched earlier on the virus survey that's happening through our program.

So, we've taken samples through the VDO programs in every state and territory just to see, you know, get a baseline essentially of the virus landscape to see how Varroa could change those endemic viruses already, as well as how we could also make an early detection if deformed wing virus somehow ends up in Australia as well. so that hopefully, we could react to that.

**Jamie**

So, Emily and Dave, we've talked a lot about Varroa in Australia. And I'm curious, as we kind of wind down to the end of the interview, is there anything else either of you would like to share about this issue?

**Dave Fairhall**

Yeah, I'd like to share one thing. I think that it's really important to acknowledge that Australia has really, really benefited from the years and years of decades of Varroa in other countries. When we hear from overseas researchers and experts and other beekeepers from overseas, it's comforting to realize that all of the management practices that we put in place are consistent with what we're being told beekeepers overseas do.

I think one of the things that we noticed, and Emily probably backed this up, is that there's quite often comments or information comes from some overseas beekeepers that say, you know, Varroa is easy to manage, you can do it with Oxalic. And there's probably a little bit of a lack of understanding about the intensity of the reinfestation in the buildup phase in Australia.

We've actually found that out of all the beekeepers that we've dealt with as VDOs in New South Wales, we haven't come across a single beekeeper yet that's managed to successfully manage Varroa during the buildup phase without resorting to synthetic treatments at least once.

And it's not to say that they're not there, we just haven't heard of anybody that's managed to do that. So, it is quite intense and we're in a pretty tough battle right at the moment until we get out the other side. But in saying that, beekeepers are very resilient, Australian people are very resilient, and we know we'll get there.

The beekeepers that have got ahead of the game and they've learned about Varroa, and they've got a plan in place, and they monitor regularly, they're doing fine. It is more expensive and you're going to have to work out ways to manage the cost. But going forward, I think, you know, it's still very, very positive for Australian beekeepers and it's a very bright future. We just got to get over this initial hump and then settle into the new norm.

**Emily Noordyke**

Yeah, those are all really great points, Dave. I also echo the resiliency of the Australian beekeeping industry. They've definitely been through a lot, but there is a lot of hope and, yeah, the people who are managing it well and on top of it are, you know, in for a good future.

I think there are a lot of beekeepers who are thinking outside of the box too and trying to come up with different strategies, and I think there could be a lot of really interesting Varroa management strategies coming out of Australia as well. So, it's a bright future. It's a difficult time right now, but there's definitely a lot to look forward to.

**Jamie**

Well, guys, I really appreciate you both joining us on the podcast. I know this is a difficult topic. You know, Varroa really is just the thing that beekeepers globally have to deal with. Pathogens it carries, the damage it does to colonies.

And we're sorry that you guys have it, but it sounds like you have a strategy for moving forward and trying to address it in your country. I know Australian beekeepers as well. We've been contacted by some, and I know that they're kind of seeing it very similarly, right? This is just something that's here. We're going to have to deal with it. You've got, you know, decades of experience for people dealing with this outside of Australia. And it's just one of those things that it's just a common enemy for beekeepers and bee scientists all around the world. And I appreciate your time and thank you so much for joining us.

**Dave Fairhall**

Thank you, it's been a pleasure.

**Emily Noordyke**

Thank you for having us.

**Stump the Chump**

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

**Amy**

Okay, everybody, welcome back to the question-and-answer segment. Jamie, the first question that we have today is about swarm prevention. And the question is, I guess when bees swarm, they leave with the old queen and approximately 40 to 60% of the workers go with her. Could you use a queen excluder at the bottom to basically prevent her from swarming? Is this something that beekeepers do? Or have you heard of this? Does it work?

**Jamie**

So, if you think about it, it's very intuitive that putting a queen excluder, say, underneath your bottom most box, underneath your brood chamber. So, between the brood chamber and the bottom board, it's intuitive. If you did that, the queen would be able to go through the excluder and out the entrance of a hive, thereby eliminating swarming because it's the present queen in the nest that's the one that goes out with the swarm.

Usually, that first swarm is led by the original queen, the original mother who's present in the nest. Then you might get a secondary swarm or tertiary swarm with the first virgin or queen or two that emerges from their cells. So, if you could put an excluder beneath the box, you would think, of course, you'd stop those queens from swarming.

The problem is, while it is intuitive, it's not foolproof. Queens lose a lot of weight in order to be able to swarm, they have to be able to fly. When they are laying eggs, they are too heavy to fly. Their abdomens are swollen. So, in advance of swarming, the worker bees will reduce the

amount of food that they give to the queen. They'll get on her back and shake her, which causes her to run around the nest. And this reduction of food and this exercise, diet and exercise cause the queen to lose weight. And once she loses weight, it's possible for her to fit through the queen excluder. So, you'd have this bell curve, right?

You'd have a lot of queens that this worked for, and they wouldn't be able to get through the excluder because even when they lose weight, they're still slightly big enough to not make it through. But you also have a lot of queens on that bell curve that will have lost enough weight to where they can make it through that excluder.

And really, it's more like swarm insurance, which is actually one of the questions that they ask. Is it more like swarm insurance? If it stopped the queen from exiting the hive, it wouldn't necessarily stop the bees from swarming. They would go out and swarm. They would just notice the queen's not with them, and they would go back to the nest.

So, the bees would interpret the queen's inability to leave that queen excluder as the inability to fly, and they may get rid of her and try to swarm with the next queen that emerges from the nest. And then you'll kind of be in this vicious cycle where you'll eventually get a young virgin queen that can fit through the excluder, or the bees will keep killing queens that can't fit through the excluder until you have no queens left.

So, it is something potentially that can help as a kind of an insurance perspective, but you're going to have to watch closely because it's really not a foolproof kind of anti-swarm prevention technique.

**Amy**

All right, so the second question that we have is that this individual teaches kids classes. You know, Jamie, I've taught a lot of kids like workshops and honey bee stuff. They have the best questions, and they're always asking me questions. Like, someone asked me why there was no king bee, and I was like, oh, yikes, I don't, I don't know. Those are called drones, I guess. But yeah. So, they have really funny questions. The questioner is asking, so in one of the recent classes, this individual is telling the kids about how the queens don't go outside to use the bathroom, they don't go outside to poop, and that the worker bees actually carry it out. And one of the kids asked how that happened.

And so, the question is, you know, the queens, they go to the bathroom, they've got feces in the colony, and then what happens after that?

**Jamie**

Dang kids, right?

**Amy**

The second part of the question is what other facts do you know about queen bee poop? So, I just had to read that one out loud for you.

**Jamie**

All right, there is a cohort of bees that deal with general waste in the nest. So, they would carry out, you know, dead bees, they'd carry out spoiled pollen, anything like that, any debris in the nest. And queens do defecate, right? And their feces is liquid. And if the bees have to deal with liquid feces, they would have to use their proboscis to drink it up, like suck it up like it through a straw, almost like they were drinking nectar. If the feces were ever deposited on a surface like wax and dry, then the bees can use their mandibles to chew it up.

And in both cases, they can take it outside of the nest. Now, you know, the last question is what other facts do I know about queen bee poop? Actually, remarkably little because I've never studied queen bee feces before. But I will tell you, in preparation to answer this question, I went to Google Scholar.

So, if you just, I'm going to tell you how to do this because you can just read until your heart's content. So, Google is a search engine of which we are all aware. Well, Google has a specialized search engine that searches the refereed literature. So, that would be the research papers that are published by scientists. It's called Google Scholar. So, if you just go to Google and search Google Scholar, click on the first option, you'll go to Google Scholar's website. It looks like a Google site just with scholar added to the name. So, you can put "honey bee queen feces" in the search box, and you can get papers galore. And for example, there's a paper on there that I had read relatively recently that queen bees of a certain age, when they defecate, I think it was young queen bees, but don't hold me to it listeners, but when they defecate, the feces actually can be a repellent to bees. So, my point is, is you can go there and read a lot about the queen bee feces if that's certainly something you want to know about.

**Amy**

That's funny. You know, just a quick shout out. I took an instrumental insemination course this past summer. And you know, one of the things we did right before we inseminated our virgin queens was we pooped the queen, is what they said. I was like, what in the world does that mean? Like, what is that? And we basically just put the queen on a window sill and then she pooped immediately. It was such a weird and random thing. So, she went to the bathroom and then you could inseminate her so that she wouldn't poop on you while she was under surgery.

**Jamie**

Well, it's funny you said that. You know, defecating is often an insect defense mechanism.

Like if you grab a lot of different types of insects, then one of the first things they'll do, they'll defecate and like, heck, a lot of things do that. Frogs, things like that. So, worker honey bee feces have a lot of broken pollen shells in the feces and other things that queen bees would have, different things that they're fed, in it. And it's funny how people need to learn this kind of stuff because otherwise, if you, you know, knock out a queen using carbon dioxide so that you can prepare for instrumental insemination, and then you start working in the area, you know, of the anal opening, you can cause that reflex to happen, and they would defecate and that would cloud your ability to do pretty much anything else.

So, who discovered that you could put queen bees on a window, and they'll defecate? That's remarkable.

**Amy**

Who knows? Bees poop. That's going to be my next book. You'll see.

**Jamie**

T-shirt.

**Amy**

You heard it here first. All right, so the third question that we have came from a first-time beekeeper. This beekeeper has one hive and they're wondering why their bees are not building wax. And you know, Jamie, our listeners may or may not know this, but we do talk about some of the questions before we go on air. So, the question, you know, we were like, OK, well, when was this question asked? Because the answer really dictates that, right?

**Jamie**

100% In this context, we put down the questioner's name or where the question was asked. If we, for example, got the question from an event, this one came from our UF IFAS Summer Bee College. It was asked sometime in late August 2025. And I'm sitting here thinking, since the question is not necessarily full of information, they could be asking about something that was months old, or it could be something that they're experiencing at that moment. So, I was just going to assume that they're experiencing at the moment. And I look at the date, and I go, August.

Well, August is the reason your bees aren't building wax. If you have – Let me restate this. Bees have to have sugar to produce wax, and they don't often use stored sugar to produce wax. So, for example, if you put a package of bees in a new brood box that has 10 frames and all those frames are frames of foundation, and then you throw a full medium honey super on top of that hive, the bees are far more likely to just move up into that medium super, empty out some cells, and make

a space for the queen to lay, than use that stored honey to make beeswax for the bottommost combs.

Bees love to have incoming nectar. Incoming nectar is a great trigger for the production of beeswax. It tells the bees that they are in a time where they can expand their nest. So, I look here at August in South Florida, there's probably not a lot of incoming nectar at the time the person asked this question.

So, if they bought a brand-new package and put it on a box of foundation, they're not going to get a lot of beeswax produced, and they're going to have to feed their bees if they want that wax produced. And to make it even odder, and this is something I experienced here with two colonies in my own backyard this year, I had bees outside of a nectar flow that I wanted to change out the old combs in the brood nest.

I removed the old combs and put in new combs and fed, fed, fed, fed, fed, fed, fed, fed. And all they did was put that stored sugar up in the medium super they had at the top and they built out some wax in the brood nest, but only about 2/3 of the combs. There were still frames of foundation in there even though the colony was strong and I was feeding.

So, you can feed bees under certain circumstances and get bees to produce a lot of wax, but really there's no substitute for having incoming nectar to trigger that production of wax. Or you have to hive them on completely, exclusively frames of foundation and then be feeding them sugar water, usually thin sugar water, something like 1 to 1 to get them to use that sugar water to produce wax.

So, the question is, is why are my bees not building wax? It's probably because you're not feeding them and there's not an incoming nectar flow happening at the moment. Now, I will give one caveat. Maybe their combs are already pulled. You know, bees don't just build wax and build wax and build wax and build wax. Maybe they have all they need in this context, but I'm kind of reading behind the scenes with this question and assuming their own frames of foundation or they have some frames of foundation that aren't being pulled. And it's almost certainly based on the time of year they're reading the season. There's no incoming nectar, and they're just not going to produce wax.

**Amy**

All right, well, there you have it, listeners. If you've got questions, you know where to find us. Ask a question by emailing us or sending a message on one of our social media pages.

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

**Jamie**

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