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SPEAKERS

Jamie, Amy, 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 00:46
Alright, everyone, so we are in December. And Jamie, it's been quite the year. We've been going through and I think the monthly management was well received.

Jamie 00:56
You're right. When I travel a lot of places and people talk to us about listening to the podcast, they're really grateful for the monthly management. Just last week, I was speaking to a local bee club here in Florida, and someone was telling me how excited they were about the monthly management and how it helped them out. So, Amy, this is all your idea, the monthly management was, and I think it was a good series. So kudos.

Amy 01:16
Well, thank you, thank you. Speaking of just this year, and my idea, I'm running out of ideas. So I would love to put a call out to beekeepers, and ask beekeepers what they're wanting to hear as far as management, or some of the scientific research that's happening in the world and different topics, different speakers. We've actually had a lot of people send over recommendations for speakers and their contact information. Yeah. So we're looking to figure out what we're doing for 2023. So, beekeepers, if you're out there and you're listening, please send us a message and let us know what different topics you would like to hear that we have not touched on already. But let's get into the management. So what's interesting is recently, a couple of weeks ago, I follow this commercial beekeeper on Facebook or Instagram or something. And they were basically saying, "Alright, bees, I

guess we'll see you in seven months." And I was like, "What?" Like, that's crazy. Seven months to not see your bees, but then I forget that it's so cold in areas throughout the world. And I guess it's a blessing and a curse to be able to keep bees year-round here. But let's talk about Florida. And then maybe we can add in some other parts of the world as far as what we need to do for December. So let's go ahead and start with, I think, the most important thing that beekeepers usually think about is the food, right? And so what do we need to do for food for the bees to have them overwinter?

Jamie 01:46
Oh, cool. So very, very, very important topic. And so Amy, you know that you and I have been working on this series for the whole year. And we know we have a number of listeners to our podcasts in the southern hemisphere. So as we're talking about December management, we're talking, essentially, about winter management in the northern hemisphere. And in the southern hemisphere, they're thinking about going into summer. So if you're in the southern hemisphere, start listening to our management calendar in July, and you'll know what to do. But for those folks who are interested in winter management, maybe even more so rather than December management, what bees really, really, really need for winter, two things, they need a critical mass of bees to push through winter, and then they need a critical mass of food to push through winter. And this time of year, so December for this particular monthly management calendar, but again, if you're in the southern hemisphere, that'd be maybe around July or so, really what you need is -- it's kind of too late to make more bees, you should already have a critical mass of bees in your colonies. That's really what you need. So at this point, the prevailing issue tends to be monitoring food reserves. Your diseases and pests should be under control. You should not have any of those. By this point, it's very hard to remedy those issues. Some folks maybe use these cooler months to treat for Varroa using things like oxalic acid or formic acid. But that's principally if you live in a warmer climate so that you can afford to treat bees with a liquid or something like that. But for most folks who are going into a standard winter, which is what December represents for us, really the biggest thing that you can address at this point is food. Do they have enough food to make it through winter? And if you're in the northern hemisphere, I think around the early 20s in December, December 20, 21, 22, somewhere in there, that's the first day of winter so it's time. And just like what you said, your commercial beekeeper contact on Facebook or Twitter or whatever, a lot of folks won't see their bees for six or seven months so they will have had to have fed their bees or ensure that they have about a medium super's worth of honey in order to survive that winter that is now squarely here. And so for folks who are able to live in warmer climates in winter months, kind of like you and I are here in, Amy, you can still hoist hives from behind using the handle on the bottommost box to kind of get a gauge for food. And you can even feed the colonies if necessary. But for most folks going into a heavy winter, it's time. You should have had the food on board. I do know that there are some beekeepers in much colder climates who will put what they call candy boards on their colonies through winter and their idea is like look, I fed them everything I can, they went into winter with as much food as I could give them. But in the event they run out of food, I've put this kind of cake of sugar above their head that's just always available to them in the event some problems pop up. So maybe that's something that you guys can consider out there if you live in a colder climate, but for the most part, the food work should have been done by now. And you're hopefully bedding those colonies down for winter.

Amy 06:00

Yeah, absolutely. So another thing that I've been receiving a lot of requests or just emails about -- one is what if my colony is queenless? What do I do? Can I find a queen? Which, I think I already know the answer to that. But what do I do? And what are your recommendations if you cannot find a queen? Or if there is no sign of a queen anywhere?

Jamie 06:23
Yeah, my argument here is all of these issues, Amy, would have been better dealt with a month ago or two or three months ago. So if you truly go into your colonies, and you find one is very weak, or it's queenless, you're not going to be able to remedy those problems easily now. If it's queenless, if you have some spare nucs on hand, you might be able to requeen the colony using a nuc, and maybe that's a talk we can have for another day. But for sure, if you're finding queenless colonies in winter, or you're finding weak colonies in winter, what I do is I just combine them. I don't want to waste the combs, I don't want to waste the bees or the resources in those colonies. And so what I'll do is I'll just combine them with another colony that can use the extra mass of bees or use the extra food and whatever leftover frames or boxes I have, I put in storage until spring, because I don't like the idea of having a queenless colony or a weak colony trying to get through winter because what's going to happen is the first warm day, they'll be dead and the bees will rob out their resources, their combs will be at risk, etc. So at this point, what I tell people, cut your losses, combine weak colonies or queenless colonies because it's going to be hard to manage them through winter, especially if you live in a much colder climate.

Amy 07:38
So I think those are recommendations for more harsh climates, if you want to call it that. Monitor food reserves, combining weak colonies at this point, like I mentioned here in Florida, we are prepping bees and we're prepping them for overwintering, quote-unquote, whatever that means, here in Florida, but what else as far as milder climates when you're actually going through the colonies, what are some of your recommendations for that?

Jamie 08:04
Yeah, it's a really funny scenario to live here in Florida because as far as the United States, at least, is concerned, the 48 contiguous states, Florida, southern Texas, southern California, we actually have really mild winters. And so what happens is a lot of beekeepers from northern states or much colder climates will move their bees to southern Florida or other areas to overwinter those colonies. Now, if you're listening to us from outside the United States, maybe those of you in Mediterranean climates or other warm climates know exactly what I'm talking about where beekeepers from the colder parts of your countries come to the areas that are warmer in winter to overwinter their bees. At least here in the United States, that's advantageous because almonds bloom kind of late January and February and so a lot of beekeepers to ready their colonies for pollination contracts that start popping up in January and February for almonds out west in California, they have to overwinter their colonies in warm climates to get those colonies ready for that pollination event. So essentially, you've kind of got like a fork in the road in the beekeeping world. Some folks are willing to just push their bees to a colder winter because they've got honey production or local pollination in mind. But for almonds, almonds kind of really shape a beekeepers winter decisions in the United States because they bloom so early that it forces you to have colonies kind of active and ready when they ordinarily wouldn't be. So in our own state, in other places of Florida and other areas around the world may experience something similar. There are

beekeepers working bees in December, actively working bees, feeding bees, giving them pollen substitutes, trying to grow the colonies, managing even in the southern half of Florida, even south, south Florida for swarming. They are getting those colonies strong. They're trying to keep the brood in there. They're trying to control diseases and pests. They may even be making splits if they have access to queens. And it's all so that they can get ready for those pollination contracts that come out in a pretty unique context, like what we see here in the United States. I mean, almonds really are an interesting thing since they bloom so early. So beekeepers who go to almonds to pollinate almonds really have to manage their bees so different than what we're used to having to see when you're simply trying to get them through a winter and get them ready for next spring.

Amy 10:28
Yeah, so while they're working bees, I mean, is there a temperature threshold? At what point do I decide it's too cold? Or it's okay to go into the colonies?

Jamie 10:39
Yeah, the books say, and I think I agree, that around 60 degrees Fahrenheit, that's about 15 and a half degrees or so Celsius, around that temperature, you don't really want to open hives and work bees. Now, I'm going to throw out this caveat. I know that bees can be worked in temperatures lower than that, in the 50s and 40s. I even vividly remember during one of my postdoc experiments having to sample bees, I forget, January or February, and it had iced the day before. And I had to scrape a few centimeters of ice off the lids of the beehive, and I worked those bees in temperatures that were around freezing.

Amy 11:19
That sounds miserable.

Jamie 11:22
Yeah, it was tough. I was warm. But I did worry about the bees, but the colonies survived. So I'm aware that all of this can be done. So we're just kind of talking about best practices here. And it's a best practice not to work colonies below about 60 Fahrenheit, or about 15 and a half degrees Celsius. So again, I know our listeners from all around the world, "I work bees in 50s and 40s," or maybe in Celsius, that'd be in the low teens, or maybe the upper single digits. But my point is, yeah, you can, but that's not necessarily best for the bees and bees will start to cluster at that temperature. And that's why that's kind of the threshold, that it's better to save it for a sunnier warmer day than work it when it's those temperatures. Now listen, if there's something that absolutely needs to be addressed, and you see that there's nothing but cold days ahead, and today, you get 15 and a half Celsius or 60 Fahrenheit, you just got to do what you got to do. But if you can not work them when the temperatures are that cool or cooler, it's best not to.

Amy 12:27
Alright, so let's talk about just prepping stuff for next year. So let's talk about equipment. What do we need to do with equipment? What do we need to prepare? What are your recommendations on that?

Jamie 12:40

So the key is, we're segueing, Amy, like from active management of colonies to what can beekeepers do during the rest of the time. And that's a very logical discussion because there's so little that you can do with the colonies themselves. You got to make sure they have food, you got to combine queenless or weak colonies, and then kind of apart from that, you just sit and wait. So beekeepers don't just sit and wait, though. You've got December, January, and February, where it's a great, great, great opportunity to prep for next year. So a lot of beekeepers, as an example, will start getting their equipment ready. They might make purchases of new equipment. This is a good time of year to purchase and put things together. It's a fantastic time of year to repair broken equipment, to paint boxes that need that extra coat of paint because they're getting a little worn, just those kinds of things. And so what you'll find is while beekeepers maybe aren't actively working their colonies in December, going into winter, they are actively working. They're repairing their equipment or their machines that they just needed to do that one thing but didn't have the time to. They're maybe working on organizing new sites to place these new opportunities through pollination contracts, maybe new honey-producing locations, so they're just doing all of those things that are really hard to do when the bees are calling your name every day.

Amy 14:06
Yeah, and just prepping your equipment, right? There's nothing like having new equipment and just playing with it and getting it ready. So that's exciting. Another question that I normally get during this time is when should I start my bees? Should I start my bees now? Is it okay to start them now? Or what is the next step, especially for a beginner beekeeper, trying to figure out whether they need to start now or what process they need to go through to even start looking at nucs. And so I was going to -- I'll just go ahead and say this management, go ahead and order your nucs and queens and packages right now because typically the commercial beekeepers that are selling, whoever you're purchasing from, is going to start that waitlist. Right, Jamie? There are many beekeepers out there who are on these lists and it's better to be on the list, I think, just to prep for the spring. Be on the list because if you decide last minute that you don't want to be a beekeeper, you can always go ahead and cancel and let the beekeeper know that you would not like these anymore. And there's probably someone right behind you who's gonna get that. So I don't know if you have anything to add, Jamie, as far as ordering nucs or queens or packages or anything like that.

Jamie 15:18
Yeah. Funny thing is people get really interested in beekeeping in December because this is exactly what happens. What's the big event that happens around a lot of the world in December, Amy?

Amy 15:30
It's the holiday season when you get gifts.

Jamie 15:32
Yes, right, exactly. So what happens? People get starter kits, they get a book on beekeeping, whatever it is that they receive as a gift that gets them, "Oh my gosh, I've got to become a beekeeper. This is going to be so great. I will sign up for this class. I see there's a class in March or April. I'll sign up, I'll buy my bees. Life is good." But what they don't know is that March or April or May, there's a massive demand for nucs, queens and packages. Let's face it, commercial beekeepers, they have already gotten on the list back in September for thousands of queens or nucs or packages. So a lot of these

folks who're kind of getting in December, especially January, February, March, "Oh, I'm going to take this up or I need to place an order for queens," you're going to have a hard time finding nucs, queens, or packages. So I would argue December is really that time. It's the latest time you want to be adding your name to the list to put the order in for those nucs, queens, or packages. Because even though these three items, nucs, queens, and packages might be available as early as March, they're not going to be available for people whose names aren't on the list. And so you getting on the list in December may still get you nucs, queens, or packages in April or May or even June. So if you want to place an order, now is the time to get on that list because the demand is always high.

Amy 17:03
So yeah, so make sure you order your queens, order your nucs, order your packages, contact and become part of your local beekeepers association so you can identify and find out maybe who your local source is. So the last thing, Jamie, that I wanted to talk about was attending beekeeper meetings. And so this is the December management that we're recommending for people. And we've got a conference here happening in January, and it's actually going to be here in Florida. So it'll be in Jacksonville, the American Beekeeping Federation. They're having their annual meeting in Jacksonville, Florida, and we're going to be there. And we're actually going to do a live recording, right? And so I'm really excited for that. But what else do people need to do as far as education, as far as their meetings go, anything like that?

Jamie 17:49
I'll tell you, Amy, winter or late fall and winter are the education months, because beekeepers work around the clock, essentially, from March all the way through October. They tend to put their state, regional, national, or international meetings between November and February. So you mentioned for example, the American Beekeeping Federation Conference, which is coming up in January of 2023. And it's going to be in Jacksonville right close to where we are. But at the end of November, early December is the American Honey Producers Association, our other national group. And so the point that I'm making is what you'll find if you're a beekeeper is that there are lots of national meetings around this time, maybe fewer in December because of the holidays. But certainly, you need to be aware that folks are advertising their spring, and maybe even their national meetings now for meetings that are occurring January, February, and March. And so I tend to find my own speaking schedule absolutely slammed in October and November and then January and February. And that's just indicative of the fact that so many organizations are having their state, regional, national, or international meetings during that period. So December is a really great time to look at the list of what's coming up in 2023 wherever you live and make sure that you go ahead and put in your calendar, "Hey, I plan to do this, attend this meeting in January and February, I plan to go here March or April. There's this really cool queen-rearing workshop in June and July and I want to make sure and attend this international meeting that's going to be somewhere awesome in September. I've got my local meeting in November that's going to be fun." This is a great time of year to get all those meetings on to your calendar so that you're aware of when they come up because, listen, going to beekeeper meetings satisfies so many things. Number one, it makes you a better beekeeper just through education. But it also lets you network with other beekeepers. It lets you meet the scientists and the commercial beekeepers and the movers and shakers in the industry because those individuals are your speakers and your workshop leaders. It allows you to see the latest science, it allows you to hear the latest beekeeping topics. Many of these will have vendors at the meetings where you can see the newest

equipment or maybe purchase some stuff that you didn't have that you wish you had earlier in the year. So attending beekeeper meetings is really a great way to just network and kind of become part of the beekeeper family. December is a great time of year to plan out the new year's meeting calendar and keep a lookout for a lot of those meetings that may even be occurring this month.

Amy 20:27
I'm just thinking that I thought that if we were going to do a December management podcast, I was like, "Well, surely everyone can just rest, right?" But it doesn't seem to be that way, Jamie. There's a lot that still needs to be done.

Jamie 20:41
No rest for the weary.

Amy 20:41
That's exactly right. And so everyone, we have this information and these recommendations on a publication. We will link that to our additional notes and resources with this podcast. But again, any feedback would be great. If there are topics that you would like to hear for 2023, please let us know.

Stump The Chump 20:42
It's everybody's favorite game show, Stump the Chump.

Amy 21:17
Welcome back to the question and answer segment. Jamie, the first question today, this person is asking if it's possible to clone a queen bee. And so this idea stems from being able to have multiple but identical queens in the same hive. What do you think? Can we clone bees?

Jamie 21:35
Okay, all right. So I would argue that with maybe not an overly large amount of work scientists could clone a queen bee. But I think the question is asking it from a beekeeper perspective, like, "Can beekeepers go out and make genetically identical queens?" And I would argue, no. Okay. So think about it this way. Let's just kind of make it easy. A queen mates with a drone, right? So one mom, one dad. So the queen's DNA and the drone's DNA. It's tricky because the queen has two copies of every gene, the copy she received from mom and the copy she received from dad. The drone only has one copy from the queen that was his mother. So right off the bat, the queen herself, when she is laying an egg, can give copy of gene one to that egg or copy of gene two to that egg, and the drone can only give his copy. So from the drone's perspective, it's not much of a problem. But from the queen's perspective, she can give one or the other. And now you have to multiply that across all the gene pairs that the queen has. She'll have the mom copy and the dad copy from all of the genes that she carries. And furthermore, there's this thing in genetics called crossover, where sometimes stretches of DNA will crossover and reform new stretches of DNA. So it's not always predictable that a queen will give her egg all of her mother's contributions or all of her father's contributions. It's actually much more mixed. So the chances of getting two genetically identical eggs from a single queen mating with a single drone are incredibly small. So the question is, then, can you manipulate the system and get it to happen? And the answer is essential, not easily.

Amy 23:39
Seems like no.

Jamie 23:39
But it's not impossible to do because of this one thing I'll share with you now. Our honey bees are from the genus Apis, the species mellifera, so Apis mellifera. And if you're listening out there, you're obviously a beekeeper and love bees. So you are probably aware that there are different subspecies of Apis mellifera. Right? So Apis mellifera mellifera is the European dark bee or the black bee that you see written about in the literature. Apis mellifera ligustica is the Italian honey bee. Apis mellifera carnica is the Carniolan honey bee and so forth. Okay. There is a subspecies of Apis mellifera that comes from South Africa and the Cape region of South Africa. It's Apis mellifera capensis. This subspecies, like all the other subspecies, when their colony goes queenless, their workers can start laying eggs. And most workers across Apis mellifera, when they start laying eggs, produce drones. I'm not going to go into how and why but they produce drones, unfertilized eggs, they produce drones. Well, when capensis workers lay eggs, they produce females and they do this without mating.

Amy 24:54
I was just about to say, so you started off that question, or you started off your answer by saying, "Well, let's put it in simple terms." We did not.

Jamie 24:54
I tried, I tried. It's crazy. It's another podcast for another day, but basically, one worker, if she lays two eggs and they're both female, they'll be genetically identical. So from a capensis worker, you could produce two female eggs that you later convert to queens through the grafting process. And so those two queens could be genetically identical. Of course, they're going to mate with a lot of different drones, potentially. So you've got the drone contributions that would mess that up later on downstream. But in theory, it would be possible to produce genetically identical queens, but it's from this one exception, and it's manipulating the workers in the system so much that it's tricky. It's just tricky, tricky, tricky, tricky. I mean, the question, ultimately, the questioner said the idea stems from being able to have multiple but identical queens in the same hive. But you can actually have two queen colonies without the queens being genetically identical. It wouldn't even be necessary for them to be genetically identical. So I understand the question. But it's not a very feasible thing for beekeepers to do. And it's possibly not even advantageous. You can already have two queen colonies, and I don't think them being genetically identical would be a benefit. Long, crazy answer. I know. But it's bee genetics, right?

Amy 24:54
That's wild. That is so funny. So basically, it is not impossible, but it's very unlikely, especially here in North America with the honey bees.

Jamie 26:37
Or Europe or Asia.

Amy 26:39
Or Europe or Asia.

Jamie 26:40
Or anywhere in Africa except the Cape region of South Africa.

Amy 26:43
Okay, there you go. Okay, so the second question that we have today. So this person has an opportunity to place hives on a property at no charge. Woohoo, no charge. Okay, there's a high-voltage power line 50 feet above and 40 feet to the east of that location. And this person is basically wanting to know if that high-voltage power line is going to have an effect on their honey bees or bee behavior.

Jamie 27:07
So here's the short, direct answer. I've seen no research that's been repeatable that has shown impacts of high-voltage power lines on bees. Now, this, Amy, it's just one of those topics that falls into incredibly controversial, right? It's like the whole 5G topic. It's a powerline topic. It's the contrails from airplanes topic kind of controversy. So I am not above believing that there could be an impact. I'm just saying that there's been no conclusive research to show it. And furthermore, I know lots of beekeepers who've kept bees in these situations with no problems. And I've even seen pictures of honey bees nesting in powerlines. I've even seen myself honey bee colonies nesting in the poles that hold up these power lines, and they're able to come and go from their nest and survive. So if the impact is there, it seems negligible enough that colonies are able to function and do just fine. Now, again, I want to stress the scientist in me would stop short of saying there's no impact ever, never. But I would say you are likely going to be absolutely okay keeping bees in this situation. Now, I've probably just alienated some of our listeners. And I'll probably get a lot of emails with refereed manuscripts showing me that I'm wrong. But I would say the consensus is it's not an issue. Now, of course, I don't work with electromagnetic radiation. I don't work in this field. But I'm just talking about the consensus literature that I've seen and anecdotal experience that I've had with other beekeepers who've kept bees in these situations.

Amy 28:50
So the third question we have, we're talking about fancy bees, we're talking about organic brown sugars. So can you safely feed bees organic brown sugar? I don't know why I said that, like, do fancy people have organic foods only? I'm not quite sure, but I'll say that anyway. Can you safely feed bees organic brown sugar syrup? What are your thoughts? So you had mentioned the molasses piece of it. Is it the molasses that's the ingredient that's in it that makes it so that it's not really that great for honey bees?

Jamie 29:11
So it's funny because I think the reason that they're kind of excited is that first word, organic, but the real word that they need to pay attention to in that phrase is the word brown. So brown sugar, opposed to just white granulated sugar, implies a different handling of that sugar. And brown sugar has molasses in it. It's composed of some molasses and generally speaking, the general recommendation about feeding brown sugar is to not do it because of this. Beekeepers have long said it causes dysentery and all kinds of other issues. I know that there's a debate about it in some beekeeper forums, but what I would just say is the consensus that the conventional wisdom -- conventional wisdom is, I guess, not something we should always rely on -- but conventional wisdom and consensus suggest that feeding brown sugar is not good for bees. So I always take the standpoint, when in doubt, don't do it.

And we know with certainty that white sugar, granulated sugar is okay for bees. So I would say that this is one of those things that you shouldn't do. Right? If you just Google feeding brown sugar to bees, you're going to see overwhelmingly people talk about how it shouldn't be done. But you will get a few people here and there who said it's okay. But I would say probably not. Yeah. The idea is that, ultimately, it's a struggle for them to digest some of this stuff. And by virtue of having that in it, it might carry some other things like ash and other stuff in it, some solids that are indigestible to them, which can cause problems later on downstream. And again, it's just one of those things that beekeepers always want to try and have tried, and they really feel like they get bad results out of it. But again, if you look it up online, you're going to see people advocating for it. But I really think, overwhelmingly, it's one of those things you shouldn't do. I think that's where the consensus is and where the most compelling support is at the moment.

Amy 31:22
I mean, even from like a beekeeping or beekeeper's standpoint, as far as spending money, it seems like organic brown sugar would also cost more than your typical white sugar. But I have no idea how much it costs these days.

Jamie 31:32
Yeah, it seems like it would cost more, right? Things that are organic tend to cost more. And we have the advantage that we're able to look at the longer version of this question. Usually, people don't just send us questions, they give us long stories behind it. And we look at it and someone's making the point that they're able to get this brown sugar for essentially nothing. And so that's their argument. It's like, "I've got this free sugar, free or low-cost sugar that I could use. It just happens to be organic brown sugar, should I use it?" And again, the overwhelming consensus is that brown sugar contains molasses. Molasses is not good for bees. I mean, I'm even looking at a quote right now, "At best they'll get dysentery, at worst they'll die." So there's just a strong feeling against feeding bees brown sugar. So in this case, even if it's free or low-cost, it's better not to do it.

Amy 32:20
Okay, so today's Q&A, we talked about cloning queen bees, we talked about putting bees on high-voltage power lines, we talked about feeding organic brown sugar syrup to bees. I love the honey bee world because it's like, in any given day, we just have all these amazing questions that come in. It just makes us think a little bit more about the crazy things that we deal with in the honey bee world. So keep your questions coming. Feel free to email us or send us a message on Facebook, Instagram, or Twitter.

Jamie 32:52
Thank you for listening to Two Bees in a Podcast. For more information and resources on today's episode, check out the Honey Bee Research Lab website at UFhoneybee.com. If you have questions you want answered on air, email them to us at honeybee@ifas.ufl.edu or message us on social media at UF honey bee lab on Instagram, Facebook and Twitter. This episode was hosted by Jamie Ellis and Amy Vu. This podcast is produced and edited by Amy Vu and Serra Sowers. Thanks for listening and see you next week.