

# Episode 23 PROOFED

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colonies, beekeepers, bees, bip, feeding, varroa, commercial beekeepers, queens, beekeeping, treatment, mite, people, good, dan, put, almonds, brood, worst, bee, honey

## SPEAKERS

Amy, Stump The Chump, Guest 3, Guest 2, Jamie, Guest

### 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. We've got a great episode for you today on Two Bees in a Podcast. First, we're joined by Dan Aurell and Matt Hoepfinger from the Bee Informed Partnership who will be here talking about the best and worst management practices with beekeeping. If you want to know the great things that you can do to ensure colony health and the things that will lead your colony to low productivity or perhaps even demise. You definitely want to listen to that segment. That will be followed by a segment with Dr. Julia Bowsher from North Dakota State University. She and her team has done research on the factors that make the female larvae become either workers or queens and you're certainly going to want to stay around to hear that. All of this will be concluded with everyone's favorite segment questions and answers. So welcome to Two Bees in a Podcast. I will tell you one of the things that we try to do at the University of Florida, and our colleagues around the country try to do as well, is we try to look for ways to help beekeepers. A lot of our extension programming will target beekeepers. Maybe we'll get a lot of hobbyists or sideliners come to that, [but] it's really difficult to reach commercial beekeepers, and commercial beekeepers, while they represent a smaller percentage of the overall beekeeping population in the US and around the world, they hold the vast majority of the bee colonies. So anything that we can do to help commercial beekeepers is a major plus. And we have this group in the United States called the Bee Informed Partnership that has a long history of trying to help commercial beekeepers. They do a lot of research on the ground working with commercial beekeepers to spot trends. And today, we are excited on Two Bees in a Podcast to have two field specialists for the Bee Informed Partnership talking about the best and worst management practices that commercial beekeepers do. I think this is relevant to all beekeepers. So it's going to be great talking about these things. Amy, I hope you're ready. Are you ready for this?

### Amy 02:39

I'm ready. Let's do it.

**Jamie 02:41**

How do I know you're ready? Just because you say it doesn't make it true.

**Amy 02:44**

That is also really true. I'm usually not really ready, but I can wing it.

**Jamie 02:51**

Well, I'm excited because I honestly don't even know what the list is. You saw these two individuals give a presentation. So I'm excited to see what they come up with. Joining us today from Texas A&M, Dan Aurell, and joining us out of UC Davis in California, Matt Hoepfinger. We have Dan and Matt on the podcast with us, Dan and Matt, thank you for joining us today.

**Guest 03:15**

It's pleasure to be here. Thanks for having us on.

**Jamie 03:18**

Absolutely. So we have two guests, which Amy, of course I botched these things up royally. So I'm going to do my best to make sure not to talk over them. So Dan, and Matt I'm about to ask you the same question. Maybe Dan, you answer first. Matt, you follow up? What do you guys do for BIP? How did you get involved with the Bee Informed Partnership? How did you get involved with bees? And what is it that you guys do?

**Guest 03:41**

Hey, so this is Dan Aurell answering from Texas. I have been working as a field specialist for Bee Informed Partnership since 2017. So about three years here working with commercial beekeepers. And in our role as field specialists, we provide one on one consulting services for about 20 or so beekeepers on my list, but then the other four regions around the country, again, they have pretty substantial beekeeper lists. In this job, I get a lot of one on one contact with the commercial beekeepers. And I first got into this job through hearing that BIP was hiring for this position back when I was up in Canada. I grew up in Atlantic Canada, and that's where I first got into beekeeping, starting beekeeping on a commercial beekeeping operation, about 1500 colonies in Nova Scotia. So yeah, I had three seasons in my back pocket of the work before joining the BIP job, but I've really appreciated all the overview and insight into commercial operations I've gotten in this position.

**Jamie 05:07**

Well, good. Dan. Matt, do you have a similar story? You have a similar background?

**Guest 2 05:11**

Sure. I started with BIP about - well, it's been exactly a year actually. I have been a field specialist for BIP for a year. Before that, I had a completely different career and was working in the IT industry for a telecom company, but I've been a hobbyist for 10 plus years and bees have really been my passion or some would call it my obsession. When this job came available, I applied and in fact, I think Dan was

one that interviewed me and here I am working for BIP as a field specialist. I'm currently on the road in California. I've also got about 20 beekeepers that I consult with, including several of the queen breeders here in California. It's a very interesting job. Never a dull moment.

**Amy 06:17**

That's awesome. I love hearing different stories about you guys being on the job, but I saw you guys do a presentation at the American Beekeeping Federation this past January 2020. And you guys were talking about the best and worst commercial beekeeping practices out there. And so my question for you is, how did you guys come up with that list? Was it just through observation? Or you know, how did you guys come up with this?

**Jamie 06:50**

That's the benefit of interviewing multiple people. We have those odd pauses, but Dan and Matt since you guys alternate the best and worst, how did you guys come up with this list? I'd be curious to see, maybe Dan, you first.

**Guest 07:07**

This list of five best and five worst commercial beekeeping practices is not supposed to be a canonical list, but we put our heads together with the other field specialists and spent some time discussing patterns that we've seen. What do the really successful operations do? The beekeepers that tend to struggle, what pitfalls do they tend to fall into? But by putting it into a five best and five worst we're hoping to make it a little bit more memorable and just easily digestible.

**Amy 07:48**

Yeah, and you guys so who is the bad cop? Who's the one that put the worst list together?

**Guest 2 07:52**

I get to play the bad cop, and I do want to credit everyone else there, the other fields specialist for BIP. I could have never come up with this list alone. And they have many more years experience than I do.

**Jamie 08:07**

Matt, are you saying there's lots of bad cops in BIP? Sorry, we joke a lot on this podcast.

**Amy 08:18**

Oh, he's like I don't know how to respond to you.

**Jamie 08:23**

Amy will answer I'm sure

**Guest 2 08:28**

That is true I really prefer being the good cop when I've been to visit someone's bees and when I'm able to say wow, this really looks like good beekeeping, but sometimes we do have to be the, not bad cops in a regulatory sense, or "cop" sense, but it's not nearly as much fun when sometimes the problem-

**Guest** 08:50

Sometimes it's bad news that you're giving someone

**Jamie** 08:53

I think one of the great things about this though, is that BIP and its field specialists, through its tech teams, and honestly just through its research and its reach in general, has a lot of opportunity to see beekeepers of all levels keeping bees, and they're able to see commercial beekeepers, they're able to look at their data, and you're able to [make] more than an educated guess, probably. How you guys develop these lists, they're lists from data and from practical experience. And what's funny is that's not the question I'm supposed to ask you, but I'm dying inside because I want to know what your best and worst management practices are because I have a sneaky suspicion I know, but I haven't heard it yet, listeners I promise I have not heard this yet. So I'm dying to know, but the question I'm supposed to ask you because it's next on the list is, even though you generated this information from commercial beekeeping, does your list also apply to backyard beekeepers? Does it cover all aspects of commercial beekeeping? I mean how applicable is it to beekeeping operations of all scales?

**Guest 2** 09:59

Yeah, a lot of what we're talking about definitely applies to backyard beekeepers, probably most everything we mentioned here, at least. And there may be some specific things that would only apply to commercial guys. But yeah, I would say most of this a backyard beekeeper could definitely take away some good things from this.

**Guest** 10:23

I would also say we've tried to focus the list on aspects of management that are actionable. We don't have things on this list, like "be in a good beekeeping area," or "run an operation with a really healthy bottom line." We've tried to keep it more in the areas that are where you can change your management to address issues.

**Jamie** 10:53

I like that idea, this idea that the list is actionable. So once you hear it, there's something you can do to address it. Because you're right, in many cases, as educators of beekeepers, we tend to, hover way up in the clouds and make these pronouncements. "Well, if you just stay in a good area, or if you just can escape Varroa" but this idea that what you propose to us is something beekeepers can go out and do to make positive changes, that's really exciting.

**Amy** 11:21

All right, this is what we're gonna do next. Are you guys ready?

**Jamie** 11:24

I'm ready.

**Amy** 11:25

Okay, good. Someone's ready.

**Jamie 11:28**

I'm excited. I can't wait.

**Amy 11:30**

What we're gonna do is we're gonna go through the top things, we're going to start with the worst. And we'll go over to best number five, and then we'll count up I guess. So, the worst five things. I did not even say that correctly. But it doesn't matter. Because as soon as we get into it, everyone will understand what we're going to do. So why don't we go ahead and go through and we'll alternate between Matt and Dan. So Matt, you're the worst. You're the bad cop. Why don't you let us know what the worst number five thing that commercial beekeepers do?

**Guest 2 12:03**

Sure. Yes. The worst commercial beekeeping practice, number five, is poor equipment. We do see a lot of colonies, a lot of operations, and we see a lot of poor equipment. And what I mean by that is, things falling apart, are your colonies bee tight? You need them to be bee tight. You want to discourage robbing. Similar to that weather tight, are your colonies drafty, or even worse, is rain getting in?

**Amy 12:36**

So you're saying we're not supposed to use equipment that's like moldy and torn apart?

**Guest 2 12:41**

Right, yeah, you're getting rain in there, you're gonna see mold. A bottom board that's all wet is just a disease reservoir. It's very unhealthy for the bees. I could talk about old comb and broken frames. For commercial guys, your pallets, if they're in bad shape, and you're moving colonies, you could spill a colony and that's never good.

**Jamie 13:13**

So Matt, let me ask you a question. This is interesting, because this is kind of a curve for me. I wasn't necessarily expecting poor equipment. I want to ask two questions. Number one, I want to ask, what percentage of commercial beekeepers with whom you work, or with other field specialists from BIP work, what percentage of the equipment do you think is bad? Are we talking 10%? 20%? 30%? And it's an estimate, of course, you can be wrong, but I'm curious what your feeling is about that?

**Guest 2 13:39**

Sure. Most of it is in good shape. And it's a sliding scale too, we're in a gray area, I would say 10 or 15%. You know, a lot of the lids seem to be rotten. And corners are completely damaged, where you see robbing happen in the fall, especially. But most of it is good.

**Jamie 14:08**

I would guess probably what commercial beekeepers are doing is that they're just playing the numbers game. To invest in new equipment, to invest in new combs, obviously costs money. And so the question they're probably facing is, do I put that money there? Do I put it in a treatment? Well, the

boxes haven't fall apart yet. And what you're saying is that you guys from BIP think it's more important to address that, than maybe we've given it credit for in the past. I think that's an interesting point.

**Guest 2** 14:34

One more specific thing I'd like to mention for commercial guys. I find that the cleats on the pallets, the W cleats are better. It separates the colonies by an inch, or half an inch, which prevents moisture from building up between the colonies and the moisture just rots the boxes. It's also easier to hinge forward a colony with those W cleats to check the bottom.

**Jamie** 15:03

That's cool for our listeners out there. You know a lot of our commercial beekeepers will keep multiple colonies on a pallet, just a moving pallet, maybe four colonies, maybe five, and I'm saying the word colony, I guess I mean hive. But the idea is that these cleats are affixed to the pallet and you sit your hive on them to provide stability. And what you're saying, Matt, is that this particular style, the W, allows some separation between hives, lowers moisture build up, allows the hive to be brought forward, etc. I love the fact that already out of the gate you guys are giving very practical advice, something I wouldn't have even considered addressing, from the academic perspective. I like that idea. That's really cool.

**Amy** 15:43

I feel like we should have asked you, Jamie, what you thought the best and worst things were and we could have compared it.

**Jamie** 15:48

It's too late, Amy, we're into this interview. That's fine. I'm excited to hear what Dan says is the best practice number five now that Matt's already thrown me a curve.

**Amy** 15:56

Yeah, well, you know, I like being bad cop. I'll ask Matt about his worst five, and you go ahead and ask Dan about his best five.

**Jamie** 16:11

Dan, I've got to hear what's your best practice number five.

**Guest** 16:14

Counting down from number five. The fifth best practice that we wanted to point out is good splitting methods. And that can encompass a lot of different things. I'll just make a few bullet points. But a pattern that we see is that the folks who split their hives fairly aggressively and consistently, where most of the colonies in an operation go through the splitting process is that they tend to have better success controlling their Varroa loads. And this does make a certain amount of sense in that when you split a colony in two then you've got all of a sudden the same number of Varroa mites. But distributed between two colonies, where you've got two queens that are laying flat out. And therefore you can get the build up of the bees can start to outpace the build up to the Varroa mites. But also, a thorough splitting gives you some opportunities to control Varroa when the colonies are smaller, or even when you've got that gap in the brood cycle if you're using cells to requeen. For example, putting in

treatments on day 17 to 19 can be a really effective treatment window. And I also just wanted to mention that I think splitting time is a time of the season when virtuous cycles or vicious cycles can really make themselves known in your beekeeping year. So that if you've got really nice, strong colonies with healthy brood that you're splitting up, that and the environmental conditions are good, like they're at the start of a nice honey flow, then your splits can just be primed to really succeed. But if you have had big losses, and if there are lingering health issues like European foul brood in the brood, and if you're trying to split them too hard, you really should be making three frames splits that time of year. But you're scrounging and making one and a half frame splits then that European foulbrood issue can really hamper the buildup of those colonies. So besides the advantage of giving an opportunity for mite control, I think it's a really key time to be looking at the health of your brood.

**Jamie 19:01**

Yeah, I think it's interesting you bring that up. A lot of beekeepers I know certainly believe that splitting can be a management strategy for Varroa. It can contribute to Varroa control for the very reasons that you said. Also, I think you know ill timed splits, splits out of season, splits when there aren't a lot of good resources can put you in a bad corner where you're having to provide a lot of sugar syrup as it were maybe pollen patties, etc. So split management in general, can be a very good thing for sure, for beekeepers. It's something that a lot of hobbyists and sideliners don't think about as much because that's what commercial guys and gals do. But it certainly can pay dividends when done appropriately.

**Amy 19:43**

Awesome. Okay, so that was five. Now we've got four more for each. So Matt, can you tell me the worst number four on your list?

**Guest 2 19:52**

Your worst number four is no plan for antibiotics. As you know in 2017, beekeepers are now required to get a veterinary feed directive, a VFD, to acquire antibiotics, and antibiotics are used for foulbrood, both European foulbrood and American foulbrood. A quick note here, you do not need a VFD for fumagillin, which is sort of an antibiotic used for Nosema. So for acquiring the correct antibiotics for EFB, for example, you would need to get oxytetracycline, which is terramycin, and AFB, you would want Tylosin or Tylan. And to get those, you need to work with a vet. And I just actually went through an experience. I am a field specialist and I look at thousands of colonies every year, but I also keep a few bees as a hobbyist. And this year, I saw EFB. And so I went through the whole rigmarole of contacting a few vets in my area. And I picked one that I seem to like, and it was quite easy to get the VFD. A few phone calls, I dropped off some samples at his office, some of the vets wanted to come look at my colonies in person, I thought it would be easiest if I just drop off the samples, that's what I do. I take bee samples. So I can certainly do that with my own colonies as well. And I was able to pick up the VFD. And my vet actually gave me terramycin for all my colonies, and it was something on the order of 100 bucks or so it wasn't very expensive. I thought it would be a lot more. But he was very efficient and took care of me and I was able to treat my bees right away. So yeah, the number four worst commercial beekeeping practice is not to have a plan. So yeah, make a few phone calls and find a vet that you like, it's not that hard.

**Jamie 22:11**

I think that's good advice. I'll tell you, inside the US and outside the US people view the antibiotic thing very differently. A lot of the world doesn't have access to antibiotics. And so for our listeners outside of the US, we're allowed to place a couple of different antibiotics in colonies to address the two foul brood diseases that we have. And so this veterinary feed directive means that it has to be essentially administered via oversight by a veterinarian. That's the short way of doing it. So that was a curve thrown to commercial beekeepers a couple of years ago who otherwise had direct access to these antibiotics before the VFD passed. We have a system for dealing with that in Florida that's kind of unique. It expedites it. It's a free system for most beekeepers in the state. But you're right man, a lot of beekeepers who haven't planned for that extra loophole might be caught off guard if they need to try to address foul brood in their colonies using an antibiotic that they now have restricted access to. All right, Dan, let's see if you can tell us what the fourth best management practice is for commercial beekeepers.

**Guest 23:18**

So number four, on the list of best practices is to rotate treatments and specifically Varroa treatments. So yeah, both in our experience talking to commercial beekeepers and also supported by the data, it's pretty clear that amitraz is the most effective miticide that's currently available. But there are some definitely credible signs of the beginnings of amitraz resistance. For example, Frank Rinkevich, who's based at the USDA Baton Rouge Bee Lab has done some work that shows a range of sensitivity to amitraz in the mites, but with amitraz still being the most effective miticide I think it's clear that you can get various benefits from rotating the treatments and not only using amitraz in your beekeeping year. For example taking advantage of different treatment windows, for example, late fall, putting in an Oxalic treatment. Just making sure to catch those weather windows or windows in the colony lifecycle. And this is also somewhere where this isn't just a recommendation out of thin air. Based on the BIP loss and management survey Ariela Haber and Nathalie Steinhauer and Dennis vanEngelsdorp published a paper that showed that migratory commercial beekeepers, who used Oxalic or Formic or thymol, in addition to amitraz saw lower winter losses than their counterparts who are only using amitraz.

**Jamie 25:23**

So the important take home message here is you've got to address Varroa but if you're going to address them, you need to rotate treatments to make sure to use the various treatment options available, amitraz being one of the backbones of that but also considering using things such as Formic or oxalic, or thymol or some of the other treatments available during the times of the year they have increased efficacy for example, oxalic acid, that would be winter.

**Amy 25:45**

Now I'm trying to think like, okay, now I don't remember the top three. So I'm excited to hear what the top three are of the two. Matt, what's your worst, beekeeping practice third from the top?

**Guest 2 25:56**

I'm just getting better here. Number three worst practice is missing visits while your bees are in almonds. This is of course gonna apply to commercial beekeepers more. But when they're in the almonds, I see a lot of guys take a break, they think I got to almonds now I can take a break. But really, I think it's a great time to check your bees just doing best basic animal husbandry, feeding the ones that



need it, doing health checks. Of course checking your Varroa levels, you want to check where your colonies are placed, full sun is better. If you're working with a grower that doesn't want you to put your colonies in full sun, you can explain to them well, they'll fly sooner, and they'll pollinate sooner if we put them in full sun around the time of almonds, too, everyone's built up their colonies. Swarm prevention, you need to be looking for cells and do anything you would normally do for swarm prevention. Something else that we've been recommending, sometimes pollination can be stressful. There are chemicals sprayed, even if it's not in the orchard you're in, it could be across the street. And so what we've been recommending lately is to add a protein patty. Even though that doesn't make sense, you're seeing a ton of protein coming in the almond pollen is coming in. But if you add a protein patty, we feel that it might dilute any chemicals that they may accidentally be bringing in. Other things, just being on top of your broker arrangements, who's going to do what? Is your broker feeding? Are you feeding? Or things like that? And of course, did I mention check your Varroa levels? I think I did.

**Amy 27:50**

How many times do we have to say that over and over again? So basically, once you get to almonds, you don't just drop your hives and leave them and go out and have a Corona or whatever you want to have. But you've got to check. I don't know. That was the first one. I don't even drink Corona.

**Jamie 28:13**

I do want to put you on the spot with that comment. I get a lot of commercial beekeepers coming out of almonds and saying, oh, you know, the bees look so bad coming out of almonds. I don't know. And I'm curious if a lot of that occurs because of lack of management during almonds. If a lot of those issues, quote, "coming out of almonds" could have been addressed had they been managed throughout almonds. What do you think about that? And like I said, it's okay to be wrong or right. I'm just curious what your thoughts are about that.

**Guest 2 28:51**

Sure. Yeah. Well, put me on the spot there. I think I did see some colonies with some brood damage this year, and there's not a lot you can do about it. You're in the almonds, but I think there's something to be done. And the few things I just mentioned could help. I can't say how much, everything's a gray area. I mean, every answer to every beekeeping question is, "it depends." So I'm gonna say it depends.

**Jamie 29:27**

Yeah, good. I think that's a very diplomatic answer. And, again, recognizing that we have listeners from all over the world, I want to say this whole almond thing is because somewhere between 60 and 70% of our commercial bee colonies are moved to almonds every January early February for the purpose of pollinating almonds. And so that's no doubt one of the most significant pollinator dependent crops here in the United States. A lot of colonies go out there and then from California, they fan back out all over the country to pollinate other crops etc., so Matt's just basically saying once beekeepers get bees to almonds for pollination purposes, we can't just leave them there, we got to manage them while they're there. Dan, we've heard the top three bad ones. So now tell us what the third best management practices for commercial beekeepers.

**Guest 30:18**

Okay, the third best management practice is to pull honey and treat early. Try not to get behind on your honey harvest. It can be really beneficial for your bee health going into the fall. Even if you get some weather delays during the summer, trying to get the honey off at the appropriate time. And treat for mites in a timely fashion. There's just a lot of tasks that need to be done towards the end of the season to get the colonies up to a good winter weight. Especially if it's an operation that's moving these colonies indoors, then they have a really strict weather window where after it's too cold for the colonies to take up syrup, then that window is closed.

**Amy 31:14**

We don't deal with that here in Florida.

**Guest 31:16**

No, that's right, so you'd have a little bit more leeway if you're moving colonies down to, for example, Texas, or Florida with your colonies. But also with honey prices as they've been for the past couple years. The value of an extra week or two of honey coming in is really not that significant compared to the condition of your bees going into winter.

**Amy 31:50**

Awesome. All right. So let's get to the final two. What do you guys think? Matt, what's the worst number two?

**Guest 2 31:59**

Number two worst commercial beekeeping practice is poor feeding practices. I see a lot of times, colonies will have just too much protein patty on them. It's a dink, and a crew will come through and they'll put two patties on everything, whether it's huge, or tiny. And then the opposite as well, if you're not giving the ones that need it enough food. So I think some training for crew might help with that. Another one I see is people giving syrup when it's too cold. I think Dan just mentioned that one too. Or leaky, a lot of people a lot of commercial guys will feed with these gallon jugs on top. And sometimes they'll leak which just really encourages robbing, or it fills up the bottom board, which is just not healthy for the bees. One other thing I could mention too, is there's been studies done where sporadic feeding can actually lead to EFB. So being consistent, when your bees need to be fed, make sure they've got something on for them. And then last thing I'll mention is that when using supplements like essential oils, or there are products out there that you can put in your syrup or even in your patties. The essential oils might be good in the spring, they're a feeding stimulant. They're not a treatment or anything but in the fall be careful with those because those strong smelling essential oils can lead to robbing. So that's the last tip for number two worst beekeeping practice poor feeding.

**Jamie 31:59**

I'm curious Matt, one of the feeding practices that almost always drives me crazy when I think about it is that open feeding where beekeepers just administer feeding in troughs and so rather than - it's a time saver for them, you can either deliver feed straight to a colony, which you've got thousands of colonies can take a while or you can fill up a bathtub in the apiary and the bees can just come and get it. Do you see that a lot in commercial operations still? Where they're kind of slopping the hogs? Is what I call it.

**Guest 2** 33:58

Yeah, there is a bit of slopping the hogs, and I've seen it where, you have a pile of dead bees by this barrel, or there's a thousand wasps that you're feeding instead of your bees.

**Jamie** 34:43

Or disease transmission.

**Guest 2** 34:47

That would be an issue. Yeah, and thanks, Jamie. That's good one.

**Jamie** 34:54

Incidentally, man, I completely agree. I think everything surrounding feed and nutrition is super important for management practices. And so here you're talking principally about carbohydrate, feeding sugar syrup, corn syrup, and some of the supplemental patties. But I think that's an area of great teaching need. In the beekeeping world, we also need a lot of research related to that, especially pollen supplements. So Dan, I'm curious, how do you counter bad feeding practices, what's your best, your second best management strategy for commercial beekeepers?

**Guest** 35:28

Number two, for the best beekeeping practices would be good treatment practices. And, again, just to focus in on Varroa treatment. For me to consider a treatment practice a good treatment practice. Primarily, it's a case of wanting to maximize the effectiveness and minimize the damage to your colonies, there's always the risk of some bit of a trade off there. But if you can maximize the effectiveness and minimize the damage, then that's really what you're aiming for. And for example, if you're using contact type treatments like Apivar, to maximize the effectiveness, it really seems like those strips have to be in the brood nest where nurse bees are going to be walking over them. If you've got that second brood box, if there's a lot of sugar stored in that box, and the brood nest is right down in the bottom box, a strip right there, hanging from the top of the top box isn't going to help you very much and you might control and generally just bee access to treatments, scraping off burr comb making sure that a treatment that you're using isn't just sandwiched right under a lid and taking into account the seasonal treatment windows. Using an oxalic acid vapor right in the middle of peak brood rearing in the spring is going to give you a lot less Varroa control than it is at a time when brood area is really diminishing or almost that has been shut down.

**Jamie** 37:28

So that I think one of the things that you're mentioning is really important. A lot of people just assume that if they follow the label on the product that it's going to control whatever they're trying to control. But there are good strategies for using things that may not show up on the label, like what you said, scraping burr comb, making sure there's contact, things like that. So there's some thought when applying treatments to try to achieve maximum efficacy. And I like the fact that you pointed that out, that's a really good idea.

**Guest** 38:01

Absolutely. And then on the flip side, to minimize the damage to your colonies. With a lot of these treatments, you need to take into account both the colony conditions, mainly colony strength and environmental conditions. So if you're applying a couple pads of Formic pro to a colony that's only four frames of bees, regardless of the temperature conditions, that's going to be a world of trouble for that colony.

**Jamie** 38:34

Very good point.

**Guest** 38:35

And similarly, with these treatments that are more volatile, like formic acid and thymol based products, you need to take a look at the temperature windows especially. And back to Matt's point about feed. You don't want your feed products to interfere with your treatments. So putting a protein patty right on top of your mite treatment is going to both interfere with the bees access to that treatment, and also I would say risk contaminating that feed and possibly having your bees suffer some damage from that.

**Amy** 39:28

Yes, Varroa, Varroa, Varroa. We're always talking about Varroa. Jaime, I want you to guess, what do you think is the worst top thing and the best?

**Jamie** 39:37

What's the worst? The worst is a struggle for me. The best, I would have to assume you gotta control Varroa, when they're controlling Varroa they're handling most of their issues, but I might be wrong because Varroa has already shown up a couple places. So maybe it's already been adequately covered. Worst management practices for beekeepers?

**Amy** 39:54

I would say not listening to our podcast but of course, that's just my opinion.

**Jamie** 39:59

No doubt a strong correlation. Well, the thing is, Amy, a lot of the things I would have said have either made it to the best, to me the three biggest issues beekeepers face are nutrition, queen quality and Varroa. Nutrition and Varroa have been covered pretty heavily. So we'll see. I'm hanging on the edge of the cliff here. They can push me off or securely pull me back on and tell me that my feet were in the right spot. That's fair. Okay, Matt, what is the very worst thing that commercial beekeepers do in their bee yard?

**Guest 2** 40:31

All right, you're ready. Here it is. Number one worst commercial beekeeping practice is relying on unproven products. And what I mean by that is -

**Amy** 40:44

Can I add science to that?

**Guest 2 40:48**

We talked about that a lot of unproven, or, it doesn't have to be proven by science, per se. I debated about adding science to that, because BIP is of course all about, data driven, we're about the science, but a lot of commercial guys, they, unfortunately, are using some off label products. And so that's something I consider to be proven, some of these products. So as far as unproven products, I'm referring to things like a lot of times supplements, I see people using supplements instead of something else, when the whole VFD thing happened, Some beekeepers were caught off guard, didn't have antibiotics, and they were trying to use some supplements to help prevent EFB. And once you've already got it, no supplement is going to treat for EFB. It might help in prevention. But once you've got it, you need antibiotics. There's been a lot of untested type mite treatments. Right now a trendy one is oxalic acid with glycerin in a towel, and it works well in some cases. I've seen it work very well. But as you know, all beekeeping is local. There has been some data that has shown it didn't work well in other areas. So other examples would be the old vaping of mineral oil or fogging mineral oil. I think that's been debunked. Small cell foundation.

**Jamie 42:29**

I am glad incidentally, you switched to "fogging," because I could just now see people putting mineral oil and their vape. I don't even know how to put that. What is the thing called with which you vape, a vaporizer? Yeah, that is - we are not endorsing vaping mineral oil. I don't even know how to talk about it. I don't even know what the right verb is?

**Guest 2 42:51**

You see these big things the guys have, they're foggers. And they're putting all kinds of these homegrown recipes in them. If you want to try something new, even if it's, some people feel it's proven, I would recommend that you take one yard and you treat half the yard with what you always do and you treat the other half of the yard with whatever new product you would like to try.

**Jamie 43:19**

I mean, daggum you Matt you just said exactly what I was about to say. One of the problems that I see with commercial beekeepers is they just, they're all in. If their buddy down the road says, oh, gosh, this works. They're going to put in 15,000 colonies! Try it in a yard!

**Amy 43:40**

Are you frustrated Jamie?

**Jamie 43:45**

Guys, but that's the funny thing about is they'll do it over 15,000 colonies and say it works or doesn't work. But they oftentimes follow that up with monitoring. They don't know if it works or not because they didn't monitor. My blood pressure is going up.

**Guest 2 43:59**

Basic science. Yeah, let's have a control and a test. Anything that promises to do everything, this is going to help with nutrition, it's going to kill mites. It's going to knock down your viruses. Any cure all

types of, I would call it snake oil, comes to mind. So if you want to try something new, that's great. But test it first. Do half a yard, the old way, half a yard the new way, pick a couple yards and do that.

**Amy** 44:30

I'm glad we're ending with the best so that Jamie's blood pressure can go down just a bit.

**Jamie** 44:39

Dan, here's your chance. What is the single best thing commercial beekeepers do to help maximize colony health, productivity, etc. Let's have it.

**Guest** 44:51

Yeah, so you just mentioned monitoring and the single thing we've highlighted as the best commercial beekeeping practice is to know your mite levels. And that involves not just a visual inspection, but it involves some sort of proportional testing methods. So whether it's an alcohol wash of half a cup of bees, even an ether wash or sugar shake for a quick check, but absolutely monitoring your mite levels and keeping records of your mite levels at a certain time of year. So if you're about to pull your honey in August, and you're peaking at about 3% mite level on average, you want to know, is that little bit higher than last year or a little bit lower than last year? So having that, keeping track of whether your mite levels seem to be stable year over year, or if there's some indication that they're ratcheting up slightly from last year and the year before, because if they are ratcheting up then you need to consider adding an additional strategy at least for a season. And of course, that's sort of BIP's bread and butter to come out and check on these operations, mite levels at times a year when there's a lot going on, and it may be hard to do the mite monitoring and in a timely way.

**Amy** 46:31

That's the best news I've heard all day.

**Jamie** 46:34

What is, the mite monitoring thing?

**Amy** 46:36

Yeah, that commercial beekeepers know their mite levels. And I think that's true. I mean, every commercial beekeeper I speak to, that's usually what they say, well, you know, we checked mite loads, and this is what it was last week. So I think that's great.

**Jamie** 46:47

But what's amazing to me though, and Dan, you probably see this too, is that a lot of commercial beekeepers don't monitor they just kind of rely on their gut, they'll look in and see shriveled wings, or I need to treat, or this is what I normally treat, so I need to treat so I think having those data to help make decisions is very important. Dan, I echo that model. Again it's no surprise to me that your best management practice is related to Varroa in some way. Well, I'm going to take this moment to reiterate those and I'm going to do worst from five to one and best from five to one and you guys tell me if I have it right. Matt, going from worst five to one poor equipment, no plan for antibiotics, missing visits while

bees are in almonds, bad feeding practices, and relying on unproven products. If you want your bees to not do well and for your bottom line to suffer you do those five things.

**Amy** 47:41

That's we want Jamie, that's exactly what every beekeeper's trying to do.

**Jamie** 47:44

But Dan if you want your bees to succeed, you've got to have good splitting methods, you have to rotate Varroa treatment specifically, but treatments in general, you want to pull honey and treat early, you want to have good treatment practices, and you want to know your mite levels. I think four of those, actually even all five of them. All five in some way relate to Varroa but some other things as well. So essentially Varroa, Varroa, Varroa, am I right there?

**Guest 2** 48:13

That's no accident.

**Jamie** 48:15

Yeah, good. Yeah, it's funny to me, when we talk about bee losses, people always want to point out all the other things that are killing bees. And when I get interviewed, people want to interview me about pesticides and how bad they are for bees or these stupid murder hornets. But nevertheless,

**Amy** 48:31

Don't even get me started.

**Jamie** 48:33

It's like you want to raise everybody's blood pressure. Let's talk about that. But really, it really boils down to Varroa management, nutrition, management, and some of these other things you guys mentioned, Matt, Dan, thank you so much. I really appreciate the insight that you guys offered.

**Guest 2** 48:48

Thanks for having us.

**Jamie** 48:50

Absolutely. So that we've been graced by your presence. Today we had Dan Aurell who's BIP field specialist based at Texas A&M in College Station, Texas. We've also had Matt Hoepfinger who's also a field specialist for the Bee Informed Partnership based at UC Davis. And you've listened to their top five best management practices for commercial beekeepers and top five worst management practices for commercial beekeepers. We'll make sure to list these five best and five worst in our show notes. And thank you guys for joining us on Two Bees in a Podcast.

**Guest** 49:22

Thanks so much for having us. It's been great to talk to you.

**Guest 2** 49:26

Thank you.

49:32

Questions or comments? Don't forget to like and follow us on Facebook, Instagram and Twitter @UFhoneybeelab.

**Jamie** 49:44

If you've been a beekeeper for any length of time, you've probably learned the old adage in honeybee biology that workers and queens both come from the same type of egg. Those eggs are fertilized, so from that point forward, you've got this female individual, this larva that comes out of the egg. And something happens to that larva to either push her in the direction of becoming a worker or push her in the direction of becoming a queen. It's been a long held belief that for the first few days of that female Larva's life that she's fed royal jelly, and then kind of somewhere around a two or three, there's a fork in the road where the individuals the workers want to keep on the queen route continue to feed that queen royal jelly and the individuals the workers want to push towards workers start feeding that individual brood food, which is a different quality or makeup of diet. So we've kind of long held this belief, but there was a paper that came out in May of 2020. In the Royal Society proceedings that actually gets at this issue. Dr. Julia Bowsher, who's here joining us today is an Associate Professor of Evolutionary and Developmental Biology, in the Department of Biological Sciences for North Dakota State University, and she and her colleagues published a paper called Diet Quantity Influences Caste Determination in Honey Bees. Dr. Bowsher, thank you for joining us on Two Bees in a Podcast. I appreciate you calling in because this is a paper of very significant interest and I look forward to discussing it for the benefit of the beekeepers audience that we have.

**Guest 3** 51:16

Well, thank you for having me. I'm excited to be here.

**Jamie** 51:19

We told you behind the scenes before we started this interview, before we get down into the meat of your manuscript, the research project that you did, just want to know very quickly, something about you. How did you get involved in bee research in general? How did you end up doing the project that we're going to discuss today?

**Guest 3** 51:35

All right, well, I've been wanting to be a scientist ever since I was a small child. And I grew up in Louisiana, and in Louisiana, there's tons of insects in your backyard. I always loved insects, all kinds, collecting them. And I eventually went to graduate school and I worked on dung flies and got a PhD doing that. And when I started as a faculty member, I started to go into bees. I got a job at North Dakota State University, and agriculture is really important up here. And I started to think about pollinators. This was also around the time that we were really starting to worry about pollinator decline. I first started working on bees that were not honey bees, I worked on the alfalfa leaf cutting bee and the blue orchard bee. As I started working on those bees, I was looking at nutrition and diet, and did some experiments showing how bees can be reared on different diet amounts to get very different adult sizes. After we did that study, I started to think about well, honey bees are bees, and wondering if this kind of mechanism



would be important for them. Would amount of diet be really important for size differences, especially size differences relate to caste? And that's sort of the start of how we got into this work.

**Jamie 52:53**

I think that's interesting because a largely held belief is it's kind of quantity and quality of diet. It's that the queens are fed not just more food, they're fed a different quality food, which pushes them towards queen but ultimately, as we get down into your project, you're gonna have shown that that's not necessarily the case. It's funny before we go there, though, I was listening to you talk about as a PhD student you were working with dung flies and I think that's interesting. It probably wasn't hard for you to get motivated to move into bees, was it?

**Guest 3 53:26**

Everybody's sort of, I would have thought it would be a real conversation killer, the dung fly thing, but I was surprised how I would go to parties and people were actually really into it, they want to know where did you get your dung?

**Jamie 53:37**

I'm not surprised at all. When I was doing my PhD in South Africa, my wife was doing her Master's there too, and she was working with ungulates, these big mammal populations and she was estimating them using piles of their feces, so scat, my wife is also a dung girl, in fact they called her the pooper scooper. So when I was hearing you talk about your PhD with dung flies, I was harkening back to my graduate school days in South Africa when I was looking at dung beetles and my wife was known as the pooper scooper, which instantly told me that you probably were a great hit at parties, which independently you just confirmed.

**Guest 3 53:37**

I guess ever since humans were able to speak, poop is a topic of interest.

**Jamie 54:24**

It's just fun.

**Amy 54:25**

I'm still sitting here giggling. Oh, my goodness. Okay, so Dr. Bowsher, let's go ahead and go back into talking about this specific research that you were doing. So when was this research done?

**Guest 3 54:41**

This was done a few summers ago. And it was done by a master's student of mine, Garrett Slater, who has since graduated. He's now a PhD student at Purdue. And we were interested in this idea about food amount and how amounts of food can regulate when larval bees decide to go through metamorphosis and pupate. And also related to this, we wanted to know about how the amount of food might affect caste determination. But of course, everybody thought diet quality was very important. And so we wanted that to be a component of our experimental design as well.

**Jamie 55:21**

Let's talk about that. Like we've already mentioned a little bit that historically, we thought it was quality, we thought it was that fork in the road, but you've kind of thought from your background with other bees, that perhaps it's the amount. Talk a little bit about your experimental design. What stuff in the literature pushed you towards doing this particular project?

**Guest 3** 55:48

As I mentioned, we were interested in other bees as well, and when we started to look at the literature, we saw that even within some social bees, like bumblebees, or cape honey bees, that quantity was thought to be really important. And so that gave us another reason to do this experiment. And we thought, well, we want to test quantity. But we need to also test quality at the same time. By doing that, in a particular kind of experimental design, we can actually measure the importance of each thing and also the potential interactions between those two things. So we can sort of take an adult bee and say, Okay, how much of the caste information is explained by quantity, [and] how much is explained by quality. And we did that by doing what's called a factorial design. And it just means that we did every single diet quality component with a quantity component. And we had nine different levels of diet quality, and we had eight different levels of quantity. For every diet quality we had, we did that at all the different quantities, and vice versa. So I don't know how clear that is. But we ended up having lots of different treatments.

**Jamie** 57:09

It was a massive study design, you basically had 72 treatment groups, right?

**Guest 3** 57:13

Exactly. It's 72 treatment groups.

**Jamie** 57:15

I read your paper.

**Guest 3** 57:20

I appreciate your close reading, we also had an extra treatment, that was not part of the factorial design. But what we did with that is we took the medium, the middle quality diet out of those nine, and we fed it to some larva in ad lib, which means as much as they could possibly eat, so we fed it in excess. And that was just the middle quality diet, it wasn't the lowest or the highest. And the idea around that middle quality diet, is we had read some papers where that diet was thought to be very good for rearing workers. And so we thought that was a good diet to kind of test our hypothesis in a second way, being as we wouldn't necessarily expect that diet would make queenlike individuals. So we tried to see if we could do it by giving them an excess amount.

**Amy** 58:16

I have a question from a non researcher perspective. What quality components were you looking at? And what does that actually mean? And how are you feeding the larva? You know, for someone who has never really even done research before, how do you do that?

**Guest 3** 58:33

Great. We had two different aspects of quality that we were interested in. We were interested in protein content, like proportion of protein, and the proportion of carbohydrates, which are sugars. And there's lots of different quality aspects that are thought to be important for queen rearing. But we just focused on those two, because most of the previous studies had gotten positive results on either protein or carbohydrate. And there had been a rather well known paper, showing that a protein component, Royal Lactin, was the queen maker. That's a reason to look at protein. But a lot of people had also thought that carbohydrate content was also important. We had those two, and we altered them looking at different - we had like a high protein, medium protein and low protein diet, and then high carb, medium carb, and low carb, and we did all those different combinations. We had like high protein, low carb, medium and medium. And that's how we got our nine.

**Amy** 59:40

Got it. So how do you feed the larva?

**Guest 3** 59:44

We took them from the hive very carefully when they're about a first instar and we put them in these little plates that are actually for culturing tissue, but they just have little circular wells in them. And you put the honey bee in there and you feed it every day by squirting a little bit of food right in front of its mouth. You have to be a little bit careful because you don't want to drown them. But you also don't want them to run out of food. So it's important to do it. And I think Jamie probably has even more experience than I do, doing it. So I look forward to hearing more tips later.

**Jamie** 1:00:23

Yeah we've done it a little bit.

**Guest 3** 1:00:24

But the way we did it is we had a certain amount we did feed them each day. And then the quantity treatments were really only fed in the final day. So up until the last period of development, they're all kind of getting the same amount, which honestly, is an excess, because they don't usually finish it, if they had finished it, they would have died. But the differences in the amount of diet really came at the end where some were fed a lot more than others.

**Jamie** 1:00:57

At the end of the day, it was neither carbs nor protein, it was simply more food, the more food they ate, the more likely they were to become queens or be queenlike, right?

**Guest 3** 1:01:07

Exactly. The bees that didn't get a lot of food, even if they got a high quality of food, they were not very queenlike and we had some that were fed a whole lot, and it didn't really matter what the quality of the diet was, if they were fed a lot, they became more queenlike. This was especially shown in that second experiment we did where we took the worker diet, and we fed them in excess. And then that one actually fed them a whole lot every day. They got more than they could ever eat. And all of those individuals ended up being similar to the commercially reared queens that were our reference group for queenliness.

**Jamie** 1:01:50

Yeah, that was really neat. I like the fact that you included commercially reared queens as that positive control, as it were, it was really neat to see that. We've got a big beekeeper audience, and people listen to this from around the world. And ultimately, they're going to have some applicable questions, they're going to say things like, well, this is really interesting. What could this, downstream, do for beekeepers? I think this is important before we kind of go there, though, because it's pretty clear from a lot of the survey data that when beekeepers are reporting about their colony losses, they're routinely saying Varroa are significant issues. They're saying nutrition is a significant issue for their bee colonies and diseases and pests. But oddly enough, in the top five, every year, they list queen quality as one of those most significant stressors that they face. When I see a project like yours and your rearing queens in vitro or in the lab, and you're showing that it's the amount of diet, and not necessarily the quality of the diet, that pushes them towards queens, what, downstream, could this do for beekeepers? Where could we head with this information that might help beekeepers improve queen quality so that they can have better queen, or better colony survivorship and better colony productivity?

**Guest 3** 1:03:03

That's a really good question. And I had also noticed that about queen quality being really important. And I think having quality queens helps the overall resilience of the bee population to lots of the other problems that they have. In getting back to what the ramifications might be, we've known nutrition is important, and it definitely is, I wouldn't say that quality was unimportant, it still is very important. I think that just this adds another thing for commercial beekeepers to consider, and I know that the way they rear them, a lot of times the nurse bees are taking care of most of the job. But I think if there's anything they can do to ensure that enough food is fed to the queens and the queen cups, I think would be really good. I know that a cup size and things like that can kind of influence how much food is fed to queens. I think it's something to be mindful of. Another thing that I thought about it is different ways to think about queenliness and queen quality. And I know there's lots of different metrics, but I think looking at some of these morphological ones might be helpful, because it doesn't involve killing the queens in order to look at them.

**Jamie** 1:04:20

Yeah, that's a really good point. Do you guys plan to continue research on this topic?

**Guest 3** 1:04:25

Yes, in fact, we're doing in vitro rearing this summer. Our goals are to look at these different kinds of queenlike individuals that come out these diet treatments and look at the different genes that are being expressed and the different hormones. We're really curious about whether these in vitro reared queenlike individuals, how queenlike are they, and how similar is our in vitro process to what might be happening in the hive, based on what we know about hormones and genes during that time?

**Jamie** 1:04:58

Well, absolutely. This is research that's kind of near and dear to my heart because like I said, we've been rearing workers for quite a bit and have even played around with rearing queens some in previous years. It's really interesting to hear all of this. For our listeners' sake, this manuscript will be linked in our

show notes. Again, it's Diet Quantity Influences Caste Determination in Honey Bees, it's published in the Proceedings of the Royal Society Bee. There will be a link in the notes. That was done by Dr. Julia Bowsher and her colleagues at North Dakota State University. Julia, thank you so much for joining us on Two Bees in a Podcast.

**Guest 3** 1:05:31

Well, thank you so much. This was a lot of fun.

**Jamie** 1:05:33

Absolutely. That was Dr. Julia Bowsher, who's an Associate Professor of Evolutionary and Developmental Biology, Department of Biological Sciences, North Dakota State University.

**Stump The Chump** 1:05:47

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

**Amy** 1:05:58

All right, we are doing our question and answer. We're going to do a really quick Q&A today. And we have two questions from Facebook. One from someone named John Stramilo. I probably butchered that name, and then someone named Kevin Herr.

**Jamie** 1:06:16

Just quit trying.

**Amy** 1:06:20

Alright, John was wondering, he has a hive and he uses the screen bottom board, he coats the plastic removable boards with canola or vegetable oil to catch all the good stuff that falls at the bottom like Varroa, small hive beetle, larva. And he's heard of people using diatomaceous earth on the board, as well as using small hive beetle traps that sits between the frames. Is there a danger? Or are there benefits to using diatomaceous earth versus using an oil?

**Jamie** 1:06:46

Well, there's a couple of things at play here, Amy, and I want to make sure that I understand this correctly. I'm going to do my best maybe to answer it two ways, depending on what he's really asking. If you use a screen bottom board, and your screen bottom board is open to the ground, there's really no need to put an insert on it, and coat it to catch those Varroa etc. Because those things that naturally fall will fall through the screen bottom board and to the ground. That's the standard screen bottom board. Now some screen bottom boards, they'll have a piece of wood under them. And that's where people will kind of slide small hive beetle trays, or slide these plastic inserts etc. In those cases, the Varroa or what have you will fall through the screen but still into the colony because they're just simply landing on a board and the worry there is that they can crawl back up through the screen and get back onto the bees. In that case, you can put this plastic insert and coat it with vegetable oil to catch the Varroa to catch the small hive beetle larvae, etc. I would argue if you're using the first option, the open screen bottom board where things just fall to the ground, you don't have to put anything under there at all. Because if small hive beetle larvae or Varroa are falling through the screen to the ground, they're not

going to make it back into the hive. If however you have one of the screen bottom boards that does have that kind of wooden piece underneath, then it is helpful to have that plastic insert that you coat with vaseline or vegetable oil to catch things. Now, the fact that he mentioned diatomaceous earth leads me to believe that he wants to put that under his colony, perhaps as a way to kill the beetle larvae or Varroa. And I would argue that the research that I've seen on diatomaceous earth suggests that it doesn't really help that much. There have been people who've sprinkled it around colonies and done research to show that it's not really impacting beetle larvae as they crawl into the soil. And even if you were to put a trap under that hive that then itself contained diatomaceous earth with the hope that the larvae or the Varroa or what have you would fall into it, I would argue that diatomaceous earth does not necessary even in that case, you could just put vegetable oil in those traps as well. Now he also mentioned the traps, the small hive beetle traps that go between frames in the nest. I do like those. There's many versions of those, the better Beetle Blaster, AJ beetle eater etc. There's a few different types. I do like those, we tend to put vegetable oil or mineral oil in ours. If we're having beetle problems in Florida, which we often do, we'll put two of those traps per box. If a hive is composed of five boxes, we'll have 10 of those beetle traps scattered throughout. But even in those we're not using diatomaceous earth we're simply using vegetable oil or mineral oil.

**Amy** 1:09:32

Sure, and some people use essential oils in those too, does that work.

**Jamie** 1:09:36

They do use essential oils. I don't think they're really that useful, frankly. Really what you're trying to do is you're providing these traps as a place for small hive beetles to go hide and really once they go in there you just need them to get coated in oil. You know a lot of people will use apple cider vinegar because it is probably an attractant. It probably attracts beetles to those traps. However, beetles can go into the vinegar and come right back out. So you've got to have a killing agent in those traps as well, which is where the oil comes into play.

**Amy** 1:10:07

Yeah, that makes sense. Okay, for the second question, we, a couple of episodes ago, talked about your top 10 tips for beekeepers. And we were talking about Varroa mites, how they look like chia seeds. And you didn't know what chia seeds were, which is fine. But you also started talking about conducting an honest assessment of the quality of forage sources where bees are located. His questions are, how does a person recognize those forage sources? And are there resources for seeing what kind of sources or forage is around you? And are there actual quantitative measures for this assessment.

**Jamie** 1:10:47

There's no quantitative measure. By definition, a quantitative measure, you can go out there and measure there's more of a qualitative measure where you're trying to assess more visually. And so let me give you a couple pointers here. Number one, you need instantly, if you're going to keep bees in an area, you need instantly to go to your nearest local bee club or find some local beekeepers and ask them hey you live in this area. Is this a good honey producing area? What plants should I look out for? Right because your beekeepers in your area are going to have lived through nectar producing seasons, and they're going to be able to know where you are. There's lots of this thing that's good or there's none

of this thing that's bad. Before I moved to where I live in Florida, there was a beekeeper I knew who lived in this area. He said Jamie, this particular area is a tough place to keep bees because there are no nectar resources and I kind of wrote him off because I'm a lot like other beekeepers. Well, bees can fly three to five miles they'll find it. Well when I moved down here, I was like my great beekeeping skills and knowledge, my bees are gonna go find this forage, well, there's nothing but oak trees and pine trees here. My bees make no honey and it took another beekeeper living in this area, telling me that and then it took me living through three honey seasons here before I finally believed it. I should have listened to the beekeeper to begin with. My recommendation is you gotta go to your local bee clubs, find your nearest beekeepers, ask them, what are the plants that bees make honey from in this area? And then you need to ask, are there beekeepers near where I live? If there are, do they produce honey? Another great resource for you will be your local county extension office, your local extension agent if I were told back 15 years ago when I was moving to Florida, Jamie, you need to look for saw palmetto and gallberry. I would have gone to my local extension office say, hey, what are these things? I live in this particular area? Is there a lot of this stuff known to be there? And some of the county agents would have been able to tell me Yeah, Jamie, where you're living there's not a lot of this. There's a lot of oak trees and pine trees and there's no such thing as oak honey. So all of these things would have helped me. If I want to produce honey, where I live, I have to move my bees and I have to move them to areas now that I can recognize have lots of gallberry and lots of palmetto. So you need to do your homework just because bees can fly a long distance doesn't mean they're going to fly far enough to get you honey if you live in a nectar desert.

**Amy 1:13:22**

Sure. What do you do if you can't move your hives?

**Jamie 1:13:26**

If you can't move your hives, then you're not going to produce honey. That's just the bottom line. Where my bees are in my backyard, I produce no honey. If producing honey is important to me, I've got to move bees and if moving bees is not an option, then you just have to know that you're going to be keeping bees, but not making honey, which is what I've done the 14 years I've lived where I've lived.

**Amy 1:13:47**

You've made no honey in fourteen years?

**Jamie 1:13:49**

Yeah, it's funny, Amy I really do. And it's funny because there's a couple of plants that come in bloom here that provide just enough nectar for the bees to not starve to death, and one blooms super early in the year. If I get freezes that knock it out, I know I'm gonna have to feed my bees until that second plant blooms, which blooms late in the year and there are certain seasonal situations where it won't produce a lot of nectar. Basically I have two plants that produce enough nectar to keep my bee colonies alive. Both of those nectar sources produce pretty unpalatable honey and so it's funny, I'm here giving people advice about bees and beekeeping, but my bees have not made honey and it's not because I don't know what I'm doing, it's because I'm truly in a nectar desert. If I wanted to make honey, I've got to move my bees. I've got to because the options that I have in my area are just simply limited.

**Amy** 1:14:44

Sure. Awesome. Well, thanks for answering those for us.

**Jamie** 1:14:47

Having done an honest assessment years ago would have saved me all these troubles. I needed to listen to that beekeeper I needed to not say oh crap, I know what I'm doing. I'm gonna show him. No, he showed me. He knew the area said no, not a single bee colony's made pine honey. I needed to be prepared for that. But it took three years of stubbornness to show. The questioner said what are some other ways that I can know? You can know by trying to live through a couple of seasons. If two or three years in, you're not producing lots of surplus quality honey, then it's probably not your bees. It's probably the area.

**Amy** 1:15:23

Sure. Awesome. Thank you. 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 Aenlle. Without their hard work, Two Bees in a Podcast would not be possible.

**Jamie** 1:15:46

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](http://UFhoneybee.com). Do you have questions you want answered on air? If so, email them to [honeybee@ifas.ufl.edu](mailto:honeybee@ifas.ufl.edu) or message us on twitter, instagram, or facebook @UFhoneybeelab. While there, don't forget to follow us. Thank you for listening to Two Bees in a Podcast.