

# Episode\_4\_PROOFED

Thu, Sep 08, 2022 9:49AM • 1:05:05

## SUMMARY KEYWORDS

beekeepers, extension, research, varroa, bees, humberto, program, bee, podcast, lab, work, meghan, florida, commercial beekeepers, entomology, teaching, objectives, beekeeping, amy, honey bee

## SPEAKERS

Jamie, Guest, Honey Bee, Cameron, Amy, Dr. Boncristiani

### 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. Hello, and welcome to Two Bees in a Podcast. I'm Jamie Ellis accompanied by co-host Amy Vu.

### Amy 00:49

I'm excited for this episode today because we're talking about one of my favorite things.

### Jamie 00:53

Flowers.

### Amy 00:54

Extension.

### Jamie 00:54

Oh, extension, my bad. I was just guessing. Do you like flowers by the way?

### Amy 00:59

Yeah, they're okay.

### Jamie 01:00



Okay. You know, they wrote a song like these are the my favorite things in the sound of music or something like that. These are a few of my favorite things. That's it.

**Amy 01:09**

It's the sound of music.

**Jamie 01:10**

Yep, that's where it was. That's right. I can't even remember apple strudel. Anyway, we need to get back to why we're doing this podcast in the first place. That's for you the beekeeper. Guys, we have a fantastic program today. We're talking about extension, what it is, how it's done, how it's evaluated. And our very own Amy Vu is going to be talking about that.

**Amy 01:30**

I don't just do social media.

**Jamie 01:33**

We are going to also discuss research at the academic level, how research projects are done, we'll bring in Dr. Humberto Bonchristiani, who's going to discuss specifically some of the projects that we do here at the University of Florida. In our third segment, we're actually going to be bringing in Dr. Meghan Milbrath, who's an academic specialist at Michigan State University. She has a 50/50 split, in research and extension. So you will be able to see how extension and research are integrated in her program to address the needs of beekeepers in her area. So I think you will enjoy today's episode. And now, Amy, we're going to talk about extension.

**Amy 02:17**

My favorite thing in the whole world extension.

**Jamie 02:20**

Amy is our extension coordinator. And of course, extension is not limited just to Florida, this exists around the United States and really around the world. So what Amy is going to be sharing with us is relevant, really everywhere.

**Amy 02:36**

Absolutely. I have friends who are extension agents all around the country, and outside.

**Jamie 02:41**

So what in the world is extension.

**Amy 02:43**

Extension is just that one leg of the land grant institution, I've talked about it before in the first podcast. And it's, essentially, just meeting the needs of the community. So we have instruction for students, for undergraduates, for grad students, and faculty that are teaching those, and then they're going out, and

getting jobs. And then of course, we have the research that's going on. And historically, what was happening was there was research going on, and it they were working with farmers. But all their time was focused on research. So they didn't really have a lot of time to take the research information to share it with the public. And so that's where extension kind of started to play a role in the land grant system was just working with farmers, working with researchers and kind of bridging that gap.

**Jamie 03:28**

I can tell you when I was hired by the University of Florida, what I believed extension to be at the time is grossly different than what I know extension to be.

**Amy 03:37**

Yeah. So what did you think it was?

**Jamie 03:39**

Well, prior to coming to UF, I'd spent a lot of time answering emails from beekeepers, answering phone calls from beekeepers, and speaking at local bee clubs, and then occasionally writing a popular article for the American Bee Journal or etc. And all of those were extension programs. But that's not at all what extension is, though. It's part of extension.

**Amy 03:57**

It is part of extension shirt.

**Jamie 03:59**

So the way that I usually teach it is that instruction is teaching university or college students, extension is teaching individuals who aren't at the University of college at that moment. So I always say it's teaching people who aren't paying to be taught.

**Amy 04:17**

Exactly a lot of people. It's funny. People just think, oh, my gosh, what are you doing? You're posting on social media, you're doing podcasts, you're doing all this stuff. So what's your job again?

**Jamie 04:29**

Well, it's funny because, extension is not mindless. It's not just us teaching because we're paid to teach.

**Amy 04:36**

Teaching with a purpose.

**Jamie 04:37**

Exactly. That is exactly right. So let's start from the top. You've told us a bit about what extension is. We've talked briefly about target audiences, right? They're not sitting in our classroom and paying for credit so they can get degrees. Who are these people who benefit from extension?

**Amy 04:54**

Sure, that's also another fun thing about extension. Target audience can really be anybody you want it to be whether they're toddlers, working at a kindergarten, preschool, elementary school. And then, of course, adults, adult education, that's one of my favorite things about extension is teaching people who want to learn beyond, whether after they graduated high school after they graduated college, and I love working with retirees, they're a lot of fun.

**Jamie 05:25**

Amy, you're better than me. I teach a youth group. And when I get mad at them you just send them to the corner. But when you do adult education, and you get upset.

**Amy 05:34**

I still do that.

**Jamie 05:36**

Sit in the corner it's stuff. Alright, so you got target audience, I assume at this point, you've got this extension background, you've got your target audience, we're just gonna go lecture to him.

**Amy 05:45**

Lecture is probably one of the worst methods of education that I prefer not to teach.

**Jamie 05:51**

You don't like my lectures.

**Amy 05:55**

You gave a lecture yesterday, and someone next to me said, "He's got really good dad jokes."

**Jamie 06:01**

I am a dad, so I will take that.

**Amy 06:03**

So, just for example, here at the lab, one of our primary target audiences are beekeepers. So that's just a general broad way to identify our target audience,

**Jamie 06:14**

But you don't just go speak to them, right? You need to know something?

**Amy 06:17**

We do lots of things. I'm just gonna go ahead and say the word SMART objectives. We like to set objectives up, we're teaching for purpose. Everything that we're teaching is purposeful, and we have a

plan, as far as what we would like people to learn from either a workshop and that is lecturing. And that's just an activity that goes into identifying how we can move forward with our objectives.

**Jamie 06:46**

Yeah, let's think about it systematically. Right, we've got a target audience: beekeepers. That's who we work with, specifically. But other extension specialists might work with other individuals, other target audiences, and we want to teach them, but how do we know what we need to teach them? What do I mean? Just because I'm teaching doesn't mean I'm achieving anything. So we have to ask them.

**Amy 07:08**

Sure. So we're doing needs assessments, we basically go out. And it's really interesting, because when you go to your local extension office, it's going to be completely different depending on where you go. And that is to identify the audience and they're working with their audience. So you know, someone who wants to work in a very urban environment or very rural environment is going to have completely different objectives. And they're going to be able to identify those objectives by just networking with the community and asking them what their needs are, and as a whole trying to identify what different workshops or activities they can do to be able to answer some of the needs and at least acknowledge some of the needs of that community.

**Jamie 07:52**

So to make this I think, easier for our listeners to digest. What we're going to do guys is we're going to use Varroa and beekeepers as an example. Let's say that Amy here has conducted a needs assessment of, we will limit our population: say commercial beekeepers, and they've conducted a needs assessment and discovered from commercial beekeepers in a needs assessment that Varroa are their biggest issue, and that they're not confident or comfortable determining their Varroa loads. Which would of course inform their decision to treat or not to treat. So with that background, Amy with that needs assessment conducted, you know your target audience, you know what they need? You said something about objectives and SMART objectives. So you don't just teach them and say: Hey, this is what you need to do for Varroa.

**Amy 08:39**

Exactly. So we have something called SMART objectives and what that stands for, it's an acronym. The S means specific. So we want to be specific in our objective, we don't want to say, we would like our beekeepers to learn about Varroa mite,

**Jamie 08:52**

Or we're going to keep bees alive.

**Amy 08:56**

Yep

**Jamie 08:57**

It's got to be very, very specific. So we'll wrap all of this into an example objective in a moment, but specific.

**Amy 09:04**

So m is measurable, A is achievable, the R, it means that it's relevant. And then the T means that it's time based that stands for time based.

**Jamie 09:13**

It's always the R that I forget, I remember specific, measurable, attainable, or achievable, and time limited, but I always forget relevant.

**Amy 09:21**

So that's funny that you say that just because it does need to be relevant. And that's a huge part in extension, right is to stay up to date on different teaching methods.

**Jamie 09:33**

Teething methods? Babies need some training.

**Amy 09:38**

But it does have to be relevant. So the way that we're disseminating that information, and we; you and I had kind of spoken about the different activities and the way that we distribute that information. So it's not just lecture anymore. We're doing a podcast right now. We are very active on social media, you know if we could make videos, if we could go out into the field, and so we use these objectives and we'll go ahead and talk about that next step. So you take those objectives you identify very, very specific, measurable, achievable, relevant and time based.

**Jamie 10:07**

Before we move on, let me see if I can put this together. All right, Varroa: target audience is beekeepers; I am going to try to create a smart object. Let's see if we can do this. Okay. I'm nervous now. All right. We want to reduce colony losses in commercial beekeeper operations to Varroa by 30%, in five years. Does that tick all the SMART objectives? Is this specific?

**Amy 10:37**

It's pretty specific. Yep.

**Jamie 10:38**

It's measurable, because we can determine if we've reduced colony losses to Varroa.

**Amy 10:42**

Sure.

**Jamie 10:43**

Over this amount of time. Okay, it's achievable. Hopefully, we didn't set the goal too high, I wouldn't want to say that we're going to reduce or eliminate all losses to Varroa. That's not achievable.

**Amy 10:52**

You are being realistic.

**Jamie 10:53**

All right. It's relevant, because we know that's what beekeepers said through a needs assessment. And it's time limited right I threw that five year thing only. And then I do it, you did it. And I write a smart objective?

**Amy 11:04**

You wrote a smart objective, you're a smart person.

**Jamie 11:07**

I need to tell my wife that I feel accomplished. So we've got this smart objective. Hopefully, our audience now knows that this is what we would like to do. How do you get your target audience to achieve that objective? How do you reach your objective?

**Amy 11:21**

Yeah, with the program, we have different activities, and we use different tools, so that we can make these objectives happen.

**Jamie 11:30**

That's so key. I believed when I first got hired that the activity was an extension program. That's were I was wrong. It's a part of an extension program to help you reach your end objective. So we work at University of Florida. So we'll give University of Florida specific activities. But what are some activities we use to help reach objectives that we developed?

**Amy 11:52**

We're doing one right now?

**Jamie 11:53**

All righty, what is this right?

**Amy 11:55**

We're recording podcasts as an activity. It's something that listeners can listen into, for their education, other activities, or maybe different workshops that people go to. We have bee college, for example. So that's an activity. Being on social media is an activity. And then of course, moving to tools. We had to buy all this podcast stuff, we have to have social media, we have to have different platforms, we have to have a website, we have to have this facility to be able to hold bee college. And online documents

and online training videos and a presence on YouTube and a Facebook, Twitter, Instagram account. The list goes on.

**Jamie 12:35**

Yeah. The way that I kind of think of that, is we have all of these activities master beekeeper program, bee colleges, in some cases, the honey judge program, we run, etc. And then we have all these tools, instruments that beekeepers can use outside of those activities. So when they're not at our bee college, they've got these online documents and these videos and this podcast, and we answer emails, etc. We speak at bee clubs as part of activity, all of this together, goes towards objective, trying to get our target audience to achieve the objective that we've identified early on.

**Amy 13:08**

Exactly.

**Jamie 13:09**

Okay, so we got all this busy stuff happening, you're out there, and you're shaking hands with beekeepers, and doing great bee colleges and running a fantastic master beekeeper program. How do you know if and when your objective is actually met.

**Amy 13:24**

That takes some time, and that also just goes on with the evaluation part of that. Evaluation is extremely important. If you come to any of our activities, if you go to any extension activities, you'll probably get either a pretest, or post test or there's some sort of dialogue where there's some sort of focus groups that are together.

**Jamie 13:46**

You know, it's funny when I was hired at the University of Florida, I remember that one of our associate deans came and gave a new faculty training session. And she said that there were five levels of programming evaluation, and I'm guessing everybody has different levels. But what she taught me is the first one was simply number of participants. The second was satisfaction surveys, essentially. Third was knowledge gained. Fourth was behavior change, and fifth was some sort of socio-economic or environmental change. So for example, going up in that group, how many people are at our activities? I mean, people came to bee college, how many people sharing beekeepers program? How many people read our websites or watch our videos or listen to our podcasts? Okay. Number two, are people satisfied? Do they tell you that they're learning? Do they say that we enjoy receiving information the way that you're giving it to us, etc? The third one is knowledge gain. You mentioned before and after tests. How do you measure knowledge and how do you know that what you're actually teaching is sinking in? The fourth level is behavior change. It does no good for us to preach if people don't do what we say. If we teach Varroa sampling, we want people to go out and sample for Varroa. If we teach treating a certain way for Varroa, we want them to do it.

**Amy 15:07**



In my opinion, that's the hardest one. Exactly.

**Jamie 15:09**

That was even one of the scarier, at least when I think about it, it's the one on top of that, which is that highest level of evaluation, which is, are the results being met? Did we have reduced colony losses? Are we using fewer miticides to control Varroa? Are colonies more productive? Is our objective met, as you can imagine, as you move from the bottom, which is simply numbers, how many people are doing this? To the top, which is we're seeing some sort of environmental, socioeconomic, or bee health change. As you move from bottom to top, it gets increasingly harder to measure.

**Amy 15:46**

Yep. And it takes longer and longer.

**Jamie 15:48**

Exactly. And so you've evaluated your program, and you've met your objective, do you kill your program? What do you do?

**Amy 15:56**

There's always room for improvement. You keep doing the same activities, and then you see if people enjoy them. So you look back at those objectives. And you say, Wow, nobody showed up to my program. Nobody showed up to bee college. Maybe it's time to reevaluate that and figure out something else that will work for the audience.

**Jamie 16:18**

I think that's key. The objective didn't change in that scenario. But your strategy to help people get there did. That's why, you know, it's funny you say that, because I only learned in the last couple of weeks, this idea about evaluating your programs throughout your program, I thought it was an endgame thing.

**Amy 16:34**

It's not. You have follow up. Either surveys or even people that will email me throughout the year. Bee college is over and people are still emailing, wanting to know when the next bee college is, that's part of evaluation.

**Jamie 16:45**

And listeners, I submit to you that is the way extension should be done. It cannot be pointless. It cannot be mindless, it can't be just entertaining where I zoom in and give a talk and everybody's happy about it. Although it is entertaining. It needs to be directional at its fundamental core. Those of us who have extension responsibilities need to be working with our clientele group to reach SMART objectives. To change the industry for the better. To improve the sustainability of bees and beekeeping. Amy, before we go and leave this extension segment, I hate to even mention this. But what does it take to do extension?

**Amy 17:28**

You know, I don't want to say this, but money money money.

**Jamie 17:32**

You know, it's funny. We talked about this with research on a separate podcast, but it takes money to do extension. It costs money to host a podcast. All this equipment had to be purchased somehow. It cost to do bee college. So how do you recuperate or recover costs associated with managing an extension program?

**Amy 17:54**

Extension used to be free. That was one part of the land grant, it was just to provide free education. Have you seen that page that says 30 minutes of my time wasn't just 30 minutes of my time, it was years and years and years of practice and experience and failure before I get to the point where I can get something done in 30 minutes?

**Jamie 18:15**

No, that's pretty awesome.

**Amy 18:16**

Yeah, that's exactly what is it. So there are lots of resources, we bring in guest speakers. And to have more quality, we really do have to put a little bit more money into that. That's just how extension works. That's just how education works. That's just: nothing's free.

**Jamie 18:33**

It's called cost recovery, essentially. It costs money to do extension. But if it's done well, that really changes lives. Last two things. And I felt like I said that with the money, but I feel like this is worth noting. Extension can't be done without people. And also we cannot do it alone. We have to partner with beekeepers, we have to partner with colleagues, you have to partner with government and other sciences, etc. To make sure that our information is valid and our objectives are met. But secondly, and hopefully finally, we need to talk just briefly about the structure of extension, right? It comes out of land grant institution, I am an Extension Specialist. You were a former county faculty member, and we both have extension responsibilities. What does that mean? Give us a brief overview of how the personnel structure of extension?

**Amy 19:17**

On everyone's ground level, there's going to be your county faculty. We call it county faculty here in Florida, but they're called something different all around,

**Jamie 19:26**

often county agents,

**Amy 19:28**



so county agents, and under that, then there are regional agents. So we have regions. So, break your state up into regions. There's probably a regional map with your land grant university, there's probably some website that has the breakdown of your state. And then we go kind of statewide, so there are specialists or statewide extension personnel, and then it just keeps growing. I mean, it's a partnership that's a federal, state and county level. So it's really a collaboration between all of the above.

**Jamie** 19:58

Well said. We're going to dive way more into this topic in the future, but for now, Amy, that was a fantastic overview. Thanks for cohosting and being interviewed at the same time.

**Cameron** 20:10

For additional resources, visit the podcast page on our website, UFHoneybee.com.

**Jamie** 20:15

In order to discuss research here at the University of Florida, we have decided to invite our very own Dr. Humberto Boncristiani to join us in the studio this morning to help us think about the research projects that we have here and tell you guys a little bit about what we do. Hello, Humberto. How's it going?

**Dr. Boncristiani** 20:36

Hi, everyone. Glad to be back.

**Jamie** 20:38

All right, fantastic. Now you've been at University of Florida for how long now?

**Dr. Boncristiani** 20:41

Almost two years now.

**Jamie** 20:43

Do you feel like a Gator?

**Dr. Boncristiani** 20:44

I'm a Gator person now. The weather is perfect to me. I came from Brazil. It's very hot and humid. And I'm pretty good here.

**Jamie** 20:52

Now. Do you cheer for the Gators?

**Dr. Boncristiani** 20:55

I've never been to a game yet.

**Jamie** 20:57

But you were at NC State, and you were close to the University of Maryland, I guess. Did you ever cheer for those guys?

**Dr. Boncristiani** 21:02

I'm a futbol, a soccer fan.

**Amy** 21:07

Humberto is finding all these enemies now.

**Dr. Boncristiani** 21:11

I need to protect myself.

**Jamie** 21:12

Well, you recognize you're in the SEC, which is the home of the best football teams in the nation. Take that, rest of the conferences.

**Dr. Boncristiani** 21:18

I heard about that every single day.

**Jamie** 21:21

Well, I just want to remind you. We don't need to talk about this any longer. There are plenty of podcasts to talk about sports. So let's talk instead about research at the University of Florida Honey Bee Research and Extension Lab. Of course, we're a land grant institution, we have responsibilities in extension, instruction, and research. And so you are heavily involved in the research leg of the land grant stool here at UF.

**Dr. Boncristiani** 21:43

That's correct. I take a lot of different research projects related with honey bee husbandry.

**Jamie** 21:51

That's good. If you think about it, you've come into our program pretty recently, as it goes. And prior to you coming here we had three broad research emphases in the lab. The first of those being honey bee husbandry, which we'll talk about more with you. The second of those being honey bee ecology and conservation, and the third of those being integrated crop pollination. So we'll talk about all those in detail. But first, I want to talk about honey bee husbandry. What is husbandry? That's a big old fancy term.

**Amy** 22:19

Yeah, are you a husband?

**Dr. Boncristiani** 22:21

Well, actually that's art, to grow an organism in benefits of human beings, to protect them to make them healthy, and for them to provide things for us. And there are a lot of challenges involved in that and how to grow them, how to keep them how to feed them, how to protect them, and in many different levels.

**Amy** 22:42

Are you talking about husbands or people or bees?

**Dr. Boncristiani** 22:45

Right now bees or cows or any [animal], that's what husbandry is.

**Jamie** 22:49

It's a term I hear in agriculture all the time. Your husbandry associated with cattle and sheep and chickens, etc. It's the art of keeping those things alive in a way that is practical.

**Dr. Boncristiani** 22:59

And productive and healthy.

**Jamie** 23:03

But also in an ethical way. Keeping them alive and healthy, but also happy. So you say you do research on honey bee husbandry? What does that mean specifically for the bee?

**Dr. Boncristiani** 23:16

Beekeepers have lots of different challenges to keep bees alive, especially in the last 15 years now, things get pretty crazy about how with the decline of honey bees, there is lots of different changes: climate change, nutrition difficulties, there is lots of challenges that beekeepers face every single day and I listen to beekeepers and we design projects here to solve those problems.

**Amy** 23:43

You're an applied researcher. Your research is primarily applied. Is that a lot of the research that's being done in the lab? Is a lot of it applied?

**Dr. Boncristiani** 23:52

Well in what I do, everything is applied. I listened to the beekeepers, the beekeepers come to me with problems. We did a survey in all the state of Florida to verify and identify all the research needs that beekeepers have.

**Amy** 24:11

And they have lots of needs.

**Jamie** 24:15

Researchers also needs.

**Dr. Boncristiani** 24:16

I got a lot of calls every week about beekeepers complaining about different things and different challenges they have.

**Jamie** 24:24

So I think this is an important thing to think about. You do honey bee husbandry research so broadly under that category, anything that deals with beekeeping is that. So nutrition, disease and pest control (that includes Varroa, small hive beetles, viruses, etc.) honey bee stock improvement, the impacts of pesticides on bees, anything that essentially improves bee health or affects bee health management research, etc. All of this falls under the husbandry category, right?

**Dr. Boncristiani** 24:52

Correct. Correct. All those challenges.

**Jamie** 24:55

And since it's applied research, I love exactly what you said, the folks listening think probably that we just cook these research ideas up kind of willy nilly. But in the applied research field, the purpose of applied research is actually to do research that has application for a clientele group. So if you're doing research to help beekeepers, it's got to be stuff that in some way has a trickle down effect and actually helps beekeepers. So how do we get ideas about what to do? And I love what you said, we have to ask beekeepers, we can't dream these things up ourselves, we actually have to ask, and you and Amy worked together recently on a survey where you asked beekeepers? Amy, you'll talk a little bit about the survey.

**Amy** 25:34

We put out a survey to commercial beekeepers. We did it in person at the Florida State Beekeepers Association, we handed out the survey on paper form. And then we went ahead and emailed all the commercial beekeepers, so anyone who was registered with 100 hives or more, we asked them how they received their education, we asked them what research methods they'd like to see. And we actually asked them to rank what they felt was the most important research projects that we could do here at the lab. We came up with a lot of really good results. A lot of beekeepers have the same issues the same challenges that are out on their apiaries and on the land that they're working on. So it's been really interesting, and we'll be able to talk a little bit more about that later.

**Jamie** 26:25

Just to interject here, at the risk of making this Florida centric, I'd like to back up a hair and see if we can expand it to the US. Fortunately, we live in a state where a lot of beekeepers pass through. 20% of the nation's colonies pass through Florida every year. We have a large number of commercial beekeepers. So we are trying to work with them and asking them for this husbandry research. What is it that you need? Other states can do the same thing. I encourage listeners around the US and around the world for that matter to find their closest bee researcher. Find a way to survey your beekeepers to determine research needs, and then work with your local researcher to develop research strategies to

address those needs. We're doing that here in Florida but that doesn't mean it can't be done elsewhere around the US. So you've got to work with those scientists. In the state of Florida we're fortunate to have you Humberto. In some of your interactions with beekeepers, what are some of the things that they are saying are important? Think big level. What are some big issues that beekeepers feel need to be addressed from the applied research perspective?

**Dr. Boncristiani** 27:30

Beekeepers need a solution for the biggest enemy of honeybees today, which is Varroa mite. Varroa destructor is heavily the number one problem in beekeeping in the world today, and beekeepers are asking for new solutions for that.

**Jamie** 27:47

Sure. I think that's crucial. And then Varroa of course, spread pathogens. To me, Varroa is kind of like the cancer in the bee world. It's the thing that everybody's studying, and there's lots of research money going into it. But in my opinion, I hate to say this in a podcast, it seems like there's very little progress made on new control strategies. We all hear about new control strategies, but nothing translates to the field.

**Dr. Boncristiani** 28:07

How many years we are dealing with it and we don't have a diverse -

**Jamie** 28:13

Exactly. And if you think about it Varroa is not the only issue bees face. So what are some other things that beekeepers raise as research areas that need to be addressed?

**Dr. Boncristiani** 28:21

Another point they talk about a lot, it's about nutrition, and how to feed bees, what to give to them, the timing, and these issues matter. If your bees do not have what they need, they're not going to thrive.

**Jamie** 28:34

I think that this is so key, you say nutrition. One of the ways of identifying research needs by beekeepers is exactly what you guys have done. You've spoken to beekeepers, you surveyed beekeepers, the Bee Informed Partnership, which we're going to talk about in a later segment in this episode is it's a group that asks beekeepers, what are what are the biggest issues facing your colonies, and we'll talk about that later. But one of those things is nutrition. So, you know, there are lots of ways to get that feedback and develop research strategies around this. We also of course, Humberto, there's a little bit before your time, but I think we're going to kick it back up here. We also get a lot of chatter about the impacts of pesticides on bees, right. So all research associated with how pesticides impact bees, we've done a lot of that here. We hope to do a lot more of that. But again, it's not really necessarily in your wheelhouse because it doesn't immediately, instantly affect the colony. But it's something that we've discovered that beekeepers really want to know a lot about. So Humberto, through needs assessments, we determined that Varroa and nutrition are big issues, we've talked a



little about the pesticide research that we've done in the lab, but there are other things that beekeepers say are important to them. What are some of those other things that you've looked at or that we're going to look at in the future?

**Dr. Boncristiani** 29:43

Beekeepers talk a lot about queen issues they have. Lots of the queens are not surviving the same amount of time they normally survived, said the research. Correlation with pesticide use, and all different kinds of problems with queens.

**Jamie** 29:56

When you hear other scientists talk about this, they usually use the fancy term stock improvement programs. They're wanting to improve the stock that is available to us for our use. So that's certainly one thing. Of course, I know every time I step over in the lab, I see you doing some sort of viral work. We'll talk about that in future podcasts. But viruses are important to beekeepers, they usually go hand in hand with Varroa. There's also nosema things that we've looked into. And of course, I don't want to just highlight our lab, one of the points of this podcast is we are going to be bringing in scientists from around the US and around the world, for that matter, to talk about the research that they need. And since this podcast is really targeting beekeepers, we're going to make sure that that research they discuss has application to beekeepers. Now I think that's key Humberto, right, because that's what beekeepers are bending your ear about all the time. "I don't care if they do it if it doesn't help me."

**Dr. Boncristiani** 30:47

That's what they need. Humberto, tell me something that's gonna help me.

**Amy** 30:48

It's pretty amazing to see all the research that's actually happening on a worldwide level. I just gave a talk the other day and someone was asking me, so is Varroa just something that is a Florida thing? And I'm like, no, people from around the world are doing research or working on mites or working on just the different stressors that honey bees have. And it's just really amazing that there can be that many researchers focusing on one insect. On honey bees.

**Jamie** 31:17

It's absolutely incredible. One of the things though, I go to these international meetings. I see all these people talking about these fantastic research projects. But sometimes I leave these meetings wondering, what's in it for the beekeeper? Humberto, you are serving an industry that's desperate for answers; desperate for help. And I think that's why honey bee husbandry research is so important.

**Dr. Boncristiani** 31:39

Correct. Correct. Beekeepers have problems to translate those things they see in those meetings from researchers and I think that's my work here, is to do the bridge.

**Jamie** 31:49



What's crazy [is] that's only one of the research categories we do here at the University of Florida Honey Bee Research and Extension Laboratory. I'll discuss the other two briefly. The second one, of course, is honey bee ecology and conservation. Ecology is simply the interaction between living species and one another, or their environment. So we essentially have done work in the past, looking at honeybee interactions with some of their pests and pathogens. Not from an applied perspective, but from a more basic perspective. We've also done some work on wild, truly wild honey bee populations. We've done a lot of molecular ecology, where we're looking at molecular identifiers of some of the honey bee species, and some of the honeybee subspecies. I have a long term goal here at the lab of developing and feeding a honey bee conservation program where we're looking at the conservation of honeybees where they are native around the globe, because there's still a lot of diversity in these wild populations. And I think that the preservation of the species is important. So this honey bee ecology and conservation branch of our research efforts here looks into that. Our third category, of course, is Integrated Crop Pollination, where we're looking at the contributions of honey bees. We've done some work with other bees as well looking at their contributions to the pollinated crops that we have here, but also collaborating with scientists around the US. So we've got a lot of varied research projects here at any given time, we have 30 to 40 research projects, you know, we're publishing usually over 10 refereed manuscripts a year on the type of work that we're doing. But Humberto, you know, to me, research is the fun part. But what does it actually take to do research? We have these great ideas, we've gotten great input from our clientele, we've got all of these projects we want to do. But what does it take to do a research project?

**Dr. Boncristiani** 33:43

Funding.

**Jamie** 33:44

Oh, my gosh, I was hoping you'd say that. You know, everybody believes that every day, the University of Florida president at least here for this purposes of this podcast, but other university presidents just drive up in their trucks, right outside the respected bee labs, and they just open the tailgate and sweep money out into our foyer so that we -

**Amy** 34:04

Is that not what happens?

**Jamie** 34:06

That's what happens when you work in extension. You just have this skewed view of what research is. Yeah, that's not what happens. Humberto, how do we get funding?

**Dr. Boncristiani** 34:14

Well, I'm very fortunate here. I have beekeepers that we work together, and they've been very generous and contributing with donations to the lab.

**Jamie** 34:25

Yep. There's also other ways.

**Dr. Boncristiani** 34:27

Other ways: we write grants.

**Amy** 34:29

That sounds fun.

**Jamie** 34:30

Oh, it is the top of my list of fun things to do every day when I come to work.

**Dr. Boncristiani** 34:36

Yeah, writing grants.

**Jamie** 34:37

What is a grant?

**Dr. Boncristiani** 34:39

It's a research - we are just begging, begging to work.

**Jamie** 34:44

Well, it's funny, everybody has this idea that there's a need. And since there's a need, the government is just going to give you funding for it. But that's not true. We can have the best ideas and want to do the best research projects on planet Earth. But if we don't have funding to do the work, it's dead in the water. It takes funding to do every aspect of a research project. From the vehicles that we have to drive to the field. They need gas and transmissions and everything. It takes money to pay salaries of the people who work on the project. It takes money to buy the reagents and do the analysis. Everything. What requires money, Humberto? Everything. Don't overthink it. He's trying to figure out, oh, my gosh, what's Jamie asking me to say? No. But in reality, what we're trying to communicate here is that research is what we love to do. We love to hear from our clientele group and shape our research programs to address need, but it takes funding. It also takes partnerships. We cannot do this alone.

**Dr. Boncristiani** 35:45

Not alone. We have partnerships with people all over the world. We work with people all over the world.

**Jamie** 35:50

Yeah, that includes collaborators at other institutions and includes government officials. It includes in our case, the USDA it includes companies, industry, it also includes beekeepers. There are a lot of projects specifically you can't do Humberto unless you have beekeeper collaborators.

**Dr. Boncristiani** 36:07

They have their partners, they donate the land, they donate the hives, labor sometimes and they give very powerful inputs that we need. We need those inputs from people that everyday in the field looking [and] observing these.

**Jamie 36:23**

Yeah, so I've been working kind of in the research bee world for 20 years. I'm just gonna make a statement here. That's a little dangerous. But, you know, there's a general science version, I would argue among the commercial industry. I've just seen a lot of give and take between scientist and beekeepers. And what I want to say is, we all have a common goal we want to improve bee health, and collaborations are critical for that.

**Dr. Boncristiani 36:51**

Yes.

**Jamie 36:51**

Beekeepers, all bee scientists need you. They need your ideas. They need your support, they need your collaboration, otherwise, research cannot happen.

**Dr. Boncristiani 37:04**

That's correct.

**Jamie 37:05**

Humberto, we look forward to seeing the great things that you do to help the beekeeping industry, not only here in Florida, but also the US and beyond. Welcome aboard. We look forward to having you on more podcasts.

**Dr. Boncristiani 37:15**

Thank you, I'm available.

**Jamie 37:19**

Thanks, Humberto.

**Honey Bee 37:23**

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

**Amy 37:31**

Welcome back, everyone. We hope you enjoyed learning about extension and research. I know it was just riveting conversation.

**Jamie 37:37**

Riveting indeed. Well said Amy.

**Amy 37:40**

Now to tie it together we have Dr. Meghan Milbrath, who is the academic specialist at the Michigan State University Department of Entomology. That's a mouthful. I struggle with that. She also has a beekeeping business called Sand Hill. So we'll talk a little bit about that as well. And we hope to bring her in in a later episode. But we do know that she has a 50/50 research and extension appointment. Is that right, Dr. Milbrath?

**Guest 38:11**

Yep, that's exactly right.

**Amy 38:13**

Awesome. Well, welcome. We're so happy to have you here. We just want to talk about your lab and other labs outside of our lab here.

**Jamie 38:20**

Yeah, Meghan, before we even get started, I just want to say something. I think it's really cool. We were talking to you before this, I was asking you to tell us how you'd like to be introduced. And I love the fact that you said "Oh, and by the way, I run a beekeeping business." I think that's important, because everywhere I go, beekeepers ask me, do you keep bees? Because they're testing you, right? They want to see, if you say no, then your street cred has completely gone. In your case, you actually run a bee business. You don't just have a few colonies, but you're trying to make money on those colonies. So that's cool, too. All right. So welcome.

**Guest 38:51**

Thank you very much for having me.

**Amy 38:53**

Dr. Milbrath. Would you like to talk to us about some of your extension and research? Do you have an instruction appointment?

**Guest 39:01**

I technically do not at the moment, but I have in the past. We just had our previous apiculture specialist retire this year. So I took over his apiculture and pollination course in the fall. So during that period, I had a ten percent teaching appointment. There's definitely some restructuring happening in the future, depending on how we do that. Some of the teaching that I do is actually covered under my extension work, it does change depending on the demands.

**Jamie 39:35**

Meghan, your lab is a great example of what Amy and I have been talking about already in this podcast, we've discussed extension, what it is, we discussed research, what it is, and you've got that 50/50 split so you exemplify someone who has to do half of your time on research and half of your time

on extension. So let's think about extension: what is it that you and your lab do? At Michigan State University in the realm of extension, what is it to you? What do you do? And what are you trying to achieve?

**Guest 40:04**

The main overarching mission is to respond to practical needs in the agricultural community. My role is a little different than some of the straight beekeeping, extension and apiculturist positions. So when I started, I've been at Michigan State for five years now, in my current position, and when I started, I was hired to coordinate their overall pollinator program. So most of my research is honey bee diseases. That's my background is in disease transmission, but a lot of the outreach I do is much broader than that. So it would include programs, we developed a course to teach the public about pollinators. I do a lot of work with pesticide recertification. And so I do a lot of extension to people who are land managers and going for a pesticide recertification credits. I do a lot of extension with growers on abilities to take their land and put it into more natural habitats and solar companies and things like that. So I would say the bulk of it is working directly with beekeepers of all sorts, but then there's a lot of it that's broader that's related to more just pollinator issues.

**Jamie 41:21**

So I think that's great. You've got very target audiences. You've got growers, you've got beekeepers, etc. So how do you fund your extension programs? That's one of the discussions in our world is we got all these great ideas to reach beekeepers, etc. But that costs money. So how do you generate funding to support your extension program at Michigan State? Yes, a million dollar question for all of us.

**Amy 41:44**

Awesome. In our extension segment, we talked about program evaluation, and what that looks like, because a lot of the time with extension, we always tell people about the activities that we do. It sounds like you're doing a lot of really cool activities. And so my question for you, Dr. Milbrath, is how do you evaluate the success of your programs? What does that look like? And how do you know that you're succeeding? And when do you know when you need to reevaluate some of the activities that you're focusing on?

**Guest 41:44**

Well, we've been very fortunate, it is a time that people do really care about bees and recognize the importance. I would say that we do focus on programs that we can fund plus we do have some general funding. So my position itself is funded directly through Michigan State University. I'm funded half through Ag/Bio research and half through MSU extension. That does give me flexibility to operate on things that I find important either way. For our extension, we've received funding from both the Michigan Commercial Beekeepers and the Michigan Beekeepers Association. We received a grant through MSU Extension to develop our pollinator champions course. But now that has become self-funded in that it does bring in money. So that's one of the things that we're trying to do a little more is find these programs that can at minimum be self supporting, so that they can fund the instructors and fund the space and fund the bees or whatever we need. We did get a really large grant to do what's

called mite check, which is a critical Agriculture Research and Extension grant, which was really extension focused to try to train people on mites and how to monitor for them. A lot of the outreach that we do is extension funded. We also have a large program, heroes to hives, and that's been largely donation funded. We even crowdsourced to get our truck paid for. A lot of what we do is really trying to be responsive of what people actually want and need. And we do have a lot of partners too so with the pesticide recertification clinics, those are things that are already ongoing. And they're funded by either extension or Michigan Nursery and Landscape, and they can just say, well, we want some more diverse programming, and we want to just reach that audience. So we can kind of work within existing structures as well. Yeah, that is a really good question. And extension does love monitoring and evaluation, and that is something that is hard to get funding for as much time as it requires to do well. I think part of it is realizing, if you need to monitor enough to write a report on it, or if you need to monitor enough to warrant seeking more funding, or where we are in the state right now, there has been a gap in extension and so there's a lot of really low hanging fruit. And so some of our work has been really easy to justify, because people really feel like they're struggling and need more information on it. And we're just facilitating getting them better information. So we do a lot of monitoring and evaluation. Now, a lot of it is just how many meetings do we put on whether it's in person or with Zoom? How many people are coming in? And the nice thing about some of the technologies that are happening now is it's really easy to get real time evaluations. So previously, when we were trying to get people to like submit surveys about what did you learn, you have really low return on those or you feel like you're harassing people, and they have survey fatigue, we've been really happy with things that are just kind of quick, and in the actual time that people are doing it. So getting feedback to say, was this useful? Did you learn from that? The hard part with that, though, is that you do get the input of the people who are there. So you don't get the input of the people who, - the people who liked the meetings are the ones who go to the meetings. And so one of the things we struggle with is trying to reach more people in different places.

**Jamie 46:11**

So Meghan one of the things that I appreciate that you've already said, you may not have heard yourself, is to me, a lot of people think extension is speaking at meetings or answering emails, but we talked about in our previous segment is purpose driven. And when I heard you describe your extension programs, they sounded very purpose driven. So I already knew that you had a goal of getting a target audience somewhere in evaluating the success of the program.

**Amy 46:32**

Yeah. And I think people are also just recognizing the need for outreach and education. And that looks different, you know, depending on your demographics.

**Jamie 46:42**

So we're going to segue here shortly into your research program. But before I do, I want to ask you one last question related to your extension program, it's going to be incredibly difficult. So essentially, I want to ask you, what do you see as the three biggest extension needs, for beekeepers across the US?

**Guest 47:05**

That's a really good question. I'm gonna give you the three big ones that maybe come to mind and maybe I won't stand behind them a year from now. I think one is more decision making tools. So with a lot of other crops, we have a lot of resources for Integrated Pest Management, and models that allow people to make decisions more confidently. And so if you're a beekeeper, and you're out there trying to decide, do I treat right now, or do I try to get goldenrod honey, and you're trying to sift through all of your mental data, it would be really nice if you had an app on your phone that has model data that says, honey prices are this, this is what you generally you get in your area, and that can help you make decisions. I think some of the really practical decision tools, like we have for other cropping systems would be incredibly useful.

**Jamie 48:10**

That's a great answer. So can you give me two more, that's as good as that? That was great. Pressure's on, Meghan.

**Guest 48:16**

This is the problem though, is the needs are such that it's easy for me to come up with some of the needs. I think another thing is having a more like a warehouse of all of these practical data. So with extension, you really focus on applied research that has direct implications. Sometimes it's hard for people to actually find the output of all of those research programs. For example, I can know that we've done all this work on oxalic acid and that other people have done work on oxalic acid. But if someone wants to look up, how well is oxalic acid working? There's not a clearinghouse with, here's the status update of what we know. So that people can make really good recommendations. It's hard to make good recommendations, especially in a system that's so diverse and complex. And so having these places where you can easily access: here is absolutely the center of what the up to date knowledge is, would be really useful. And then I think a third thing for extension is trying to have faster ways that we can look through different treatments and have more access available too. For example, for getting new mite treatments to the market quicker to have a pathway that is efficient testing. I think we really do need to acknowledge that we're really soft about the crisis that these parasites have. Even though we talk about Varroa all the time, you just would never have a deadly parasite that would kill off huge proportions of another livestock for decades and it not be a national emergency. And so I think to understand that it's 90% of the industry is dependent on one chemical that is now showing signs of resistance. And that should be everybody all hands on deck of trying to figure out, what are we going to do five years from now? And where is that going to be? And how can we make sure that people are set up to have functioning operations at that point?

**Jamie 50:27**

That's great. I think listening to you talk about your extension program makes me feel that there's hope for the future. Well, let's segue a little bit into research. This is the other half of what you're supposed to do, apparently, in your 50/50 split. So tell us a brief overview of your research program, you know, how do you categorize your research? What types of things do you do?



**Guest 50:49**

My research has been pretty variable up into this point, and part of it has been where we can get funding. So we have done some landscape things. The research that I'm doing now, though, is really in line with my background. So one of the things that makes my program a little different is that I've never taken an entomology class, my entire background is in public health and disease transmission, and epidemiology.

**Jamie 51:16**

You didn't miss anything. That's a bad entomology joke. I'm sorry.

**Guest 51:23**

I have tried to make up with it, though, I have started collecting. So I'm doing that intro to entomology course, where I develop my collection in my own time, so I can catch up. But so my first love is really diseases and disease transmission and looking at environmental risks. And so right now, I've been doing a lot of work on European foulbrood, and the bacterial diseases. So even though I talked about, you know, Varroa being this national emergency, European foulbrood, and the bacterial diseases are also just a huge problem nationwide. Looking at the risk factors for what causes those diseases, and what allows them to clear up faster what inputs beekeepers can take. The nice thing about working kind of within a disease system is it does still allow for some basic research. So understanding the diseases themselves, and virulence factors and things like that. But it's always through this lens of being highly applicable, and dealing with what beekeepers are actually working with and what tools they functionally have available to them.

**Jamie 51:26**

I think one of the things that people think about when they think about research and extension is they've kind of disconnect them. Research is what scientists do, right? Extension, is what specialists or teachers do. And in reality, a successful applied research program integrates naturally with extension, because you're doing work that helps the clientele group, and then you have to communicate it to them and change their behavior. Could you discuss a little bit in your own view about the interface or the integration of your two programs? How do you strategize? I mean, how do you try to make them work together to the benefit of your clients?

**Guest 53:19**

Sure. Some of the programs, there's a really natural way that they fit together in what we can do. For example, with the blueberries, and European foulbrood. Coming out of that, first off, we worked directly with commercial beekeepers, so they were heavily involved. They knew about the experimental design, and we're in a lot of communication with them. So we're able to tell them quickly, what things we see working or not working, even before we get to the point that it's published. And so that's something where we're actually hands on working with them with an actual problem that is with them. But then we're also taking those same samples and sending them off to labs to do complete sequencing and microbiome studies and that kind of stuff. So we're, we're using those same samples that we take to develop the number of colonies that are sick and to understand European foulbrood. And we're doing



basic research on them, and getting, you know, those data that we won't have back for maybe two years. And so the analogy that I use is it's kind of different battles, same war. And so it's really similar to my work in public health. It's like when you have an actual issue with a health issue on the ground, you have to have, the NGOs that are coming in and actually handing out the bed nets, but you also have to have the people who are understanding the lifecycle of the mosquitoes and when you do problem based work, it does require the basic research, the applied research, the education to the public, and then also just groups to help the people who are suffering from the problem and get things done. And so it does require all of those aspects. I think the extension role is really key though, because if you have a foot in the research and the outreach and extension side, you get to understand, you talk to people, your stakeholders figure out the problems. But then you can also speak science. And you can dig through the literature and figure out, 8 years ago, we were also dealing with this or 20 years ago, we had this solution that maybe we can revisit it in this particular way. So it allows you to kind of have an understanding and access of both worlds.

**Jamie 55:31**

So Meghan, we can't end this segment with you without fulfilling the little bit of a tease that we did earlier on with the beekeepers, could you give us a thirty second overview of your beekeeping business? I think that's pretty cool. So tell us a little bit about Sandhill Apiaries.

**Guest 55:46**

Sure. I've been beekeeping since the early 90s. I started as a hobby. And then in about 2011 I started to sell queens and nucs. For a while selling nucs was basically the bread and butter for that. Since, I've started to do the research in blueberries. The thing about blueberry bloom is they bloom right at the same time as when you need to go out and make nucs. So I've really switched to honey production, and I still do the queen rearing. I try to run about 100 hives now. When I was doing my postdoc, I was doing 75% time, and then between my postdoc and my current position, I was just running bees full time. So at that time I was doing about 300 hives, mainly for nuc sales. Now I'm down to about 100 in my free time, full time job, that I run for mainly honey production, and then just really focusing on making good queens accessible to people.

**Amy 56:52**

Yeah, that's great. So Meghan, thank you so much. We will be having you back here in a couple of weeks. And so we can focus a little bit more in depth on your research. And so we're really excited to have you back in a couple of weeks.

**Jamie 57:05**

Yeah, you're like a great integration of research extension and practical beekeeping knowledge because you yourself are a beekeeper.

**Guest 57:11**

Thank you.

**Jamie 57:13**

So everyone, I just want to thank publicly Meghan, Dr. Meghan Milbrath an Academic Specialists at Michigan State University Department of Entomology who also runs a beekeeping business. So thank you for joining us on Two Bees in a Podcast.

**Amy 57:26**

Thanks, Meghan.

**Guest 57:27**

Thank you so much for having me.

**Amy 57:37**

Welcome back, and now it's time for question and answer, aka what we call it here at the lab stump the chump.

**Jamie 57:43**

Wait a minute, who's the chump in this scenario?

**Amy 57:45**

I'm gonna let you guess on that one. So here we are. We have asked questions. Moving forward in the next couple of podcasts, we are going to start promoting it on our social medias, seeing if people have questions for our guest speakers. That way, they can start answering some of those questions and answers as well. What do you think Jamie?

**Jamie 58:07**

Oh, I think that's a fantastic idea. Awesome.

**Amy 58:09**

I just have a couple of questions here that we had from one of our Reddit pages. And a lot of these questions I think a lot of people have so hopefully they'll find it helpful. So one person asked, you know how you got into entomology. So how did you even get into entomology as a career? Who loves bugs that much?

**Jamie 58:27**

The truth is, not me. Very briefly: I've been keeping bees since I was 12. And I did science fair projects and 4H projects with bees. And both of those allowed me to meet Dr. Keith Delaplane at University of Georgia. He helped me when in my high school years through advice on those types of projects. So when I went to the University of Georgia, he invited me to work in his Bee Lab. And I already liked bees. And of course, he was one of my role models. So it was kind of a no brainer for me. So I worked with Keith Delaplane for four years at University of Georgia and discovered that I love science. I loved bees already, but I loved science. And so I put the two together. Now it's important to note I did not like entomology. I was a biology major at the University of Georgia. In fact, I often said at the time, I wish I

could study bees without being an entomologist. But nevertheless, I didn't. I went overseas to do a PhD in South Africa at Rhodes university and have a PhD in entomology. The funny thing about the South African system is it's modeled after Oxford, where they do not require graduate students to take courses. So in fact, they usually don't even allow it or promote it. And so now what's funny is that means I could have gotten a PhD in entomology without ever having taken an entomology course. So I went back at Rhodes and took all the entomology courses that they offered to undergraduates, which amazed people at the time they had no idea that a person could be in grad school and take courses and do research. Of course, all people in the United States do that. It's just the way we do it. But anyway, I did that and became an entomologist. I won't say that I love entomological sciences, but I will say insects now do fascinate me. And bees, of course, just rock my world. So that's a brief overview of how I became an entomologist.

**Amy 58:34**

So what was your major before?

**Jamie 59:53**

It was biology as an undergrad. I was pre med.

**Amy 1:00:03**

Okay, pre med.

**Jamie 1:00:15**

In fact, Amy, you know, I'll tell you why I was pre med. I grew up in a rural area. And I loved science, but I thought medicine was the pinnacle of science. So I just assumed everybody who liked science had to go off and be a medical doctor. But that clearly-

**Amy 1:00:39**

What kind of doctor did you want to be?

**Jamie 1:00:41**

Well, I started wanting to be a vet. And then I wanted to be just a human doctor but discovered I didn't like humans. And so I decided I was going to work with bees and so of course when bees get mad at you, the worst they can do is sting you. When humans get mad at you, they can do lots worse.

**Amy 1:00:57**

Now on that note, you know, talking about stinging, that kind of leads me to the next question that we have. It's about smokers.

**Jamie 1:01:05**

People who smoke?

**Amy 1:01:08**

I mean, yes, maybe. So people are wondering, you know, what are the best ingredients to put into a smoker to calm them down?

**Jamie 1:01:20**

Calm who down, the bees? All right. I just want to need some clarity here. All right, so I use pine straw. That's because that's a lot of what's available here. I've also used cut grass. I'm talking about the growing grass variety, that's not a code for marijuana, which people use.

**Amy 1:01:42**

I didn't even think about that.

**Jamie 1:01:43**

People have asked me, can you put marijuana in a smoker? I'm like, well, you can put anything in a smoker, but that doesn't mean it's good for you. So I've always advocated cut grass, or marijuana. See, I've done it. Always. Incidentally, I've never done drugs, I feel like I need to say this.

**Amy 1:02:01**

Man. I almost feel like we need to just take this out of the podcast.

**Jamie 1:02:05**

Let's let it go. Alright, so I've always advocated, dried cut grass or pine straw. I know a lot of people use wood pellets. We've used those here at University of Florida. I think those are perfectly acceptable. And incidentally, when I lived overseas in South Africa, it was routine for people to use dried animal dung. If you think about it, horses and cows eat grass and that's organic.

**Amy 1:02:23**

I bet that smells really good.

**Jamie 1:02:25**

Yeah, well, it's not so bad once it's dry. One thing I will caution people against is people have used burlap and other rags etc, which is fine, but you need to make sure that they were not soaked first in something such as oil or something like that. You don't want to burn anything that might have a chemical in it. So all of those are really good things that you can use in a smoker.

**Amy 1:02:46**

So when you're using the smoker does continuous use of the smoker on the bees, does that weaken the hive? In the long run? Is there anything

**Jamie 1:02:55**

There's no evidence I'm not aware of any research has shown that using a smoker chronically impacts bees, that there's any negative health effects. And really what smoke does is it masks the alarm pheromone. When bees are getting mad alarm pheromones are getting produced and that causes

other bees to get mad. So you're just covering that when we leave and the smoke dissipates, that's that. Now of course there's a wives tale that smoke causes bees to gorge on honey because they think it's a forest fire and then they're too fat to fly. But I would ask what evolutionary scenario would produce bees who wanted to get away from a forest fire by eating a lot of food and becoming too fat to fly? Right? Yeah, it's completely counterintuitive. So it masks alarm pheromones. And there's really no long term impact. What's really interesting to me, and I don't know the answer to Amy, is there a long term impact to the beekeeper? From chronic exposure to smoke? I'm not aware of any studies where scientists have looked at that. Now, I don't know there's any higher incidence of lung cancer in beekeepers than the general public. But I just think it's one of those interesting things that comes up that I've never seen anyone address systematically.

**Amy** 1:04:00

That's very interesting. Well, thanks. That was a quite an awkward conversation, but I don't think we'll cut any of that out. So we'll just keep it in the podcast.

**Jamie** 1:04:09

The truth is the truth, Amy. Truth is the truth.

**Amy** 1:04:15

We'd like to give an extra special thank you to the following: to our editors, Shelby Howell and Bailey Carol, and to our audio engineer, James Weaver. Without their hard work, Two Bees in a Podcast would not be possible. So thank you.

**Jamie** 1:04:31

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.