Episode 53 Mixdown PROOFED

Mon, Apr 11, 2022 12:56PM • 47:37

SUMMARY KEYWORDS

varroa, bees, mite, colony, hive, honey bees, organism, brood, sammy, honey bee, feed, people, parasites, research, sugar syrup, beekeepers, question, cell, work, good

SPEAKERS

Stump The Chump, Samuel Ramsey, Jamie, Amy, Honey Bee

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. Welcome to another episode of Two Bees in a Podcast. In today's episode, we'll be joined by Dr. Sammy Ramsey, who is a USDA-ARS postdoc in Maryland. His specialty is the Tropilaelaps mite, and he's going to be talking about the research that he's done on this mite in Asia. Following that, we're going to do our Five Minute Management segment on characteristics of healthy honey bee colonies, what makes a honey bee colony healthy, and how you can identify that, and we'll finish today's episode with our question and answer segment. Hello, and welcome to another segment of Two Bees in a Podcast. We have got a fascinating topic to talk about today. We are fortunate to be joined by a fascinating scientist who's going to be the one talking about that fascinating topic. That scientist is none other than Dr. Samuel Ramsey, the Research Fellow for the Bee Research Lab, the USDA-ARS lab station in Beltsville, Maryland. Sammy, thank you so much for joining us on Two Bees in a Podcast.

Samuel Ramsey 01:59
It's great to be here. I think this is going to be really fun.

Jamie 02:02
Yeah, man, I was so excited when we saw that we were able to bring you on to Two Bees in a Podcast. I've been watching your career, as have a lot of others. I know a lot of people get excited when you're behind a mic. And, Sammy, on top of all of that, we're not here just talking about you and what you've been up to, we're talking about Tropilaelaps. So this is something a lot of beekeepers want to know. So thank you for joining us.

Samuel Ramsey 02:24
It's funny to hear you say you've been watching my career. You've been a part of it, sir. My first big publication, you're one of the co-authors.

Jamie 02:31
Well, it's always fun to collaborate with superstars like you, Sammy. It's fun to do that.

Samuel Ramsey 02:38
Oh, stop.

Jamie 02:39
I know. I know.

Amy 02:41
I was going to say, are we going to do this for 20 minutes?

Jamie 02:44
I don't know, Amy. Amy, you're such a good extension specialist as well. It's great to hear your voice. No, in all seriousness, Sammy, one of the things we like to do when we bring on a guest for the first time is before we get down to the nitty-gritty of, in your case, Tropilaelaps and all of the stuff that you've been doing with it, I think it's always cool for our listeners to hear a little bit about the person we're interviewing. In your case, you kind of came into bees a roundabout way. So could you tell us about yourself, how you got into bee research, and after you introduce yourself to the audience, we'll start talking with you all about Tropilaelaps.

Samuel Ramsey 03:19
Okay, sounds like a plan. You're right. It is sort of a roundabout way that I ended up as a researcher on honey bees. A lot of people think that since my dad is a beekeeper, that's how I got into things, but my dad was actually inspired to become a beekeeper based on the research that I was conducting, having come to a bunch of my presentations. So that was a fairly recent occurrence. But about six years ago, I was actually a researcher on parasites of stinkbugs. Prior to that, I was researching parasites of ladybugs. The connection that I have with honey bees actually started through Varroa destructor because I spend a lot of my time studying symbiosis. That's kind of my specialty within entomology, and that encompasses not just the mutualisms. A lot of people, when they hear the word symbiosis, they think, "Oh, those are the relationships where two different species work together for a common goal." But symbiosis also includes parasitism, and so I studied close relationships between organisms, even the ones where one of the organisms is hurt by the presence of the other one. I was really fascinated by Varroa destructor, all the weird elements of its biology, and that kind of pulled me into a deeper study of honey bees in general, and it's opened an entire new world to me. But it's strange for people to think that I actually got into it because of my fascination with Varroa destructor.

Jamie 04:45
It's funny you mentioned the symbiosis thing. When I was a PhD student in South Africa and I was working with small hive beetles, that relationship with honey bees is what interested me the most. I mean, obviously, from a beekeeper perspective, we wanted to kill that sucker. But it was really hard for me to overlook the relationship that it had with bees, a very protracted relationship. I learned a lot about symbiosis, like what you said at the time, everybody thinks mutualism or commensalism, but it includes parasitism. I read a ton of works from E.O. Wilson, Bert Holldobler, and others, "The Insect Area," all

kinds of things. It was really interesting to me to see how social insects are great hosts of lots of different things. What was interesting to me, perhaps, the most, Sammy, is that of all the social insects out there, it is said that bees, especially honey bees, have comparatively few species compared to things like wasps, ants, and termites that host maybe thousands of species. And so you're here today to talk to us specifically about Tropilaelaps, but it's really interesting to hear you look at it all from this symbiosis perspective. I like that. It's interesting to me as well. So it's neat that you came at it from that angle.

Samuel Ramsey 05:58
Yeah, yeah, I think it's actually really funny that honey bees are the ones that are pretty much -- they have very few by comparison to ants. All the rest of the groups have a clear name for what the associates are that live with them in their colonies. Ants have these Myrmecophiles, and they're just other creatures that are associated with their colonies. There are so few creatures that there hasn't been a really precise term for the ones that live with honey bees. It's been pitched that we call them Melittophiles, so that's what I've been calling them. But there just aren't that many.

Jamie 06:34
Sammy, along those lines, man, you keep giving me things to talk about man. When I first got hired at the University of Florida, we published a newsletter, now it's a blog, and we call it the Melitto Files: Bee News for Beekeepers.

Samuel Ramsey 06:47
I love it. I love it.

Jamie 06:49
It was because I discovered Melittophiles back in the day. So Melittophiles, as everyone now knows, means bee love, phile, right? Lover of bees, and so things that live in bee colonies are Melittophiles, but Melitto Files, can be our newsletter. Anyway, so, I was like, no, I'm going to educate everything, even in the name of a newsletter, and I had so many people asking me what that meant. I'm like, "Hey, time for you to learn something."

Samuel Ramsey 07:17
That's what I'm talking about. And also, I love puns. I absolutely love them. I love the really corny puns, and I love the really good deep puns. You need a little bit of both in your life. Those are some really solid puns there.

Amy 07:31
Alright, so Sammy, I know that before COVID hit, you were traveling the world, speaking to groups, large groups about Tropilaelaps, right? I think seven years ago, I wouldn't have even known how to say Tropilaelaps. It's so much fun to say. So, that's been your specialty. That's been what you've been studying, and that's what we brought you on here today to talk about. And so what is the Tropilaelaps? What is Tropilaelaps?

Samuel Ramsey 07:55

That is a wonderful question. It is an organism that a lot of people just have a really difficult time pronouncing. We did not give it the best name in the world if we wanted people to be able to talk about it. So a lot of times, I just call it the tropey mite, and that seems to be catching on. So the tropey mite, it is one of just four species of mites in the genus Tropilaelaps. So like Varroa, there's multiple species of them, and they tend to be found on different hosts. There are a couple however, they're able to go after Apis mellifera. They're similar to Varroa in that they parasitize the stage of development, the brood stage of development, where the bees are still immature, and they can do a lot of damage to them in that process. But unlike Varroa, they don't spend pretty much any time on the adult bee population. By comparison to Varroa, they spend less than a day on the bee population, and it doesn't seem like they're actually feeding on the adult bees. So that generates a pretty substantial difference in how the population grows because they're able to jump right back into the brood and continue their reproductive cycle, whereas Varroa can spend somewhere between seven days and two weeks on the adult bees before it starts reproducing again. It's the kind of the parasite of honey bees that can grow really, really, really fast and overwhelm colonies really quickly.

Amy 09:20
I can imagine management is probably much more difficult when they don't really survive on the adult bees.

Samuel Ramsey 09:27
Yes, that's a great point, management is much more difficult because we typically target management of Varroa destructor to the period of time where they're on the adult bees. It's a very vulnerable period in their lifecycle because they're hanging out on these bees that allows them to be exposed to chemical treatments, that allows them to be exposed to non-chemical treatments. It's kind of the only time that we really target with Varroa with most of the chemicals that we use because, otherwise, you're trying to get the chemical under the cell capping. This is a hydrophobic cell capping, it's made out of wax, it's difficult to get stuff in there, especially, stuff that won't damage the vulnerable stage that is the brood. So with Tropilaelaps, if you're going to treat this organism, you have to find some chemical or non-chemical treatment means that is going to get through the wax and attack the period that is actually available to you under the cell capping.

Jamie 10:25
So you'd mentioned, Sammy, that this particular individual can bother Apis mellifera. You mentioned, I believe, if I'm not mistaken, you said it was in Southeast Asia. Can you tell us a little bit about where this thing is distributed and what its natural host is? Because Apis mellifera is not native to Asia, or at least Southeast Asia. So what's its natural host?

Samuel Ramsey 10:46
Yes, and I should also probably give a little bit of background on this organism just in case there are people here that don't understand. Like I mentioned the Varroa lifecycle, but I'm not sure everybody here actually knows how these organisms work.

Jamie 11:02
Please do tell us, yeah.

Samuel Ramsey 11:04
So you've got your honey bees, there are 10 species of honey bees, 10 or 11 species of honey bees in Southeast Asia, depending on how you you look at the data there. And these species of bees, they rear their offspring inside of the colony in these wax cells. So the parasite, right before the cell is capped, the parasite will go inside and start to feed on the developing bee. When the cell is actually capped, the adults will go over and they'll place a wax capping over the cell and that's supposed to be protective. That's supposed to keep things like parasites and such from actually getting inside and let other bees know that this developing honey bee is about to turn into an adult. The parasites have figured out how to get in there. There are some really small organisms called mites that have figured out how to exploit these honey bees. Now, in Southeast Asia, you can find every species of honey bee that exists, it's quite remarkable. But over in the West, we have just one. We have Apis mellifera. But you would expect that in an area that has every species of honey bee, you also have pretty much every species of honey bee parasite, they're all just hanging out on different species of honey bees. So, every so often, they'll decide to try a new species. Now, most species in Asia, because they've been exposed to parasites for so long, they have built up a ridiculous number of resistances that allow them to manage the populations of these parasites, but unfortunately, Apis mellifera, having moved out of Asia, into Europe, and then eventually being moved around the world, it's been away from Asia for so long and away from the other species of honey bees and their parasites for so long, tat whatever resistance genes that it may have had, it's lost the majority of them to a lot of these parasites. And so when they've been moved back into Asia by people, the parasites, over evolutionary time, have just been able to jump on to this new host. They found that it's a lot easier to develop on Apis mellifera than the rest of the bees. So Apis mellifera is becoming the primary host of some of these parasites where it was originally only an alternative host. That's become really problematic. Now, originally, Tropilaelaps was present in Southeast Asia. So think, the Malay Archipelago, so think, Malaysia, think, Thailand, Burma, Vietnam, that region of the world. Then, it started spreading outside of this area. So it originally wasn't present in China. Now, it's present in China, India, it's moved into the Middle East, and we can find them actually in Iraq now. And so it's a concern because the sort of spread that we're seeing in Tropilaelaps mirrors the exact same spread that we saw in Varroa some time ago, when Varroa ended up in the US in 1987. The speed of Tropilaelaps' movement through these different countries is substantially more accelerated than that of Varroa and so I think it's a good idea for us to start researching this organism.

Amy 14:26
Interesting. So it is not here in the United States. Is it in Europe? So, not in Europe.

Samuel Ramsey 14:32
Not yet.

Amy 14:33
Not in Australia. Okay, cool. All right. So, we'll try to keep it that way, I think.

Samuel Ramsey 14:37
Yes, yes. Our biosecurity standards are such that if we work hard enough, and really keep an eye on things, it's possible that we can actually keep these out of different areas. Australia is a wonderful example of that. They have maintained biosecurity standards that have kept them Varroa-free for

decades and decades and decades and it's amazing. We want to make sure that we can keep our standards such that we can keep these organisms out. But it can be very difficult to do when you're actually connected to other landmasses and so, yeah. We don't manage how other countries maintain their standards as well.

Jamie 15:16
So Sammy, if I understand the biology correctly, though, I mean, they would need that brood link. So unless brood were brought to an area that was infested, it seems like that's where the national standards would be targeting, right? Just keeping live brood from showing up.

Samuel Ramsey 15:33
I said I thought that this was going to be fun and I was right. You guys ask great questions. So Jamie, that's a great question. And there was a paper written about this some time ago where the headline, the title of the paper was, Tropilaelaps is a concern, but not to the West, or a concern, but only in tropical areas. That left a lot of people with the impression, we're fine. If the organisms don't have brood all year round, they're not going to be able to establish even if they just happen to show up as a result of an incursion in one area or another. That actually seems to not be correct. We don't understand why yet, but we do have data that shows very clearly that somehow Tropilaelaps are able to survive in the absence of brood and are able to spread in the absence of brood. We don't quite get it. So a good example would be Korea. They have frigid Siberian winters, where it is clearly the case that the Apis mellifera there are not rearing brood all year round. But for some reason, Tropilaelaps has been able to establish in Korea and the coldest regions of China. And we don't know quite how they're doing it, how they're persisting from year to year, but they're able to establish in that country. What we do know is that their reproductive rate and their population growth is substantially slower than it is in the tropics. But somehow, they've been able to make it work and that is the most concerning thing about this organism, because that means in the same elevations, the same latitudes, we could have those issues here in the US in our temperate regions as well.

Amy 17:15
I thought you were supposed to be on here to give us good news today. I guess I was wrong.

Samuel Ramsey 17:21
I'm so sorry. But I think it's very important. I think the best news that we can really get in this situation is that we are prepared, and the only way that we're really going to be prepared is if we face the scariest parts of this head-on. Because I've been telling people, the worst thing that you can do is to wait to develop your emergency response plan when somebody is already yelling at you, "FIRE!" I don't want us to do that. I want us to have a great emergency response plan in place, just in case this organism does arrive.

Amy 17:55
That's fair. I remember, I actually heard you speak a couple years ago at an association meeting here in Florida, and I just remember someone joking around with you and saying, "All right, so you're the person that's going and working with Tropilaelaps. If we find Tropilaelaps in Florida, there must be some sort of correlation." But all joking aside, I know that you have been doing a lot of research with Tropilaelaps, and so can you tell us what research is currently being conducted on it?

Samuel Ramsey 18:22
Yes, yes, I can. And there are some exciting projects currently being conducted. But I will also say there are not a lot of projects being conducted on this organism. There are few people actually actively and consistently researching it. I should also say, that was a good question that someone asked me in Florida, even though it was posed as a joke. I wanted people to know that I am taking very seriously the possibility that going over to Asia and then coming back could be a means of movement for this organism. I don't want to be the transport vector. So it is very important to me to leave things there that are involved with any of those projects. So individuals who have seen the videos of me doing my research, you'll see that I have a Thai set of research equipment that stays in Thailand, and an American set of research equipment that stays in America, and never the two shall meet, because, in the words of an old African-American proverb, "Ain't nobody got time for that". So that is that situation there. But the other question that you asked, what research is being conducted? Well, there are researchers in Thailand who have been conducting research on how the Tropilaelaps mite feeds on its host, specifically because that's the primary way that they damage the organism. So, research has shown that these mites feed on honey bees, and they actually bite multiple holes in the honey bee over the course of the process of feeding, which is different from Varroa, which will feed through a single hole. Tropilaelaps can cause a lot of damage all over the body of the honey bee by constantly biting a different hole every time it feeds. There's been a substantial amount of research conducted to this point on viruses and the transmission of these viruses by Tropilaelaps. There hasn't been quite enough of it yet. But I'm glad to see that research is going in that direction. And we know that Tropilaelaps can spread many of the same viruses that Varroa can, and every time we look at new viruses, we find that there are more. I think we need to conduct even more research to see if there are viruses specific to Tropilaelaps instead of just the ones that Varroa transmits, like deformed wing virus and black queen cell virus. The research that I've been conducting there has been focused on -- so my research project, which has generally been called the "Fight the Mite Initiative," is actually separated into two pieces. So there's the Fight the Mite element and the "Sight the Mite" element. The Fight the Mite element of the project is focused on understanding how we can control and properly manage the Tropilaelaps mite if it were to arrive in the US. What would be the best ways to control this organism? What chemical or non-chemical methods do we have at our disposal? What could the beekeepers do, and what can biosecurity individuals do to potentially eradicate it? And then, in addition to that, I've really wanted to know the lifecycle of this organism better. All the work that we conduct on Tropilaelaps, unfortunately, it's through a stop-motion system. If we want to see the development of this parasite, we have to constantly open brood cells and see what the mite was doing at the time the cell was opened. While that can provide you with some information, it's a stop-motion system. It's like seeing someone walk past a window. You don't know what was happening before they reached your field of sight, so before they get to the window, or after. You've just got that one period when they're in your field of sight in the window. The Tropilaelaps mites are like that. When you open the cell, they stop moving, they stopped doing all the things that they were doing before because they feel the influx of air and they know that they've been found out. If you really want to know what's going on inside of that cell consistently, you have to find a way to get a camera into a tiny little wax brood cell where it's dark, and there's nothing going on. I created a system called Mite Insight, where you can actually look into these cells. I've got a camera recording over a microscope that can record the entire lifecycle of this mite, so instead of us just kind of gluing together a bunch of pieces of what we think is happening here, we can see the entire thing, and I'm really excited about that work.

Jamie 22:33
That sounds pretty neat. I'm looking forward to seeing some of those videos. So beekeepers, you're going to be listening to this, and one of the cool things about this podcast is we found that beekeepers from all around the world listen to us, dozens and dozens and dozens of countries. So with that background, you're doing a lot of cool work, this mite has an amazing biology. It's linked in with a few different species of honey bees in Asia. That's super cool. So from a beekeeper perspective, what should they be looking for with regard to this mite? Number two, if it were to ever spread outside of where it currently is, and worst case scenario, it goes around the world, like is conceivably possible, how is it managed? How is it managed currently in Asia? What's on the horizon for us to be able to do against this thing should it show up here or other places?

Samuel Ramsey 23:21
Once again, great questions. That's a big question. So I'm going to try to answer it in chunks. One element of it is, how are beekeepers actually managing these organisms in Asia? I know that one of the questions that was asked to me earlier on is what were the original honey bee hosts of this organism? I'm not sure that I specifically answered that. It is the giant honey bee in Asia that has been the primary host of this organism. The reason why that's important to management is that the giant honey bees actually manage this organism by constantly migrating. They migrate multiple times a year, at least twice a year. That consistent theme of migration allows them to fly away from where they would normally be rearing brood and break the brood cycle. The mites also aren't able to spend a lot of time on the adult bee population in flight. Flying bees can easily get rid of their mites because the mites just don't hold on particularly well to a mobile population of adult bees and so that's a good way for them to be managed. The beekeepers in Asia seem to have taken on a similar way of managing this process by breaking the brood cycle. If they're able to take the brood out of the colony or cage the queen and keep them from having a consistently available capped brood to them, the mites typically die within a good 48 hours. They don't seem to be able to survive much longer than two days without brood to feed on. However, unlike Varroa, we know that tropey mites will actually feed on the uncapped brood as well. They will go into the brood cells of early-stage brood and actually start feeding on those young larvae, which can cause a lot of problems within the colony as well. So, individuals have to remove pretty much all the brood from the colony. Unfortunately, that as a consistent theme of management can really disrupt things like honey production and the general buildup of the colony. If you don't need a lot of honey, then that's a fairly effective way of managing these organisms, and you can eradicate them from a colony in that way. But if you want to actually develop brood, another way that the beekeepers will actually manage them is to take liquid formic acid to soak pieces of wood in that liquid formic acid, and then shove that into the colony and close it, and over time, that formic acid will aerosolize into the colony, and it will kill the population of mites that are actually under the cell capping. It can penetrate the cells. That's one of the reasons why we use formic acid in North America and other areas. Because if it's concentrated enough, it can penetrate the capping and kill the Varroa mites that are under the cell cappings as well. So that's one way to do it. It's not the most precise method to actually soak really concentrated formic acid that way. You want a more controlled release. So I'm working on finding better ways to manage that release of formic acid, but anything that will manage the population under the cell capping is something that we should be looking into and evaluating. So I've also been looking into the potential for thermal remediation. Heat will penetrate all of those different areas of the colony, and the actual internal contents of the cell, those can be managed, potentially, through the usage of a level of

heat that is beyond what the mites can take, but below what the honey bees are able to manage and remain healthy. So we're looking into better understanding the effectiveness of that as well.

Jamie 27:05
Let me ask a question, Sammy. So in the United States and maybe in Europe and other places around the world, there's a lot of chemicals, potentially, at least, that go into colonies to control Varroa. There are Varroa treatment regimens, etc. Well, these things, not also kill mites, and I guess, answering my own question, if they don't, is it because there's such a short period of time that these Tropilaelaps mites expand outside of brood cells? So long story short, is what we currently do against Varroa going to give us the double control against Tropilaelaps as well?

Samuel Ramsey 27:37
So it seems unlikely that what we use against Varroa is going to allow us to effectively control tropey mites. A big reason for that is exactly what you were saying a moment ago. The small amount of time that they spend on the adult bee population reduces their vulnerability to chemical formulations like amitraz that we currently have available to us. That's one of the most consistent mite treatments that is used in North America, but unfortunately, it targets the population that is on the adult bees and doesn't penetrate the cell capping. We can actually learn a lot from the areas of the world where tropey mites have become invasive species. So China, Korea, they're in Oceania now, so Papua New Guinea, Iran, in these areas, a lot of people have tried to simply repurpose Varroa treatments, and they have failed quite consistently. We know that tropey mites have a lot of resistance genes available to them for resistance to chemicals, and so that's one reason. They develop resistance really quickly, much more quickly than Varroa. But in addition to that, anything that's just going to go after the population outside of brood cells is just not going to have enough time to really heavily impact the population, and so things like formic or things that penetrate the cell capping are really going to most likely be the most important thing we can look to for some time.

Jamie 29:08
Well, Sammy, I appreciate you coming on Two Bees in a Podcast and sharing all of your insight with us. I think one of the benefits of having you is that you've got first hand experience with this particular mite where it's native in Southeast Asia. So it's been great to have you on talking about this, man.

Samuel Ramsey 29:24
Well, thanks so much for having me guys. I love increasing awareness about these organisms. I think we need to know as much about them as we can before they reach the West.

Jamie 29:35
Given your background and research with Varroa as well as what you're doing now and even Asian giant hornets, other hornets from Asia, we'll have you on again if you'll join us so that we can talk about those topics as well.

Samuel Ramsey 29:45
I'm looking forward to it. We really need to keep an eye on the Asian giant hornet situation as well. So, definitely.

Jamie 29:52
Everyone, that was Dr. Sammy Ramsey, a Research Fellow for the bee research lab at the USDA-ARS station in Beltsville, Maryland. Thank you for joining us for this segment on Two Bees in a Podcast.

Honey Bee 30:15
Have questions or comments? Don't forget to like and follow us on Facebook, Instagram and Twitter at ufhoneybee.com

Amy 30:31
All right, it's that Five Minute Management segment. Today, we are talking about characteristics of healthy honey bee colonies. Jamie, I'm going to go ahead and start.

Jamie 30:44
Perfect. So a lot of people want to ask me what sick colonies are, how to recognize this stress and that stress, and in reality, it's better to teach people how a colony should look first, before teaching them things that are abnormal. All right. So when you're approaching a hive, there are some external cues. When you get into that hive, there are some internal things that you should be looking for. I'll go over those quickly. Externally, you want to make sure bees are exiting and entering the hive, if it's normal for that time of year. Obviously, if the temperature is below 60 degrees, you wouldn't expect to see it, but if it's above 60 degrees, you should have regular bee activity. You should have few or no dead bees on the hive entrance. The reason I say few is because it's normal for bees to carry off their dead. Once they start piling up on the bottom board or on the ground outside of the hive, this can suggest that there's a problem. There should be no adult bees crawling around on the ground outside of the hive. This is often an indication of a virus or some other problem. There should be no robbing. There shouldn't be adult honey bees trying to find their way into the hive anywhere beyond the nest entrance. You can also do a quick assessment of the hive weight. You can grab the handle on the bottommost box of the hive and kind of rock it forward a little bit, and if it's got a good weight, then that means they have enough stores. And then you're going to just do a general hive inspection. Do you see ants trailing in and out of the hive? Is the stand rickety? Is there evidence of something scratching on the entrance of the hive? All of these things are good external things to look for when you're going into a hive. Now, once you're in that hive, the very first thing you do is you remove the lid, you should see frames in the uppermost box or super, you should see bees blanketing about 80% or more of those frames. So if you've got a 10-frame box, if you're looking at it from above, it might be okay to have the outermost frames without bees on top of those frames, but you really want to see 80% or more of those frames kind of covered from above. When you pull out a comb, you want the face of the comb, about 80% or more of it covered with bees. The more bees that can cover these frames and these combs, the more that can keep them protected from diseases and pests. Whatever your uppermost food box is should be about 50% full of stored honey. So what do I mean by uppermost food box? Well, it all depends on your standard hive configuration. If you run a single as your brood chamber and a medium as your food super, then your medium should be 50% full of food or have more honey than that. If you have two double deeps as your standard hive configuration, then the uppermost deep should be at least 50% full of honey. That doesn't count all those supers that are above that for your purposes, but you just need to make sure that the box closest to the brood chamber is about 50% or more stored honey. The frames in the brood chamber should also contain honey or nectar and pollen in the corners and a band around the top. You should see evidence of a queen. Maybe you see the queen herself or eggs or

young larvae, but there's clear evidence that she's there. All life stages of bees should be present. You should look and see if there are eggs, young larvae, older larvae, pupae, adult bees etc, and they should look normal. So what does that mean? You should have one egg per cell. When you see larvae, they should be lying in the back of their cells in the shape of a letter C and glistening and white. When you see capped brood, it should have domed cappings, no sunken cappings. It should have no perforations. It should be a good solid brood pattern that occupies a good percentage of the frame. You shouldn't see queen cells. Queen cells are usually made during swarm season or response to a queen emergency. So the absence of those things tells you that the colony's kind of in a normal pattern or period at the moment. You should see no unchecked diseases or pests. Now, with one quick caveat. It's okay to see a little bit of evidence of small hive beetle damage or Varroa damage, but it shouldn't be unchecked. It should be very manageable. It's impossible for colonies not to have Varroa, but you should have very low level. So seeing incredibly low levels is not bad, but you want to make sure that diseases and pests are in check. Finally, all the adult bees should have normal wings and all their hair. I know that sounds weird, but if their wings are shriveled, that's an indicator that there's a high virus level because of Varroa, and if they're losing substantial amounts of hair, then you might have a virus as well. So pending that you see all of these things, you've got some reasonable assurances that your colony is doing well, and that everything's okay at the moment.

Amy 35:37
I am amazed. You did that in four minutes and 58 seconds.

Jamie 35:43
I just felt it. I felt that clock. Just for the listeners sake, you and I aren't even in the same room. That was completely unscripted. I just worked that out right on time.

Amy 35:53
Yeah, I'm very impressed. Well, that was awesome. So there are so many different characteristics that you look for in a healthy honey bee colony. We'll definitely be sure to link a lot of these characteristics on our website so that people can take a look at this.

Stump The Chump 36:14
It's everybody's favorite game show, Stump the Chump.

Amy 36:38
All right, so with that, it's question and answer time, and the first question is about sugar, the different types of sugar to feed bees.

Jamie 36:46
Perfect. We're going to start with a sweet question. Ba dum tss. What do you think about that, Amy? See what I did there?

Amy 36:51
Yes, I have comments and I'm not going to say them. So tell us about the different types of feed. What types of sugar do we use?

Jamie 37:01
There are three different types of sugar sources that you can provide to bees. One of those is honey, right? You can actually feed honey back to bees. You can do this in frames that you've stored. You can move frames of honey between colonies, from maybe colonies that have a lot to colonies that don't. If a colony dies and leaves the super full of honey, you can throw it in the freezer and use that honey later. But I'm assuming this listener's asking specifically, more so about what are some non-honey related sugars I can provide the bees. Really, the two that we typically recommend are corn syrup, which is what you see a lot of commercial beekeepers use, but a lot of beekeepers have less access to this, and I'll talk more about that in a moment, and just straight up granulated sugar, like what you would buy at the grocery store, be it beet-derived or cane-derived. It doesn't really matter. It's just granulated sugar. Sugar is sugar, right?

Amy 37:47
And there's a difference between the white and the brown sugar, right?

Jamie 37:50
That's right. Yep, absolutely. So brown sugar, you do not feed to bees. I'm talking specifically about white granulated sugar. Brown sugar can cause dysentery in bees. You don't want to feed molasses to bees and things like that. So I'm just talking about the white granulated sugar. So that is what most hobbyists and sideline beekeepers are going to use to mix into their sugar water. The reason that's the case is because it's very accessible in small quantities. You can go to the grocery store and get it. A lot of commercial beekeepers will use high fructose corn syrup. Not because it's better or worse for bees, but sometimes, it's just cheaper than granulated sugar. What you'll see commercial beekeepers do is they'll look at the market, and if the market says a tanker load of high fructose corn syrup is cheaper than a tanker load of sugar syrup and they'll go with the high fructose corn syrup. I have seen one research paper on bee preference for granulated sugar-derived sugar syrup versus high fructose corn syrup and bees did have a slight preference for granulated sugar produced sugar syrup, but I think at the end of the day, it comes out in the wash. That's why a lot of commercial beekeepers make that decision based on price. But for the rest of us, a lot of hobbyists and sideliners, we're going to tend to go towards the granulated sugar, the white granulated sugar. I will make just one statement because I'm guessing there are a lot of folks out there who go, "What? You would feed bees high fructose corn syrup or granulated sugar?" But you got to remember, honey bees use honey mostly for the purpose of energy. It's not really a nutrition source. So the energy comes in the form of sugar. So it really is okay to provide bees sugar syrup derived from granulated sugar, or for that matter, high fructose corn syrup. It's an energy source for the bees and they seem to do okay on it, or just fine. So I don't have a problem doing it. The alternative is them starving to death and that's always the worst solution, right? So I don't think it's a problem. But for sure, you want to stay away from things such as brown sugar, molasses, and some of these other odder things.

Amy 38:43
Maple syrup.

Jamie 38:58
Maple syrup, even though I like that. Some people might even try to use powdered sugar but powdered sugar often comes with some sort of filling agent that keep it from clumping, maybe cornstarch or

something like that and it just doesn't dissolve well in water. It's just a mess to use. So if you're going to use cane or beet-derived sugar, you're going to really want to use granulated white sugar.

Amy 40:17
Sure. My grandpa, I actually was talking to him about honey bees and he asked if my honey bees had diabetes because we feed them so much sugar.

Jamie 40:25
They can actually process it.

Amy 40:28
I'll let him know that. Okay

Jamie 40:29
I thought you were saying, dia-BEE-tes. And I'm like Amy, Amy, Amy.

Amy 40:34
No. Okay, so the second question we have is still related to feeding, and it's about communal feeding. So this person was asking, what do we feel about communal feeding? Does it spread disease? What are we worried about? Does it enhance or promote robbing? Let's talk about communal feeding. What do you think?

Jamie 40:51
Yeah, so the answer to all those questions are all the above. So what is communicated feeding? It's basically when beekeepers will set out large amounts of food, usually sugar syrup, sometimes pollen, usually some sort of sugar syrup. Well, they'll set it out and allow bees to collect it on their own. So the obvious advantage to this is it's cheap and easy to do. The alternative is individually feeding every colony. So that takes time and time is money. All right. So it's cheap and easy to do, which is why a lot of commercial beekeepers do it. On the other hand, there are drawbacks, and they're everything the questioner mentioned. Number one, it's easy to spread diseases this way. You get a lot of bees going into the same source, it's just easy to spread diseases. Number two, it can incite robbing. It can cause bees to want to rob at the feeding site as well as one another. It can result in a lot of dead bees if you're not careful of things like that. Number three, and one of the things I think is important that most people focus less on, is the idea that, usually, the stronger colonies that may not need it as much are the ones that are able to get it more, simply because they're stronger. So often, the colonies that need it most are the ones that are least able to get it, so there are some benefits and drawbacks. Despite everything I said, people are going to still continue to communally feed bees, and there might be circumstances where it's a good idea, but generally speaking, it's better to feed colonies or hives directly than it is to provide it communally.

Amy 42:29
Sure, and is it true that -- so I've heard from some beekeepers, that if you feed with the entrance feeder that that also promotes robbing? Is that a real thing?

Jamie 42:39

Absolutely, Amy. Anytime you take food to a hive, you are in danger of causing robbing to that hive. There are some things that are better than others. For example, the entrance feeder makes it easy for bees from other colonies to go and rob sugar syrup. Incidentally, for that matter, so do feeders that sit on the top of the hive. Those same jars move to the top of the hive where there's a hole in the lid, and the jar fits through that, that also attracts other bees. A lot of folks like division board feeders or those hive top feeders for that purpose because it's completely protected and a robber would have to go into the hive to get it. The downside of those feeders, of course, is you have to open the hive to get the food to them. The benefit of entrance feeders or lid feeders is that you can physically see the syrup going down so you know it's time to feed them. Another thing, too, is you have to be real careful when you feed bees because you don't want any sugar syrup on the outside of anything, on the outside of entrance feeders, on the outside of jar feeders, on the top. You don't want to necessarily fill the jars at the hive because you can get sugar syrup on the hive lid or the walls of the boxes. Anything that makes it sticky and attractive to other bees can promote robbing in that particular hive.

Amy 43:58
All right, very cool. So for our last question, it's not about feeding. It's actually about the boxes. So the question is, it's kind of funny, I'm just gonna go ahead and read exactly what the question was. "I want to brand my numbers and more into my boxes like a real commercial beekeeper." I thought that was kind of funny. Very cute. Thank you. Do I burn the boxes and then paint them to try to avoid the brand or do I paint them first and then brand them? Which way is the correct way to do this?

Jamie 44:34
I prefer to brand mine first and then paint them. Anytime I have tried to brand through paint, it's harder to do. It melts paint onto the brander, it can blister the paint right around the heat source. You can tell I've tried this before, right? So I prefer to brand it first, then paint it. But, of course, a lot of people will be in beekeeping for some time before they elect to brand In the first place, and now they've got all these painted boxes and in that case, you have to, they're already painted. So your only option is to brand on top of the paint. But when you have the choice, I prefer to brand and then paint.

Amy 45:11
What are some other options that people do? I know that here in Florida, everyone has kind of their own apiary number, and it's supposed to be on their hive. So what else do people do to identify or label their boxes?

Jamie 45:27
So, branding is what a lot of commercial guys and gals do, but on top of that, a lot of people use labels. There are a lot of waterproof labels that you can print with waterproof ink on them, and then you can affix those to the front of the hive. I've seen a lot of people, you know those cattle tags that hang from cattle ears, I've seen people nail those to hives. I've seen people do all kinds of things. Again, a stencil, for example, with their hive identifier, and put that stencil on the hive and spray paint the stencil. There are a lot of ways that you can paint hives. But a lot of the reasons that commercial beekeepers do it the branding way is it's very difficult to erase. So if someone steals your hives, it's hard to hide a brand, where it's easy to paint over someone's painted numbers or take off a tag or a label that's been affixed to the hive, which is why a lot of commercial beekeepers gravitate towards that branding.

Amy 46:24
Great. All right. Well, there we go with question and answers. Don't forget to send us your questions or comments on our social media pages or feel free to send us an email at honeybee@ifas.ufl.edu Hey, everyone, thanks for listening. Today, we'd like to give an extra special thank you to our podcast coordinator Lauren Goldstein and to our audio engineer James Weaver. Without their hard work, Two Bees in a Podcast would not be possible.

Jamie 47:00
For more information and additional resources for today's episode, don't forget to visit the UF/IFAS Honey Bee Research Extension Laboratory's website ufhoneybee.com Do you have questions you want answered on air? If so, email them to honeybee@ifas.ufl.edu or message us on Twitter, Instagram or Facebook @UFhoneybeelab. While there don't forget to follow us. Thank you for listening to Two Bees in a Podcast!