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SPEAKERS

Jamie, Amy, Guest, Stump The Chump

Jamie 00:10

Welcome to Two Bees in a Podcast brought to you by the Honey Bee Research Extension Laboratory at the University of Florida's Institute of Food and Agricultural Sciences. It is our goal to advance the understanding of honey bees and beekeeping, grow the beekeeping community and improve the health of honey bees everywhere. In this podcast, you'll hear research updates, beekeeping management practices discussed and advice on beekeeping from our resident experts, beekeepers, scientists and other program guests. Join us for today's program. And thank you for listening to Two Bees in a Podcast.

Amy 00:43

Hello, everybody, and welcome to this segment of Two Bees in a Podcast. Today, I am extremely excited to be joined by Dr. Kim Morgan, who is an Extension Economist. She is an Associate Professor at the Southwest Florida Research and Education Center here at the University of Florida. Kim has been working with us for the past couple of years on a grant project that we have here at the University of Florida with beekeepers, specifically. And I'm excited to talk about her specialty, mostly about safety in the apiary and also, when you start to get to that point where you want to start hiring employees in your operation. But before we get to that conversation, Kim, why don't you tell us a little bit about yourself. Welcome to the show.

Guest 01:31

Thank you, Amy and Jamie, for having me on the Two Bees podcast. I'm excited to be here. As you noted, I'm an Extension Economist, and I am working out of one of our research and education centers. So I'm down in southwest Florida, which is pretty much in the center of our large-scale fruit and vegetable production here in the state. We also have a lot of cow-calf operations, where I often see, driving into work and visiting my growers, I often see lots and lots of beehives hanging out with the cows. So again, I'm an economist, so I like to help folks try to figure out how they can manage any risks they may be facing in their business and figure out ways to mitigate those. And that's why I'm here to sort of visit with you all and see how I can help.

Jamie 02:17

Well, Kim, we really appreciate you joining us and I'm grateful that this is a topic you want to discuss because this is really relevant to beekeepers all around the world. We brought you in, specifically, at least initially, to discuss farm safety. So could you give us the 30,000-foot view of farm safety and then we'll get some specific questions to you about how beekeepers can protect themselves?

Guest 02:37

Sure enough, I'd be glad to. When we look at economic risks on any farm or agribusiness, there are five of them we look at. The human resource or the labor side of that is really critical. I mean, it impacts all of the others and impacts finances in terms of what you have to spend to hire and retain good people on your farm, it impacts how much you pay yourself as an apiary, and then it's going to impact any marketing you do in terms of how the bees are handled and raised and managed and what their food source is. I know, for me, I always heard about orange blossom honey. As a Florida visitor that was always interesting to know what's orange blossom honey. So marketing is important and it's also managed by your employees and your owners. And then it goes into regulatory concerns as well when it comes to managing the safety of your workers and any kind of liability issues there or concerns from that side. So it's really important when it comes to farm safety. After all, the most expensive thing on any farm is typically the humans that you're hiring to keep the farm in progress or in process. And of course, paying yourself a nice check would also be really useful. So I'm excited to talk with you about farm safety and how that one risk affects every other aspect of the overall business.

Jamie 03:52

So, thanks, Kim. Could you give us some specific examples of safety issues that are related to bees and beekeeping?

Guest 03:59

Sure enough. One of the big ones here in Florida is the concerns with heat and heat stress and heat illness, especially when you put on one of those beekeeping suits that I'm sure you all advise and I'm sure many of the listeners are already doing. One thing with heat illness that's really new to a lot of folks that may not be familiar with working and living in a hot state or in the high heat of the summer, it's just that there are three different stages that you can look for. And the other thing that I've learned in working with my growers here in southwest Florida is that these symptoms often look like something else. So, for example, one of the first stages of heat illness is heat cramps. So if you've been outside lifting heavy beehives around moving equipment around, traipsing through sand and native forage, you're probably pretty worn out so you might not immediately attribute a cramp in your lower leg or in your arm to a heat illness or the onset of heat illness. So, heat cramps is one thing that can easily be mistaken for some other kind of thing instead of being an early warning sign that, hey, your body's starting to overheat, it's starting to draw resources towards the center of your body to try to cool, to keep the organs going, the most important things going. Going from heat cramps, you can go to heat exhaustion. That's when you feel irritable, you're thirsty, you might have some nausea or vomiting, you can have heavy sweating, you can be lightheaded or dizzy, and of course, your body temperature is going up. So you can feel tired as well. So a lot of times, we'll see this here in the fields, and we'll assume someone maybe they are a little bit hungover from the night before, or maybe they're just not in good physical condition, or maybe they're just trying to get out of working harder. So again, easily confused or dismissed, the second stage of heat illness, which can put you right into the third critical stage, which is heatstroke. Again, you're gonna have slurred speech, you're gonna have confusion,

you're gonna have very heavy sweating on that person, or they're going to have hot, dry skin. Their heart rate is going to be really high, and they may be staggering around. And again, easy to confuse this with other things, if you're not really aware of that. So that's one thing I really wanted to share with your audience in this talk is to sort of know that there are three different stages. There are things you can definitely do to recognize those a little bit better, especially considering if someone's wearing full protective gear, you really can't see a lot of those physical cues, and you may confuse them for something else. So that's just one example of the importance of farm safety when it comes to having people working on your farm.

Amy 04:01

Yeah, So Kim, I feel like every single beekeeper who is listening to the podcast and beyond, they've all just gotten to the point where it's so hot outside, but they still have to go into their bees, right? I think the hottest I've ever been, I went and worked with a commercial beekeeper and pulled honey, and it was in the middle -- I think it was June or July here in Florida. It was so hot outside. I was sweating. It was a hot mess. I was a hot mess. And I realized at that moment how dangerous it was to actually be out there, to be even just a little bit dehydrated, right? So I think this topic is very relevant and important. I was also wondering if you could talk to us a little bit more about other farm safety, specifically with beekeepers. You mentioned PPE, so personal protective equipment. What are other considerations with farm safety that beekeepers should be considering?

Guest 07:24

This is a great question. I think I see a lot of this in agriculture. I've had horses, for example, my whole life, and you tend to assume people know things about horses. For example, they're really big, and while they don't have stingers, they have sharp, pointy teeth, and they have four legs with sharp, heavy hooves on either end. So they come in with their own built-in defense. And it always behooved me, I learned pretty quickly, to let people know, hey, don't go behind a horse, for example. Look at their ears, if their ears are flat on their head, that horse is in a crabby mood and really isn't in the mood for humans to be messing with it. So I learned pretty quickly that some of those things we take for granted are not obvious to people we may have, either on our farm visiting as a possible buyer or people that we're hiring. And so yes, you can put a video in front of them and do some training and we very much encourage that. But the real-life aspects of it are you have to let people know you can, too, learn how to read a hive's mood, if you will. Bees have moods, just like large animals or even small animals. So they have moods, they're affected by the weather just like we are. If it's hot, and it's sunny, they're probably out there doing their bee business and bringing in the pollen and everybody's very active in the hive or they're trying to keep the hive cool. So being aware of the temperature. If it's dark and rainy, they're probably all at home in the hive doing hive business. So, if they're in a heavy traffic area, that's something that you want to be aware of. Are they constantly being irritated by people walking past them? So when your new employee goes to work with that hive, those bees are already cranky, and they're not going to be in the best of moods and they may not respond to your preventative measures as easily as you would expect. So if you've gone mowing past somebody or past the beehives recently, that's another thing. So those vibrations, those irritants have already got those bees sort of on high alert, if you will, and they're on defense mode. The other thing that I would recommend, and this happens with all critters, but bees especially, they work with pheromones, which you all know, of course. So walking by them with your lotion on or perfume on is going to draw their attention. The other thing that I've learned about bees is that they sort of sense if you've been handling their hives. They

can smell you on your clothes, and if you sort of feel like the bees have come after you and you've smashed one or even smashed one in handling them, they can smell that and that drives them into extra defense mode, and they're gonna go follow that smell on your protective equipment. So that's another thing. Letting people know those situations where, "Oh, a bee is coming after me, I think I'm gonna be stung, I smashed it," may not be the best solution. You may want to say, nope, you need to run away, protect your eyes and ears and nose, try really hard not to smash them on your person because they're gonna keep following that smell and literally label you as a threat." So checking your own mood as well, don't go in there jerky movements or stressed out or even afraid or impatient because they can sense that. Again, they're very sensitive with that and the smells and the pheromones. So things that I've learned about bees that aren't any much different than working with a larger animal, but also not as obvious to those folks that aren't familiar with working with bees. So letting them know that these critters have certain triggers and that they have certain moods, and that that's something you can make people be aware of when you bring them on your apiary.

Amy 10:52

Yeah, definitely. So thank you for that. You just mentioned a little bit about farm safety in general. Can you give us recommendations as far as employees? So when beekeepers are ready to start hiring employees, they have employees on their farms, what recommendations do you have for beekeepers that are interested in making sure that their employees are safe?

Guest 11:13

Well, we're in the business of education. So we always like to start with take the time and invest the money and the resources to educate people upfront. Just like grandma used to say, prevention is worth 100 times a cure, especially because you want people to stay with you. Hiring and retaining an employee is super important, especially in the tight labor market that we're feeling here in Florida and in the US, and I think even globally. People are going to be pretty particular about their workplace environment and getting stung because of cranky bees out there and they weren't aware of that is not going to be a good way to retain them, right? So upfront time and resources spent on letting folks know that this is how bees behave, this is what you want to look for, these are the things about yourself that you want to be aware of, this is the equipment, this is how you put it on the right way. A lot of folks tend to sort of, especially in sort of the ag industry, we have a tendency to, "Well, they'll learn by doing," which is a great idea. But when the costs could be potentially getting stung, or most important to the business, losing that employee, you want to definitely expend that effort and energy on getting folks trained, and make them aware that everyone has a motivation for why they may work on an apiary, but making sure you understand their motivation to why are they there? What is their general personality? Are they allergic to bees? Have they ever been stung? Asking sort of upfront questions, even spending some money on an allergy test if that's financially a possibility, so you know whether that person is at higher risk than another person. I think it's really important that they never put crew out there by themselves. They should always have a bee buddy. Those are all things that can impact what you would do in a case of somebody actually being stung. Then, of course, posting information on procedures on what to do if someone has a heat illness event or if someone has a bee sting event, letting those be posted clearly. And I really recommend doing some sort of role-playing. I know it sounds really silly, but when you're getting stung, the only thing that's silly about that is how people look when they're running away from something you can't see. It looks silly, but it's not. It's the same thing with heat illness. They may look silly staggering around, but it could be life or death. So having some

role-playing time where it's like, okay, this person looks silly, but can you deduce from your training that we've given you if it's a critical event or a health concern that you can identify right away? And then what do you do? I mean, you're in the middle of a cow pasture in southwest Florida. How close are you to the nearest help? How do you get ahold of them? How do you let them know where you are? I mean, these are questions where we can have it on a poster and on a video training, but there's nothing quite like actually stepping through that plan and what happens in those cases.

Jamie 14:03

So, Kim, I think this is all really good advice that you're giving to beekeepers working in and around apiaries. You clearly know a lot about farm safety. So what workshops / resources do you provide for your specific program that might be useful to beekeepers?

Guest 14:17

Sure enough, Jamie. One of the programs that I inherited when I started here at UF three years ago is the UF/IFAS Farm Labor Supervisor Program. The reason that program was started initially was, again, in South Florida here we have a large number of seasonal and migrant labor workforce that has always been the main workforce behind harvesting, caring for, packing, shipping, transporting our fruit and vegetables. We are the second largest, sometimes the first largest, grower of fresh produce here in the US that travels all the way up to Boston, Chicago, New York City, and then we also do some exporting as well. So we produce millions and millions of pounds of fruit and vegetables with the help of temporary and seasonal workforce folks. For example, Florida, this year, brought in over 50,000, what we call H-2A workers, which are folks brought here on a temporary and seasonal visa so that they can help our growers in a specific location harvest a specific crop in a time period that they need them here. So we built this training specifically to help the crew leaders or crew supervisors of that workforce. All of them are coming from outside the United States. So there's a gamut of things that they're not familiar with, including the heat is one, living conditions, threats to their health and safety. It's not uncommon, for example, in southwest Florida to see gators hanging out in the water retention ponds. So, those types of things are all things that our crew leaders needed to train their workers on, so we built this program in 2005. We're really excited, next year, to be launching it in an online module form so that we can have an official certification program for those crew leaders and crew supervisors of the migrant workforce or the H-2A program here in the US, and this will help them keep in compliance. Speaking of the five risks, the regulatory and legal risks is a big deal in ag industry. And it's not going away. That's a global situation. So one of the things our training does is let people know, how do you handle payroll, how do you post signs, how do you handle different languages of the crew that are coming in, and how do you make sure you handle overtime correctly? So we handle all of that in our online training certification program. So we're excited to have that be available online because it's going to better fit the timing and needs of our producers here in the state.

Amy 16:54

So Kim, when I first started here at the honey bee lab in 2019, is when I first heard about the H-2A program. You had mentioned a little bit about it being seasonal and temporary workers for our growers here. And so I was wondering if you could tell us a little bit more about H-2A and what that is.

Jamie 17:14

So, Kim, it really sounds to me that H-2A requirements are probably very confusing. I mean, I cannot imagine trying to navigate the paperwork and ensuring that the individuals who you're hiring on these H-2A, all the rules and regulations are met. Do you provide training about that? Is there a way that beekeepers can know more and what their requirements are with regard to H-2A's?

Guest 17:14

Sure. The H-2A program here in the US is a temporary agricultural program that allows ag employers who anticipate or are experiencing a shortage of local or domestic workers. So this program allows them to bring in non-immigrant farmworkers to the US to do, specifically, those ag labor or services of a temporary nature. So with us, fruit and vegetable production is usually in a small window, it's not year-round. So the H-2A program is really important for us, especially here in Florida, or folks dealing with seasonal needs. And it's been a real help to us. As we've experienced fewer and fewer migrant labor folks who are willing to work in the ag industry, we've had to rely more and more heavily on the H-2A program. So last year, across the US, we had 370,000 H-2A workers come into the United States. Florida is the largest employer of H-2A workers across the states. And that's up from about 40,000 15 years ago. So to give you an idea of how important it is for us to have a workforce and how few folks are nearby to our production areas, that can be seen by those numbers. Yep, we sure do, Jamie, and that's part of the program I mentioned earlier that we've now revamped to be more focused on those H-2A workforce rather than migrant labor. Although, we still do have some folks that will follow the season up the East Coast here in the US. So we do offer training. The first three modules are specific to what are those regulatory requirements and what are the regulatory agencies involved in just submitting an application to even try to get H-2A workers. So we have associations here in the state that help us or help our growers navigate those. That's what our program is about. It really focuses on the paperwork aspects. How do you figure out how to pay folks and meet all the regulatory requirements once you get them here? It is a tremendous amount of paperwork, and so, often, you'll see folks become non-compliant when they've forgotten to post posters indicating health and safety issues of that particular operation on that particular farm. It is required that they have posters up. It's required that they track how many hours each worker has accumulated and how they get paid and their payroll has to be kept track of. So we'll see in cases where the Department of Labor goes in and finds some violations and then their fines are levied against the growers because the growers are jointly responsible with the farm crew supervisors. So a grower may hire a farm crew supervisor, who then sources labor from outside the US. But the grower and the crew leader are both liable for all of the requirements and meeting all the requirements of the H-2A, which include health and safety. So that's one thing a lot of our growers don't know, hiring a crew leader isn't going to absolve you of responsibility. You are jointly responsible under this H-2A program. And just to give you an idea, we have 1700 registered farm crew leaders here in the state of Florida alone. So there are a lot of choices for growers to pick which crew leader but in terms of choosing one that's had the training that we've offered to them, I think that's going to offer both of them an advantage at better managing these risks. And at the end of the day, it's all about achieving profitability and making sure we have that healthy and safe workforce that's also put in the best situation to be safe working in our ag industry or ag operations.

Amy 21:16

Your trainings should be coming out by the end of 2024. A couple of questions about that, is that training specifically for Florida ag or anyone who's involved with ag in within the nation? And then my second question is, we have H-2A here in the United States, and I was wondering where people

outside of the United States might be able to -- who would they contact if they had questions about employer safety or anything regarding rules and regulations with employees?

Guest 21:57

That's a great question. So our program has traditionally been offered upon request. So we have a team of five to eight folks that come with us, usually to a larger ag producer's operation where the crew leaders are. And we usually do it at the beginning of the season, which was wonderful, and we trained about 1200 people that way over the years. But one thing we heard when we worked with our growers is it's a faster-moving world and all of us have gotten pretty proficient with Zoom, particularly during the COVID-19 pandemic where we had to communicate with growers and crew leaders in multiple languages very quickly because crew were here. It was high season for us when the world shut down. So it was really important to them that we put this program in an online environment. So what we do plan to do is have it in an online environment, hosted here by IFAS Extension online. And so those modules will be available online. We are not limiting them to the state of Florida. Access would be available to anyone to take those online modules. There are six of them split, again, across basics of H-2A, dealing with wage and hour requirements, again, these are specific to the US. And then the second part is focused on heat illness prevention and health and safety and well-being of our workforce is the sort of second set of modules. So it would be accessible by anyone outside of the state of Florida. And although it is, the examples would be state-specific. So a question about where would you find information about this in other countries that are outside the US or even other states? Because it is sometimes a federal -- like OSHA is Occupational Safety and Hazard Agency, and then all the way down to state-level Department of Labor, or Department of Wage and Hour. So again, this regulatory aspect is really important. I would start, first, with your nearby associations. Hopefully, your beekeeping group has an association or, perhaps, the fruit and vegetable growers, which I imagine the beekeepers are in communication with. That's probably one of their bigger clients if they're bringing their hives to those locations. They probably have an association and they may be the first step in how do I handle the paperwork required to secure labor from other countries. So I imagine that would be the sort of chain of command if I was in another state. That's the first place I'd look is in your associations, if not in a beekeeping and fruit and vegetable. If not, then the state-level would be the next thing I would look to you to see what your equivalent may be for those. But there are five different agencies, state and federal, that are hands-on the H-2A program in the US. So it's a lot of paperwork. So you're gonna want to put someone who's patient in charge of that and it takes a long time. Our growers are submitting applications four to six months ahead of the actual need window. So it will be a lengthy process. But at the end of the day, it guarantees you a workforce.

Amy 25:04

So, Kim, thank you so much for sharing with us all your knowledge about farm safety and H-2A. There's so much to know. I actually want to take your training so I know what is also involved with everything. But I'm just wondering, for those who are interested in attending an online workshop or finding these resources, where can they find this information?

Guest 25:24

Well, the best way to find out now is to reach out to me directly because we haven't quite got them launched to the live public yet. So if they would like to reach out to me, I can share my email or phone

number with you, or I can share it here. Kimorgan@ufl.edu is the best way to reach me and we will figure out a way to help you out.

Amy 25:48

Alright, thank you so much, Kim. So what we're going to do is we'll share your email address in the podcast in our additional notes and resources. And hopefully, you get over 3000 emails tomorrow.

Guest 26:01

That sounds great. Maybe I should have sent them to our Facebook page.

Amy 26:04

What is your Facebook page?

Guest 26:07

@FLSTraining15.

Amy 26:10

Alright. So what we'll do is we'll post your email address and your Facebook page so that our listeners can reach out to you with any questions that they may have. But thank you so much for joining us today.

Guest 26:20

Thank you both for having me. I appreciate it.

Amy 26:28

Jamie, I was happy to have Kim on today because I think just worker safety and safety in the apiary are things that we think about, but it's not really at the very forefront until, of course, someone gets stung or something happens, right? So I feel like people are kind of a reactive group instead of proactive sometimes. I think that worker safety and safety in the apiary can be that way as well. So, the heat thing I told you, I worked with a commercial beekeeper and it was so hard. And Kim was talking about those three kind of levels of heat. So we also have documents on sting safety and recognizing stings. So let's talk about that a little bit. What are your thoughts?

Jamie 27:08

Yeah, when we talk about safety in the apiary, Kim spent a lot of time on heat, just like what you noticed. She also talked a bit about stings. And the best way to deal with stings is just to not get stung in the first place. But frankly, we're beekeepers, so we know we're going to get stung, and you referenced the document. Yeah, I wrote a document for the American Bee Journal some years ago that we have up on the website we need to make sure and link in the show notes. In that document, I review the literature about stings and make the point that there are actually six levels of sting response. It's very beneficial that all beekeepers know what those levels are so that they can recognize problems in themselves if they're getting stung or problems in others if they're getting stung. For example, stings hurt, so that's not a problem. When you get stung where the sting side is, if it swells a little bit and itches, that's not a problem. If you get stung on your hand and your throat starts to close, that's a problem. So in that document, I kind of go through those six levels that allergists had written about and

discussed in the literature. It just outlines things you really need to watch out for with regard to the body's response to things because, honestly, if you're in beekeeping long enough, and you work with enough people in apiary, you're going to encounter, at some point, a situation where you're going to have to help someone. Even here at the lab, we've noticed it before. Even some of our employees have had significant responses to stings, and we've had to recognize what those were and make sure they get appropriate medical attention. So knowing how the body responds is key. And we'll make sure and link that document so that folks know how to take that next step if they see any of those alarming symptoms.

Amy 28:50

Yeah, so the second thing I wanted to talk about was the second piece of that episode was discussing H-2A, the temporary seasonal workers that we bring in for agriculture. We were talking specifically about Florida and the United States. But, internationally, I think that beekeepers hiring also have that responsibility to make sure that their employees are taken care of.

Jamie 29:14

So, Amy, of course, human safety is really the most important thing we should consider when we're in an apiary. Like you mentioned, here in the US, we kind of have this very structured OSHA and all these other things that we have to do and you mentioned the H-2A visa bringing in folks to help work out on the farm. Well, internationally, obviously you and I wouldn't know what those similar organizations are internationally, but they're almost certainly organizations that focus on worker safety. It would behoove every beekeeper, literally around the world and whatever their country is, they need to know what those rules or regulations are so that they can make sure and take care of their most prized possession, which is themselves or the individuals who are working for them, the obligation that they have to ensure worker safety. While may not be able to go country by country in this podcast and point out those safety organizations, it's a safe assumption that most beekeepers listening to us are going to be living in a place that has safety rules and regulations not only for themselves, but for their employees. And it's important to be able to follow those.

Stump The Chump 30:21

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

Amy 30:30

Alrighty, welcome back to the question and answer segment. Jamie, we've got three questions. They're very, very long with very long backstories and questions. But what I'm going to do is I'm going to try to shorten each question for you. So we'll try to kind of make this short and simple. The first question that we have is basically, are Varroa attracted to queen cells? And if they are, why would that be, especially if there's other open brood in a colony? Have you ever seen this before? And is it very common?

Jamie 31:01

So I've never seen Varroa in a queen cell before. So I don't think it's very common. I did, in preparation to answer this question, look up in Google Scholar, "Varroa in honey bee queen cells." And I did find a couple of papers where, in the earliest paper, in high infestations and very little brood in the colony, so high Varroa infestations and little brood in the colony, the researchers were finding Varroa in queen cells, but in low Varroa infestations, or if there was other brood in the colony, they weren't seeing

Varroa in queen cells. I'm gonna give the quick caveat too, this first paper I saw was in 1991, which is when they were still calling the mite *Varroa jacobsoni* rather than *Varroa destructor*. So there's no guarantee, even, that it's the same species of *Varroa* that's the actual detrimental problem. But I will say, it did not seem to be a major issue. It was just a quick finding they had. In a second paper that was published in 2012, the scientist experimentally manipulated the colonies to lead to a situation where *Varroa* would come into regular contact with open queen cells, and they were seeing *Varroa* in those queen cells at very low infestation rates. And some of the *Varroa* did oviposit but none of their offspring will actually mature to adulthood. So let me pause and tell you what I mean by that. It's overwhelmingly clear that *Varroa* prefer drone brood, and then worker brood. While we don't know with certainty how *Varroa* are telling the difference between those things, it's virtually certain that it's pheromonally linked, right? So drone brood probably smells different than worker brood. So then why would they prefer drone brood to worker brood? Well, drones take three days longer to develop. So if *Varroa* are reproducing in drone brood, they get extra time to produce extra offspring. In contrast, worker brood takes three fewer days than drone brood does to develop. So *Varroa* will reproduce in worker brood, we see it all the time, but it's just not their preferred choice because they lose three days of reproduction. I read a study years ago, Amy, and I'm going to butcher the numbers so I'm not going to try to be overly specific. But when *Varroa* are reproducing in worker brood cells, they will produce about an offspring and a half in a worker brood cell. When they reproduce in drone brood cells, it's almost two and a half offspring. So they get almost one more offspring per reproductive cell invasion when they reproduce on drones than workers. So why am I talking about drones and workers when the question was about queens? Well, this illustrates, then, why they absolutely do not prefer to go into queen cells because queens take 16 days to develop and *Varroa* would essentially not have any time to produce a fertile adult offspring by the time a queen emerges. So I can certainly envision many situations in which *Varroa* accidentally go into queen cells because they're there, or in the complete absence of brood, would go into queen cells. But it is not a very useful way for them to reproduce because they're really going to fail to produce viable offspring more often than not. I mean, all of our listeners know that I say, it's biology and biology is messy. So I could conceive a situation where *Varroa* would invade a queen cell and have a mature offspring, but it's going to be so uncommon that it's just not advantageous for them. So I think what our listener is asking, hey, I saw a *Varroa* in a queen cell. How frequent is that? Well, it's not overly frequent. It's not impossible to see. It's not overly frequent, but it's not a concern that most people have because it's just not a really reasonable way for *Varroa* to reproduce. Now that said, in theory, it could impact the quality of the queen that emerges from that cell. Even if the *Varroa* is not able to reproduce, maybe she's able to transmit deformed wing virus or something like that, but it's just infrequent enough to where it's not something beekeepers worry about with regularity.

Amy 35:11

Okay, so I have two questions/thoughts. The first question I have, when you're saying *Varroa* has one and a half offspring, what is a half of an offspring?

Jamie 35:23

It just means in some cells, Amy, *Varroa* invading like a worker brood cell will have two offspring reach maturity, whereas in some cells, *Varroa* invading worker cells will have one offspring reach maturity. So it works out to, on average, when *Varroa* invade a worker cell, they produce about a mature offspring and a half when you do the law of averages, and it's kind of similarly reasoned for drones, except they can get a whole nother offspring out of that, or an additional offspring out of that.

Amy 35:55

Got it. My second thought/question was, with Varroa being on queen cells, we know that there is something else called a braulid, and that kind of looks like a Varroa but those are on queens. I guess my question is, do braula invade queen cells? Or are they just found on adult queens?

Jamie 35:57

That's a good question. So braula are strictly adult bee parasites. So they reproduce, usually, in kind of the honey areas of the colonies. Their offspring are little larvae, since a braulid is a wingless fly, their offspring are technically maggots, and these little things will do their damage in the honey area of the comb. So braula don't have to go into brood cells to reproduce. In fact, they don't go into brood sales to reproduce, so it would be unlikely for the questioner to mistake what they were seeing in a queen cell as a Varroa when it was really a braulid. But that's a really great thought because you do see braula on queens when they are present in colonies.

Amy 36:57

Sounds good. For our second question, this is a honey question, and we're going to talk a little bit about what is considered honey and the process of what honey is. Let's say someone is selling honey, so the honey is not all the way capped, people may not consider that honey. Is that considered honey? So let's talk about, I guess, that process from nectar turning into honey, and what is considered honey, what's considered real honey? What is the definition of honey?

Jamie 37:28

This is actually going to be a tricky question to answer. I will not say that I'm stumped but it's going to be one of those questions that the answer is in that gray area of semantics, right? It's just how you use your terms. Okay, so where do I start? Well, we all know, as beekeepers, bees collect nectar from flowers, and while they're flying that nectar back to the hive, enzymes are added in their honey stomach, their crop. And then when they get to the hive, they offload that nectar to receiver bees right inside the nest entrance, who then go and spit a bubble of that honey and suck it back in and spit a bubble and suck it back in, which starts the dehydration process. Then, they put it into cells already en route to dehydration, and other worker bees stand at the nest entrance, fan their wings and it circulates air to the nest, which dries off additional water from that nectar. And once that nectar reaches somewhere in the neighborhood of about 15.5 to 18.5% water, the bees will cap it over, which is what we, as beekeepers, call ripe honey. So the questioner is saying, well, I've got customers saying that if it's not capped, then it's not honey. Well, now, we're getting into a bit of semantics here because one of the recommendations that we give to beekeepers is they don't extract their supers unless they're 75 or 80% or more capped. And that's a recommendation to limit the likelihood that honey is fermenting, right? The more that the liquid sugar in those combs is uncapped, the greater the likelihood that it has a higher moisture content. When it has a higher moisture content, the greater the likelihood that it's going to ferment later. So, most people's recommendations would say, well, you should extract if it's over 80% capped. Well, that means by default, it's 20% uncapped. And so if it couldn't be uncapped at all, then beekeepers would never be able to produce honey because there's always a cell or two amongst the super that's going to be uncapped, and does it take only a cell or two to render that whole uncapped thing no longer honey? Florida is an interesting state because, early in my time here at UF, the Florida State Beekeepers Association fought for, legislatively, and won a formal definition of honey.

So there is actually a definition of honey. It's the Florida Standard Identity of Honey that the nation's tried to adapt and other places have similar definitions. And so the definition here is "the natural food product resulting from the harvest of nectar by honey bees and the natural activities of the honey bees in processing nectar." So, it is the recognition that bees are converting nectar to honey. And so the questioner is saying, at what point can we safely call what it is honey versus nectar? Well, the safest definition is when it's capped, it's ripe honey. But I would argue that if it's 70-80% capped, the whole super that's extracted now is honey. So then the question is, if it's not capped at all, is it honey? I would say, no, that's ripening nectar. But I can't define, for this listener, exactly the percentage that needs to be capped before it passes the honey threshold. It's a bit of a gray area. So I think in this particular discussion that this questioner is having with their questioners, it's not irrelevant, but it's one that neither side could ever technically win. So I would say if it's over 80% capped, then the super contains honey. If it's maybe 25% or less capped, then it's probably nectar. So then the question is, what do we do about the gray area? And there's really no good way to handle that.

Amy 41:25

Yeah. I think, when you're talking about selling honey, especially when you're adding comb, to maybe just use all the capped honey instead of the uncapped. I don't know, I mean, what are your thoughts on that?

Jamie 41:40

Well, it's hard because --

Amy 41:40

From a marketing and sales perspective.

Jamie 41:44

Because one of the recommendations that we give is, if the honey is mostly uncapped, then you can actually put those uncapped supers in a room with a heater and a fan and a dehumidifier and you can pull the moisture off of that nectar, and once it reaches a certain concentration that you want, then it's honey. So I mean, you could argue that it's not honey until it's below roughly 18.5% water but the problem with that is that some honeys are naturally quite wet, and they get capped. So it's really tricky. But, I would say, this is a question of good faith. If in good faith, most of the super is capped, then it's a super of honey. I don't know. This is one of those interesting questions that doesn't really have a defined cut-off point.

Amy 42:33

So let's go to the third question. The questioner has a colony that's queenless. There are no eggs, no larva, no capped brood. Thankfully, there aren't any laying workers yet. And so this person was told to put two frames of brood in all stages and eggs from a different colony into the colony that's essentially queenless and is not producing. They were told to leave it, check it in about a month or so, and see what happens. The question for you, Jamie, is do you agree with this? Is this the right thing to do? And is this a common practice?

Jamie 43:07

Yes, yes, and yes. So, ultimately, Amy, there are multiple ways to deal with queenless colonies. And if a colony is truly queenless, and they have been queenless for a week or two, and they failed to make queen cells, then there are no female larvae that are young enough to push in the direction of queens. I mean, you could essentially have a colony that's queenless and broodless, so they're going to die. In this particular case, the beekeeper just moved over two frames of eggs and young larvae into that queenless colony to allow that queenless colony to make queens from, hopefully, the newly emerged larvae or those larvae that will emerge from those eggs very soon. So this is a very common practice. They have a number of follow-up questions. Is this something that I would agree with? Yes, I've done this all the time. How often should I check on them? Well, what I like to do in these circumstances is, when I add those frames of brood, I like to come back the following week and remove all of the queen cells, except the largest two. I used to just leave the largest one. But now I'll leave the largest two to make sure that if one of the queen cells is a dud that I'm not up the creek without a paddle. So I'll leave the largest two queen cells, and I'll remove all the other ones. And I'll usually come back a week after that to ensure that the new queen has emerged, and then I give her about two more weeks to mate and start laying eggs. So that whole process is about a month. The questioner says, someone told me to come back four weeks later. I don't wait the whole month. I watch closely the first two weeks because I want to make sure that they are, in fact, making queen cells and that a new queen emerges from one of those. But once I see that that has happened, then I leave it for two weeks before I come back and make sure that she's laying eggs. This is a very common way to do this. It's really not a problem at all. I've opened many colonies that are in the process of making queen cells in this similar context and don't believe I've ever caused them to abort the cells that they were producing or lead the colony down the wrong path. So I don't think it's a problem at all. So I would check closely the first week or two to make sure the requeening was successful. Then, I'd give them another two weeks to allow her to mate and start laying eggs.

Amy 45:19

Jamie, we sit here and we podcast and we talk about bees, and it just like gives me the itch to go and work bees all day. Maybe we should just quit the podcast and go work bees. What do you think?

Jamie 45:30

Yeah, I think that's actually a good idea. I miss working bees all the time.

Amy 45:34

Yeah, definitely. All right, everybody. Those are the questions and answers for today. If you have other questions -- I'm just being fully transparent -- I'm working on getting some sort of fillable form out. So if you have questions, you're able to go to one location, ask your questions, and we'll be able to answer it on air. But until then, we'll let you know. Right now, feel free to send us an email or you can send us a message on one of our social media pages. Hello, everyone. Thanks for listening to today's episode. This episode was edited and produced by our podcast coordinator Mitra Hamzavi. Thanks, Mitra.

Jamie 46:18

Visit the UF/IFAS Honey Bee Research and Extension Laboratory's website, Ufhoneybee.com, for additional information and resources for today's episode. Email any questions that you want answered on air to honeybee@ifas.ufl.edu. You can also submit questions to us on X, Instagram, or Facebook

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