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EPISODE 214 TRANSCRIPT

Jamie

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

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

Hello everyone, and welcome to another episode of Two Bees in a Podcast. Today, we are joined by Peter Barnes, who is a commercial beekeeper who manages and owns Barnes Apiary in Queensland, Australia. And so, he's here today to talk to us about commercial beekeeping, the commercial beekeeping industry and beekeeping in general in Australia. He is joining us after midnight his time. Peter, thank you so much for joining us on this podcast.

Peter Barnes

Thanks for having me.

Jamie

So, you're going to be sleepy through this podcast, but Peter, I was thinking, you know, the first question that we always ask our guest is tell us about yourself and how you got into the honey bee world. But before I do that, I met you while I was still a PhD student at Rhodes University in South Africa, and I think that was 2003. I think that's the first time I've been to Australia. You guys had just got small hive beetles. You brought me over to the Queensland Beekeepers Association meeting, and then since then, since 2003, we've become friends. Our families know each other. You've come over a few times and it's just been really -- it's great to have you on this podcast because I can't wait for our listeners to hear about all the experiences you have over there.

So, well, OK, with all that fanfare out of the way, let me go ahead and pitch you the softball question that we always ask our first guest. Could you tell us a little bit about yourself, how you got into the honey bee world? Just introduce yourself to our listeners, Peter.

Peter Barnes

Well, hi, I'm actually a third-generation beekeeper. I took an interest in bees at the age of about 8, and by the time I was in high school I really just wanted to get out with my father on bees rather than be at school. I found I could definitely pass all my subjects without studying, which freed me up a lot of time for beekeeping. Mornings before school at 3:00 AM, I'd be getting up,

unloading bees, then be dropped off at high school. Just as an example, just before my 16th birthday, I graduated high school after counting down the days and hours for months, and then I became a full-time beekeeper in the family beekeeping business.

Amy

And you've never looked back since.

Peter Barnes

Never.

Amy

You've been to the past two American Beekeeping Federations, and we've spent some time together, and it's been so much fun, you know, just hearing about beekeeping in Australia and your operation and what you do. And we were wondering if you could tell us and just give us a little bit of information on the beekeeping community in Australia.

Peter Barnes

Well, the beekeeping community in Australia is mainly hobbyist beekeepers, around 50,000 beekeepers registered in Australia, most in the commercial side of things, it's down to about 2000. So, it's a large community of hobbyists. The commercial beekeepers, the biggest make up of that is in New South Wales, one of the southern states with about 1100 commercial beekeepers. In my state of Queensland, we have about 200 commercial beekeepers, but with a majority of part-time beekeepers who are mainly around the major capital cities.

Jamie

So, Peter, it's interesting that you had mentioned registered at the national level. So, you guys seem to have a good handle on the number of commercial beekeepers, hobbyist beekeepers, etc. What is the focus of the industry? I guess, number one, are you primarily honey producers, bee and package bee producers? Are you pollinators? And also, I'm curious, you mentioned mostly commercial beekeepers in New South Wales. Maybe half of all registered commercial beekeepers are there. Do you have beekeepers throughout the country? I think about the center of the country or most of them within so many kilometers of the coast. Just broaden maybe your discussion a little bit about the beekeeping industry there.

Peter Barnes

Well, the beekeeping industry is mainly coastal orientated. Probably, once you get 500 kilometers from the coast, basically, you get very few beekeepers because most of the trees that produce honey are mostly on the coast, with the exception of some of your western trees in the Channel Country that the commercial people would go out and work.

We are mainly honey producers. Most smaller beekeepers sell their honey privately whereas majority of the commercial beekeepers sell their honey to packers with just a few selling their honey overseas. We tend to – now, the industry has made a big shift away from so much honey production being the main income to more in pollination and also avocados and macadamias. The industry in Australia does not have enough bees to support the number of trees that need pollinating.

Amy

I'm also interested to know what the climate is like in a lot of the areas where you all are keeping bees commercially.

Peter Barnes

Well, Queensland is probably the warmest climate to keep bees. You can pretty much produce honey all year round some years, depending on the weather of course. We will often get here, where I live on the East Coast, we may get 2 days of winter or we might get 3 months, but it's not very cold. We wouldn't get below freezing probably once in 10 years, so the bees still are able to be very active out through the winter period.

The southern states get a lot colder conditions but, in most states, they are able to sustain some form of brood. A lot of the beekeepers from both Queensland and New South Wales move West into the Channel Country where it's a lot warmer and produce honey through the winter period out there.

Jamie

So, Peter, it's fascinating. I've been fortunate to go to Australia a couple times and it's really amazing the honey plants that you have, the beekeeping that you guys do. I remember every time I'd go to a commercial beekeeping operation, it was just so clean. The boxes were well taken care of, the honey houses were spotless. It's really amazing. But I know, you know, keeping bees is a difficult business. I mean, you told us before we came on the air that even though you're doing this interview right after midnight for you in Australia, just in a few hours, you know, your 3 or 4 in the morning, you're going to be moving bees to a crop for pollination purposes.

So, I know it's hard, a lot of hard work and there are threats that make your job even more difficult. So, could you tell us kind of very generally, what are those biggest threats to beekeeping in Australia? Would beekeepers get together there? What are they discussing as the biggest issues they face as an industry?

Peter Barnes

Well, I think the pest and diseases are definitely the top threat to beekeeping industry. And of course the new kid on the block is Varroa. Basically, it dominates all the meetings and everything

at the moment. I think that it will do that for such quite some time until we start to get a handle on how we're going to treat for it.

The pesticides and chemicals are probably the second biggest. I think we share these sorts of problems with most of the rest of the world. Our third one is probably access to native forests, and following on with that, poor management of the native forests from the government. We lose a lot of forest each year to bush fires and just a lack of hazard reduction burning.

Probably the biggest one of recent times, which is a bit of a conjecture, is that we have noticed a big difference in the native forests since the selective logging of the timber industry has moved out. The forests are no longer as healthy, and we don't seem to be getting the average production, and we seem to be spending more time out of the forest than ever before.

The final one that is probably the biggest problem right now with the biggest increase in numbers with almonds is overstocking -- when there is a honey flow, there seems to be bigger trucks and more beehives moving into an area and the bees often don't do as well. And that's just part of the industry. I think Varroa might sort that out to a little bit of an extent.

Amy

Our listeners on this podcast, many of them probably know this, but Jamie, when did Varroa come to the United States? In the ‘80s, right? It was introduced in the ‘80s.

Jamie

Yeah, 1987, I believe was -- yeah, I think ‘87 was when it was first discovered in the US.

Amy

Yeah. So, it was just within the past couple of years that Australia had their first confirmation of Varroa. So, I mean, it's kind of amazing, first of all, that Australia went this long without having Varroa. But now that you all have Varroa, I mean, what were you talking about in your meetings prior to Varroa being there? That's my first question for you.

Peter Barnes

Well, I think the threat was always there, and I think we spent a lot of time talking about biosecurity and trying to -- basically more about honey than we were before Varroa.

We had Apis cerana come in in North Queensland and that has dominated the meetings up till the point Varroa has come in. Still, some of us, like myself, haven't detected Varroa yet in a test even though we know we probably have it. It just hasn't shown up.

Amy

That's really interesting. So, did Apis cerana become established in the area?

Peter Barnes

In the far north of Queensland, it's established, but it hasn't tracked more than a couple hundred kilometers south, at this stage. It's a lot slower moving than was first thought.

Amy

Wow, I just learned something new. All right, so I'm going to transition a little bit. You mentioned honey plants and that there is a honey industry there. I wanted to talk about some of the honey plants. I know that you had talked about the pollination crops that you all do.

What honey plants do you normally, you know, harvest and do you all have Manuka honey? I'd be interested to know about Manuka honey as well.

Peter Barnes

Well, it's probably easier that I sort of explain what sort of honeys we target, what sort of trees we target at what time of year. So, I'll start off through the winter months. In Queensland, here we target spotted gum and narrowly fine bark, and they're two trees that can produce a large amount of honey. Probably, spotted gum produces when the temperature at night time gets below 15°C. So, before that it, it's very erratic. And then once the temperature drops, the tree actually produces a large amount of pollen and some honey. And then basically we work it from February through -- well, we can work it through February through September by shifting every month onto a different part of the state, and each part of the state flowers at a different time.

And then once we get to May, we can also get the option to move to narrowly fine bark, which is a much lighter honey, but it also produces several boxes of honey and pollen, and they breed really well through winter, which leads us into our pollination quite nicely around August.

Once of course, our pollination in August is avocados and macadamias, which we stay in till probably early to mid-October. And then once we come out of October, we will probably go to either mangrove on the coast or have other options like grey iron bark, brush box.

And they are the main ones we hit towards Christmas once, and if it's a lot drier, we'll head out to the river country out in western Queensland onto Coolibar and River Red Gum. Once we come into January, we've got other trees again like bloodwood and what we call messmate, and they carry us through basically mid-February.

Once we get into mid-February, we we're basically back into spotted gum, but there are a wide range of other plants we can work if those plants fail, like tea tree and white under leaf. And there's lots of options out there.

While we target certain trees, there's lots of other trees you can work if there's a drought or whether there's floods. Trees in Australia on production are very weather dependent.

Jamie

So, Peter, I'm going to follow up with a couple of questions regarding honey because, you know, just for the record, what you would call a gum tree, right, G-U-M, we in the US would call a eucalyptus tree. And I'm not sure, for those listening, what side of the fence you say are eucalyptus versus gum. But Peter, how many species of gum trees are there that produce honey? And then, I'm going to ask you what's your favorite honey? Then, third, talk a little bit about Manuka specifically, because when people hear Manuka they think New Zealand, but I know you guys produce it in Australia as well. So, species of gum tree, your favorite honey, and a little bit of about Manuka.

Peter Barnes

Well, species of gum tree, I actually don't know how many species of gum tree there are in Australia. There are quite a lot. I work at least 20 different varieties of gum trees in Australia in my area. And then you have, further South, you have a lot more gums further South. Again, the interesting thing about gum trees is, and I'll pick out one in particular, Eucalyptus blue gum in Queensland is a tree that is very unreliable for honey and pollen, whereas if you move to South Australia and Victoria, it's a very reliable honey tree.

So not only do the gum trees differ in different places in the country, my favorite honey is definitely spotted gum. It is a honey that tastes very much like caramel, and it is what they call a low GI or low sugar content honey. So, it does not candy, which means it keeps for a long period of time. As far as Manuka goes, Manuka grows basically all the all the way around the coast of Australia from basically South Australia right through the eastern states and right up as far as Townsville.

So, we have a wide variety of Manukas and [inaudible] plants, I think that there are over 50 different varieties. Now, within that seven, there are seven main types of Manuka that produce active honey and a fair few other different species that produce just non-active manuka. It's a very, very interesting tree to tree to work. Not all Manuka will be active all the time and from year to year the activity levels will change.

Amy

So, Peter, I have the next question for you. And normally I'm the person who comes up with some of these questions and I'm kind of laughing at myself.

I'm wondering, like, did I ask this question? I think I did. I'm going to ask you anyway on air, what is it like being a commercial beekeeper in Australia?

Jamie

Yeah, I mean, this is an important question because I've seen it. It's hard work. So, Peter, yeah, tell us. Be honest.

Amy

He’s going to say, it’s hard work.

Jamie

Just let it go.

Amy

Peter, what's it like being a commercial beekeeper in Australia?

Peter Barnes

Well, I think the biggest challenge is it is hard work, but it's also very rewarding. Probably the biggest -- if I have one complaint about commercial beekeeping in Australia, it's the fact there is very little time for a break.

We don't get a very cold winter so we can often work all year round, which is sometimes frustrating when you want to take time off with family. I really enjoy the travel and the scenery. I mean, it's pretty much like being a professional tourist.

We get to see some beautiful ranges and just get to camp in national parks and work bees in some of the areas that most people only go for holidays or on weekends. We get to see a lot of the native animals. Most people probably have heard about the Australian snakes, but overall it's just one of those experiences that I think that most of my friends actually really enjoy coming out with the bees and you meet so many like a wide range of farmers and really nice people that you can learn a lot from. I actually don't really gripe about beekeeping too much. I actually just really enjoy all the facets of it.

Amy

Well, now you're making me want to become a commercial beekeeper in Australia. So, that was a great answer to that question. So, Peter, you know, you're talking about being a commercial beekeeper in Australia. I remember very specifically you showing me, and I'm surprised you haven't brought it up in your threats of beekeeping, but when you said the word snake, it made me think of the videos that you have of the other issue that you normally have in the apiary, which is, are they toads? What is it that you deal with in the apiary where you have videos of, like, these frogs, don't you?

Peter Barnes

Yeah, we have a pest called cane toads, especially in Queensland. There's nothing for us to have to eradicate toads around beehives every couple weeks because each toad can eat about 100 bees a night on average when we've dissected them and had a look at the number of bee heads inside their stomachs. In one season last year, on 400 hives of bees, I killed over four and a half thousand toads in six weeks.

Jamie

Not even sure how to follow up that statement, Peter. I do remember when I was there, I believe last, I can't remember if it was your apiary or someone else's, but they had laid down a sheet of plywood and when they would go work in, the toads would go under it during the day. And when they go work the apiary during the day, they pick up the plywood, there'd be toads under it. And then they spend time eradicating them. And for those of you listening and you wonder what the heck we're talking about, cane toads were introduced into Australia, you know, years ago and have become amazingly terrible invasive species. So, they eat bees at night time. Peter, you said up to 100 bee heads in their bellies after a night of feeding. That's incredible.

Peter Barnes

To make an example, there's nothing to see like a group of 20 to 30 toads outside one hive every night and because our bees are on pallets on the ground, that's just basically like going to an all-you-can-eat restaurant.

Jamie

Every time I think about this story, Peter, though, I keep thinking like, when these toads swallow bees, surely, they're getting stung in their digestive tract. How in the world, I mean, how do they weather those things? Surely, they're getting stung by at least a third of the bees they eat.

Peter Barnes

Yeah, I think they're very immune to bee stings. They don't seem to show any effects or any signs from getting stung by bees. But yeah, they can certainly fatten them up really well.

Jamie

I want to pivot back to honey production because again, I've seen it first hand with my own eyes, just the cleanliness of the honey houses, the professionalism of these Australian commercial beekeepers, yours specifically, but others I've visited while I was there. Also, I think about these unique and really good honeys that you produce across the country. You said earlier some commercial beekeepers do have an international market, but could you elaborate on that? Do you specifically sell honey overseas, especially like the Manuka that you make, or is it almost all internal to Australia?

Peter Barnes

Yeah, most of our honey, about 80% of our honey is consumed in Australia of what we produce. Of course, because of our seasons and unpredictable weather, you know, some years we consume most of the honey we produce with Manuka and with my business specifically, we sell most of our honey to packers, one packer in particular that we've had contracts with since 1960s. But basically, we keep it simple for us. We don't have anyone in the family that is interested in selling honey on the local market. So, it's easy for us to just sell our honey to packers and basically spend more time on the bees rather than diversify our business and sort of take our time away from our bees by trying to sell all the honey we produce.

Amy

So, Peter, I know that you all have many conferences. Jamie and Cameron have been to Australia. Cameron actually just got back, I think, last week or so. So, I'm just wondering, you know, how do you stay on top of information related to beekeeping in your area?

Peter Barnes

Basically, we have conferences, our industry, each state has its own association and those associations put out constant flow of emails on any updates that the industry needs to receive. Of course, if you know anything about beekeeping in Australia, network services for phones and that can be quite challenging.

So, you basically have to be at home to read a lot of the emails. But that's mainly how we keep up. Word of mouth. A lot of the beekeepers talk amongst themselves. So, if there is something coming up, you can probably hear it also through the grapevine. And also, beekeepers spend a lot of time at conferences and conferences happen once a year. All the beekeepers get together. Usually pretty well-attended, especially now with Varroa. Normally, what you find is when there's a really important issue, conferences in Australia become very well attended and so you get the information out to a wide range. In the case of like Varroa, at the moment, there's workshops and a lot of involvement from industry. AHBIC, our national body, also puts out a lot of information. There are websites that you can visit for more information as well as for those who are a bit more technology savvy, they can go to your university websites and pick up some of the latest stuff on the sites.

Jamie

So, Peter, this has been great. It's been fantastic learning all about beekeeping in Australia. And I know you don't have a crystal ball. Well, I know that they don't work either, so even if you had one, I'm not sure it'd be helpful. But if you don't have a crystal ball, I'm still curious where you think the future is headed for beekeeping in Australia. Where do you see things going?

Peter Barnes

Well, I think that beekeeping in Australia's future is quite bright. Been to America the past two years has shown me that there's ways to control Varroa. And while the country, at the moment, a lot of the beekeepers are still in the doom and gloom stage, I think that we have to take solace from other countries that we've seen overseas where, you know, I think that pollination will become a larger part of income as the feral colonies die out and people lose the pollination of some of their crops that they've relied so heavily on the wild bees for.

Honestly, if I was probably 20 years younger, I'd be certainly looking to invest in beekeeping heavily and probably up the number of hives to meet the pollination demands because I think that's where the future is headed. The future is pretty bright for those who want to keep good records and can just move forward with the times.

Varroa is only a stepping stone for other pests, as hive beetles and AFB and all the other diseases have come through this country and we have all learned to live with them. I think we'll learn to live with Varroa, sadly.

Jamie

So, Peter, it's really been great having you on, get a great overview of beekeeping in Australia. I know you guys have a big challenge with Varroa, but you're spot on. There's a lot of other countries that have been dealing with for decades and I just wish you guys the best of luck. I know it's almost 1:00 in your morning now and you've got to get up in a couple hours, I believe, to take bees to macadamia nuts for pollination purposes. So, thank you so much for taking time out of your evening to discuss with us the amazing beekeeping industry in Australia.

Peter Barnes

Thanks, Jamie. Thanks, Amy. I wish you guys all the best.

Amy

So, Jamie, I think part of the fun thing about our job is just being able to work with people internationally. I mean, it's a beekeeping industry, right, but outside of the United States and learning about the different floral sources, the pollination services, the plants and just all the differences. But you speak to a commercial beekeeper in a different country that does honey production and pollination and they still kind of have the same struggles. You know, they all kind of just have the same struggles as each other and the same love for their work and, you know, a passion for bees. So, it's always fun to especially, you know, with Peter being a close friend of the lab, to be able to talk about the industry.

Jamie

Completely, 100%, you know, like I said, I met him when I was just a PhD student in South Africa, gosh, you know, over 2 decades ago and I've been able to go to Australia a couple times.

He's been here, I don't know, three times or so and visited with us. And one of the cool things about our job is we get to meet people, we get to travel, we get to share stories.

And honestly, Amy, those kinds of things are things that help us do our job better because we're able to speak to our own beekeepers. Like, hey, we saw this done over there, and it was a good idea. Why don't you guys think about here or vice versa? You know, you mentioned in the interview that Cameron had just gotten back from Australia. Well, Cameron's a Varroa control expert, so he was over there trying to provide information for those folks who just got this terrible pest. So, it's a really great community to work in and Peter and us learning about beekeeping in Australia is just a good example of how networking makes all of this possible.

Amy

Yeah, definitely. Well, you know, in the future, we have another one of our previous grad students who is now working in Australia, and she was familiar with Varroa, and that'll be an interview later on that we'll share with the audience. But I kind of wanted to pivot to just quickly discuss Varroa. As I mentioned in the interview, Varroa was found here in the United States in the 80s, in the 1980s. And you know, it's kind of crazy that, you know, with movement of a lot of different things that it's just now hit Australia. It's kind of impressive actually, that it took that long to get Varroa, but now it's there, and it is it established?

Jamie

Yeah, so this is, it's just -- there's so many thoughts in my head when I think about Australia and Varroa. I mean, ’87, 1987 was a long time backwards from 2025 when we're recording this and not a long time with the grand scheme of things. But it's almost 4 decades that that we've been dealing with this issue here in the US, and Europeans had it even before.

us. Australia was really kind of the last big hold out. All of our meetings, you know, the last 30-40 years have been dominated by Varroa, the scourge of the earth. New Varroa controls, failing Varroa controls, Varroa viruses, all these things.

Well, the Australians have been largely resistant to that because they didn't have to deal with it. So, they got to keep bees kind of like the good old days where you could have bees and worry about some of these other issues but not have to treat what is really a detrimental problem. And of course, they got Varroa a few years ago.

It's become the news for them, kind of one of the big news stories of beekeeping internationally in general. You just, your heart goes out for them because you know how much we've had to work. It's still a struggle to deal with this important issue, and now they're having to deal with this. So it is, I believe, considered established. Obviously, it's a lot of places there. I think it's in feral populations. It's just tough. It's tough to watch happen to folks who didn't have to deal with this. And you can see in Australia kind of what our industry looked like 40ish almost years ago,

where folks were getting out of it and people wondered what was going to happen. And it's just troubling. But the good news is beekeepers are very resilient. Honey bee colonies, you know, fight all the way through and they're going to figure this out. This is going to be an issue that we're going to be able to address. And it's a learning curve for sure. But you know, we're all in this together, so we can help one another.

Amy

So, Jamie, you just mentioned something about the beekeepers primarily being in honey production. And of course, when we spoke with Peter, he was primarily honey production and then started doing pollination. So, I guess the majority of the commercial beekeepers was, you know, at some point, right, a honey producing business. What are your thoughts, like have they pivoted? What does that look like?

Jamie

Yeah, I mean that's cool, because when I think about me starting beekeeping years ago, you know, honey production's what I did, it's just all I knew. And I know before me keeping bees, pollination was important, but really pollination is kind of the big deal here in the US specifically.

Yes, there's plenty of commercial beekeepers who make honey, but when you go to our meetings, you'll hear beekeepers talk about honey production and pollination. It just drives the conversation. That's why bees are moved all around the country. Well, the few times I went to Australia, you know, 10-20 years ago, they were principally a honey producing nation.

That's what their commercial beekeepers did. And now, before I pivot, they've got great honeys. Think about it. You just heard Peter walk you through his honey producing year. How many plants did he name? We don't have access to that number of plants. It's just so cool. The art of honey production over there is just so neat. Bees make so much honey, etc. Now, they're pivoting. They're not pivoting away from honey, but they're expanding their portfolio to include pollination. Peter and you and I were talking off the air before we started the interview about the number of colonies needed for the crops that are being produced. They've got almonds there, macadamia nuts, other things that they pollinate, and it's just interesting to see them kind of go through this growth into pollination as well.

And it's a really cool place to keep bees. Now with Varroa in the system, that makes it more difficult. But when you hear Peter talk about their big issues and all the stuff that they do, you know, it doesn't sound so unfamiliar, does it?

Stump the Chump

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

Amy

All right, welcome back to the question answer segment, Jamie. We're going to kind of go back to basics a little with some of the questions we have today. The first question that we have is about lighting a smoker. In our master beekeeper program, in the classes that we have here at the University of Florida for students, we always try to teach people, you know, how to light a smoker and not only how to light it, but you know, how to keep it lit. I think that it's a really, really, really important skill that some people kind of look past. And so, I wanted to talk a little bit about tips and tricks for lighting a smoker. You know, what are people looking for when they're lighting a smoker? I don't know, I'm just going to leave it at that.

So, what are your tips and tricks for lighting a smoker and keeping it lit?

Jamie

Yeah, I totally have tips and tricks for this. It really boils down to like a lot of, well, first of all, a lot of years lighting smokers myself, but also a lot of years trying to teach people to light smokers.

You know, we teach beekeeping courses here at the University of Florida. We also have extension programs through which we teach beekeeping courses. We teach people how to light smokers, and when you're quizzing them, when they're taking you through a hive and an open hive demonstration, for example, where they have to keep a smoker lit, well, smokers don't always say lit. Let's just say that. OK. And I mean, to me, lighting a smoker really comes down to two things. One of those two things beekeepers get right all the time.

The other of those two things is what kills their smoker dead. So, those two things happen to be the two things that fire needs to, quote unquote, survive. So, what does fire need? What two things does a fire need? Fire needs fuel and fire needs oxygen. And the fuel part is what everybody lighting a smoker gets, right? They'll light a little bit of fuel, they'll stick it in the bottom of the smoker, then they'll put more fuel in and more fuel in and more fuel in and more, more fuel in. And then they'll finally pack that fuel. And they might even add, you know, pine straw or wood chips or whatever their fuel of choice is, and they fuel it.

And Amy, what they do is they fuel it to death because what they forget is they forget the second piece of this. The second piece of this is oxygen. 100%. I would argue that I don't know, 95% of smoker failures that I have seen, people would light one and it would go out, it's they just didn't provide enough oxygen, and they didn't do it one of two ways. They either snuffed out that fire, they smothered it by over packing the fuel too early in the lighting process, or they did not puff the bellow enough. The bellow is on the smoker for the purpose of delivering oxygenated air into the fuel chamber to keep that oxygen in the fuel chamber.

My mentor taught me years and years ago, at this point, decades ago, he told me, he said, Jamie, once you get a good fire lit in the bottom of the smoker and it's adequately in those first rounds of fuel or adequately lit, then you can pack smokers as tight as you want them to be and they won't go out.

And he told me the truth. But again, the problem is that people fuel it to death. They just don't provide enough oxygen. So, what I do, this is how I light a smoker. Imagine an empty smoker chamber, and we have a lot of pine straw around here, so that's kind of our smoker fuel of choice.

I'll pick up a little bit of pine straw and stuff it into the bottom of the fuel chamber, the smoker chamber, all right. Then, I pick up an equally small group of pine straw, and I light that outside of the smoker and then I lightly stuff it into the stop of the smoke chamber. And then I puff the Dickens out of the bellow. I puff, puff, puff, puff, puff, puff, puff. I want to see flames coming out of the top of that smoker. Now, I'm not trying to burn up all the fuel I just put in there. Remember I put a little bit at the bottom, and I only lit a little bit, and I put those two things together. So, if you over puff that bellow, you know, if you over puff it for a minute, you're just going to burn up all the fuel in there and you're going to have to start over.

But once I puff it and see flames come out the top of the smoker, I stop puffing. I grab a little bit more fuel and I lightly put it in the smoker, and I do the same thing. I puff, puff, puff, puff, puff until I see more flames coming out, and then I grab more fuel, and I lightly do -- so I do this 3, 4, 5 times. Once I've done that and I've got good smoke, so the fuel is loosely in there, which gives a lot of air, and I'm puffing the bellow, which gives a lot of air, I then start packing down the fuel. I don't pack it all the way, I just pack it down some, and then I puff, puff, puff, puff, puff, puff, puff, puff, puff until I get a rich smoke.

And once I get a rich smoke, I'll get more fuel, and then I'll add that fuel to the smoker, all the while puffing the bellow. I like to keep that rich smoke coming out while I'm putting fuel into the smoker. You can see that you're about to put out that smoker when the smoke gets so thin, you can see through it. Like when I'm watching a person put fuel in it and now, you're starting to get really thin smoke. It's starting to be see-through and it's not that rich white, gray kind of color, but it's just a little bit coming out, that's a telltale sign you're not giving it enough oxygen, so you've got a puff, puff, puff, puff, puff. Keep that rich smoke coming out. Once you kind of get that smoker, you know, half packed pretty good with fuel that's tight and you're getting that rich smoke, then you can be more aggressive with the packing, and you can pack it almost as tight as you want it to go.

And then keeping it lit is really simple. It's just reading the smoke, reading the smoke, like when you're puffing the bellow and smoke's coming out of the smoker, you can look again at that color and go, oh my gosh, it's running out of fuel. How do you know it's running out of fuel? You're starting to get that light smoke that you can clearly see through, right?

And at that point I'll open up the top and add more smoker fuel to it. But a well packed smoker can last you quite a long time. These days, people are using wood chips and wood pellets which extends the smoking life of a smoker as well. But all that to say, Amy, the biggest mistake folks make is just simply not giving it enough oxygen during the lighting process.

Amy

Yeah, absolutely. We've seen hundreds and hundreds of people lighting smokers and, fun fact, the reason I wear hiking boots to work is because sometimes I have to stomp those fires out. Well, as some of our listeners here know, we also, Jamie just started a YouTube channel called Beekeeping Academy. There is a video on there for those who are visual learners. So, we'll make sure to link that in our additional notes and resources as well. OK. For the second question that we have, Jamie, can you remind our audience what the difference is between American foulbrood and European foulbrood?

Jamie

You and I were talking about this question, kind of, before we came on the air, I'm like, oh yeah, I can do that. And then the moment I was like, there's so much. I'm going to keep this super-duper duper general. OK. So, American foulbrood and European foulbrood, you know, we tend to acronym those AFB, EFB.

So American foulbrood, AFB, European foulbrood, EFB. Incidentally and quickly, those names aren't an indication of where these things, quote unquote, were born. It’s really more kind of in the development discovery process. So, it's not like European foulbrood is European and American foulbrood is American.

It's just a history of discovery and research and those kinds of things. I thought I'd get that out there. AFB and EFB really are the names for the presentation of the clinical signs associated with infection by two bacteria.

OK, so AFB, American foulbrood, is the clinical manifestation of the disease caused by Paenibacillus larvae. That is the name of -- it's the disease-causing organism for American foulbrood.

It is a bacterium that gets inside of developing bees and kills those developing bees and produces, then, all the clinical signs associated with American foulbrood. It happens to be a bacterium that forms a very robust spore.

The spore can survive a lot of different things, time as an example, heat, to certain temperatures, all sorts of things. And this bacterium is so bad because you can treat colonies infected with Paenibacillus larvae and the vegetative state of the bacterium dies.

The antibiotic, it kills the vegetative state of the bacterium, but the bacterium then leaves behind spores that survive antibiotic treatment that then are available to reinfect colonies later on down the stream and represent these clinical signs associated with American foulbrood.

So, it's just a really nasty disease to get into your colonies. And even if your colonies are going well and strong and life is good and you haven't treated in years, it can still manifest periods of stress. Once you've had it in the hive, the spores will probably outlive you keeping bees in that hive.

In other words, you could say, well, I'll get rid of the bees, and I'll just save the box, and I won't use the box for two decades and then I'll put bees in it two decades later. Well, guess what? They found the spores survive more than two decades. So, usually when you see the disease, the colonies are burned, the hives are burned just to get rid of American foulbrood.

So, what are these clinical manifestations? The reason I was thinking, Amy, back on this question about it being so difficult is when we used to teach this concept of the difference between AFB and EFB, it was kind of clear. But now we know that these clinical signs are starting to get fuzzy, kind of bleed in to one another.

So sometimes AFB can be mistaken for EFB. So, really, I'm going to speak in very broad generalities here. But in general, in both cases for AFB and EFB, the larvae is the one that's infected. In AFB, some of the typical clinical signs that you would see is that those larvae will develop, they'll become pre-pupa, the cells are capped over. Well, then you will start seeing sunken cappings of cells.

So rather than cappings that are dome-shaped and coming out of the cell, they're kind of sunken into the cell .They may also have perforations, so holes in the lids of those cells. If you were to open up those cappings, you might see a diseased or dying individual in there, often turning brown first.

The black and pre-pupa that's dead to AFB will die and fall to the bottom of the cell and develop a hard scale that the bees themselves cannot remove. So, you'll get the scale build up in the cells where individuals have died of AFB. A lot of people are aware of the rope test. If you see a cell like this, you could open up the cell and stick a small stick into it and stir the cell contents around and as you pull out that stick slowly, if it's this ropey stringy, and I hate to use this analogy, snot, if it's snotty, stringy, kind of slimy, then that is another potential clinical sign.

And finally, the clinical signs, well, there's two more clinical signs I can think of. One is you get this really spotty brood pattern, and then the next thing is you can even get what they call the pupil tongue, where the dying individual -- part of the body of the dying individual will stick to the top of the cell, and as the body dies away from that, that piece sticks to the top of the cell. And you can see that kind of pupil tongue. Now everything I've just described for you could be a

clinical sign for other pathogens, but when you're seeing these things collectively, then you're led to believe that you have AFB.

So EFB, European foulbrood is also caused by bacterium. It's caused by Melissococcus plutonius. This particular bacterium doesn't form these awful spores that are the same level of resistance in American foulbrood disease-causing bacterium forms.

So European foulbrood will also infect larval bees, and it often kills them in those larval stages. So, you won't see these glistening pearly white larvae in the back of the cell in the shape of the letter C. Instead, the larvae get yellowish, brownish, they become twisted in the cells, they darken, and they die before the cell is capped often.

So, you'll get these spotty brood patterns, you'll get a lot of larvae scattered throughout those cells presenting these kinds of clinical signs. And in the case of European foulbrood, you often can treat the colony with antibiotic because if you kill the vegetative state of European foulbrood, it doesn't produce the same, you know, quality of these awful spores that Paenibacillus larvae does.

And so, you can, most of the time, clear or clean up this European foulbrood in honey bee colonies. Neither one of them is a very good disease to have. American foulbrood is the one that essentially created the honey bee inspection programs around the United States.

They're the reason we have bee inspectors. It's kind of a legacy and search for American foulbrood to burn colonies if they get it. But I see European foulbrood so frequently. Beekeepers have often forgotten how to diagnose this problem, and they've created terms like snot brood and all these other things. When they see this brood disease and they don't know what it is, oftentimes it's just European foulbrood.

It can manifest similarly to parasitic mite syndrome. And you know, American foulbrood, on the other hand, clinical signs can look very similar to those created by sacbrood virus. So, it's tricky. And that's why when you have these two things, you've got to dig further. You've got to look for many of the clinical signs we've discussed and then you've got to develop this treatment plan.

So, they're both bad brood diseases. If you want to have one, I guess you sort of want to have EFB, but it's so common and so problematic, I'm not sure it's a good wish either, right? So, that's kind of the way that I think about both diseases.

Amy

I think that's fair. I didn't think about it until right this second, but we, at the Honey Bee Lab, my colleagues here in Florida and I, we put together a honey bee pest and disease guide. So, it's a book that is available to you all for purchase if you want to. We'll go ahead and link it on the additional notes and resources, but we do have pictures of, you know, AFB, EFB and some of the clinical signs that Jamie's talking about. So, you've got something there to compare out in the

field. That's the only selling point that I'll have for this podcast. All right, so for the third question, Jamie, that we've got today, let's talk about the status of honey bees right now and the future of honey bees.

Jamie

I would love to and be happy to chat with you about this. Now we are filming this – we are recording this -- as you can see, I mess up as I toggle back and forth between podcasts and YouTube videos. We're recording this in August of 2025. Kind of the big news in the United States this year in the beekeeping world has been losses that are reported to be the highest, you know, gross losses we've seen in the beekeeping industry. If you're listening to me out there, you've probably heard about this because of the news, the way the Internet works is this idea spread really around the world. Huge losses, they say. And a lot of those have been, well, some of the leading papers out there, some of the leading surveys out there are pointing at Varroa and deformed wing virus and you know, potentially, Varroa resistance to amitraz.

So, Varroa, right? And it sounds bad. And we know since 2006, honey bee colonies have been dying. We've got these colony losses that are just widespread and, and, and, and… and on and on and on and on and on and on. OK. So, it's easy, I think, to get very discouraged in the bee world, right? We are constantly battling Varroa. Varroa is terrible. I wish it would go away, but it's been a fight that I've had since I started keeping bees in the 1990s. And that doesn't mean that we should learn to embrace it and enjoy it. It just means that it's here, right? This is the thing we have to deal with.

But Apis mellifera, as a species, is not really threatened, so to speak. Apis mellifera has a natural distribution from the northern part of Europe through the Middle East all the way down to the southern tip of Africa. And beyond that, Apis mellifera has been taken to North America, South America, Australia, parts of Asia, and island nations around the world.

So, as a species, there are millions and millions of colonies of Apis mellifera globally. It's not threatened. However, keeping the species seems to be very difficult. A lot of that falls at the feet, or the tarsi, as it were, of Varroa.

But it's also other management things, you know, nutrition, queen quality, some people say pesticide exposure, other pathogens, etc. It can be hard, right? When people keep bees for the first time, they're often overwhelmed about the number of things you have to know and the treatments and things you have to worry about. But I'm an optimist when it comes to the status of Apis mellifera as a species. I think it's OK. I don't think it's threatened. I think that we, as scientists and as beekeepers, really need to be conscious of how we manage Apis mellifera and know that there will always be change.

Even if we were ever able to control Varroa, I mean, Amy, doesn't it feel like the next thing would just fill its place, right? We've talked about Tropilaelaps. We talk about new pathogens.

We know we talk about other stuff. It just always feels like there's the next thing anyway. So, what I found in my over three decades of kind of being a beekeeper, working in the beekeeping industry is there's always the next thing.

But even though there's always the next thing, we all still find some way to deal with it. It's not easy. I mean, if the loss rates are true this year, you know, the average, I think, Amy, weren't they in the 60 percentage or something like that? The beekeepers doing the surveys? That's crazy. I just can't imagine trying to feed my family with 60% colony loss rates. It's just mind boggling to me. So, it's hard. You could argue about the sustainability of beekeeping, but gosh, graduate students these days are so smart, and beekeepers are so smart and creative. And there are industries popping up to support beekeeping that are coming up with creative solutions.

I'm an optimist that we will figure this out. I'm also a realist, you know, someone who's considers, you know, the truth that even when we figure it out, there's the next thing. But I just feel like we'll be OK. There's a lot of alarming things. We should take all of them seriously. We should think about those things. But I would hope that that news doesn't rob the joy of just cracking your bee colony and going into it. And that's what sometimes all of this can do. Just hearing these things, it's just one of those things that it can do to you. Hopefully, that's a holistic and positive way to look at what's going on, at least in the American beekeeping industry. But I think it spills over globally, potentially.

Amy

Yeah, definitely, I'm feeling hopeful.

Jamie

Well, good.

Amy

All right, everyone, those are the three questions that we had for today. Don't forget to send us questions on e-mail or you can reach out to us on one of our social media pages. Ask those questions, give us advice. We have so many people that send us e-mails saying, you know, oh, we heard this person speak and they'd be great for the podcast. So, if you've got advice or recommendations on who you'd like to hear or what topics you'd like to hear about, please let us know.

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

Jamie

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