

# Ellis and Roberts\_honeybees\_mixdown

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## SPEAKERS

Jamie Ellis, Lauren Roberts, Ricky Telg, Phillip Stokes

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### R Ricky Telg 00:04

This is Science by the Slice, a podcast from the University of Florida's Institute of Food and Agricultural Sciences Center for Public Issues Education. In this podcast, experts discuss the science of issues affecting our daily lives, reveal the motivations behind the decisions people make, and ultimately provide insight to solutions for our lives.

### P Phillip Stokes 00:45

Welcome to Science by the Slice. I'm Phillip Stokes, Education Coordinator with the PIE Center. This month our series is all about honeybees, and we have two episodes. One where we speak with two guests from a long-standing honey company in Florida – that's episode two of this series. And today's episode is all about honeybee research at the University of Florida. I talk with two researchers, at two different places in their careers, about how the work they do addresses some of the most pressing needs of beekeepers. We also talk about some of the basics of honeybees. For instance, did you know that there are about 20,000 species of bees in the world, but only nine of those species are honeybees. And here in the US, there's only one species of honeybee used for honey production and crop pollination. You'll hear more about this, the importance of honeybees, and so much more in this episode from Dr. Jamie Ellis and Lauren Roberts. Dr. Ellis is the director of the UF/IFAS Honey Bee Research and Extension Laboratory, as well as a professor and Extension specialist in the UF/IFAS Department of Entomology and Nematology. Lauren is the public engagement technician with the UF/IFAS Honey Bee Lab, and entomology and nematology student at the University of Florida. Now we'll join in on my conversation with Jamie and Lauren as they explain how they became interested in honeybees in the first place.

### J Jamie Ellis 02:29

The reason I study honeybees is I myself have been a beekeeper since I was 12 years old. It was something I got interested in when I was young and I moved up through middle school and high school doing a lot of projects, you know, science fair projects, 4-H, etc. with bees and then

I went on to the University of Georgia where I got a degree in biology, but worked in the honeybee laboratory there all four years of my undergrad. Went on to Rhodes University in South Africa to get a Ph.D. with honeybees, and then back to Georgia where I did a postdoc and now at UF where I'm the professor working with honeybees. And so it's kind of a long journey to get me here, but ultimately I mixed two things that I really enjoy, both, you know, honeybees/beekeeping and science. And now that's what I do for a living. I do research, Extension, and teaching all centered around honeybees here at UF.

L

Lauren Roberts 03:18

Similar to Dr. Ellis in the beginning of really how he got plugged into beekeeping, I was 16. I had to be old enough to be able to drive a vehicle legally to get bees. So I started beekeeping and a little bit before that, I was able to get in contact with Dr. Ellis and the honeybee lab at the time. And I was just so fascinated by what they were doing at the lab at that point and the really awesome research in pollination studies that were going on and I was immediately hooked. And ever since, I was really able to dive deeper and started doing research through the National FFA Organization throughout high school. And now I actually am able to work as a public engagement technician over on the Extension side, which I've really had a blast doing so far.

P

Phillip Stokes 03:30

Yeah, that's fantastic. So it sounds like both of you are, of course, now researching, of course Lauren at the undergraduate level, and then Dr. Ellis, you know, as a faculty member. But you both have that background in being beekeepers yourself from a younger age up to now. I think most people know that there are different products that you can receive from honeybees, but probably don't know a whole lot about them and probably myself included. So Dr. Ellis, if you could just kind of give us an overview of honeybees. So, here in the US, have they always been here? Where do you find them? You know, are they in the wild? Are they only managed by beekeepers? So maybe just kind of a brief introduction to honeybees, and we'll just go from there.

J

Jamie Ellis 04:56

I get really excited when I talk about bees so I'll probably tell you more information than you're asking. But, you know, honeybees are insects, and they're a type of bee. And there are actually 20,000 species of bees on the planet. In North America, right, where we live, there's 4500 species of bees. In Florida specifically there's around 320-ish species of bees. Now, of all those bee species on planet Earth, only nine of those are honeybees. And eight of those nine occur exclusively in Asia. So, you know, if you're in the US, the only honeybee you will have ever seen will be one species of honeybee that occurs naturally outside of Asia. Now, the interesting thing about this bee " this bee's scientific name is *apis mellifera*" " the interesting thing about this bee is that it's actually native to Europe, the Middle East, and Africa. So honeybees that we have North America, South America, Central America, Australia, many island nations around the world, etc. they all were moved there by early settlers. So the honeybees that we have here in the US, for example, came over to the US with early settlers in the 1620s. There are no native honeybee populations in the United States. And so beekeepers manage European-

derived strains of these honeybees that were brought with European settlers. Now, we do happen to have one African strain of honeybee here in the US and that's the bee that the press affectionately calls the "killer bee". But the bees that we have here — the honeybees specifically that beekeepers manage that we'll be talking about — were originally introduced into the United States, you know, hundreds of years ago. I'll just add one more thing, too, is that there are feral colonies of these honeybees — these honeybees that would have escaped management, and you know, occupied tree cavities or the walls of a house. I remember when I was growing up, my grandparents had a feral honeybee colony in their chimney, but we don't refer to them as wild honeybees because they're not native here, so they're a feral population of honeybees that have established in the environment, but they can all trace their roots back at some point to a managed colony at, you know, at some point in their history.

P

Phillip Stokes 07:12

Interesting. Okay. So there are a lot of honeybees here in the US, but pretty much all of them are managed, right? So, they play a big role for probably a lot of different reasons. So Lauren, if you could just tell us why are honeybees important? And why do people manage them? What is kind of their purpose?

L

Lauren Roberts 07:30

Right, so honeybees have affectionately been named the "angels of agriculture", right? They're a great generalist pollinator, and really the reason why they're kind of dubbed the "best pollinator" is not for its effectiveness for a specific flower, but because they are so generalized. And they're also very easy to manage, for the most part. So that is why, you know, commercial beekeepers will truck their honeybee colonies out to California to pollinate almonds, because almonds require honeybee pollination in order to have that really high crop yield. Also in Florida, watermelons wouldn't be possible if it wasn't without honeybee pollination specifically — they're 100% dependent. So we have all these staple food crops in our diets here in the US that we're so used to having, and if we didn't have the commercial beekeepers to get these colonies out there, we wouldn't have them on our dinner plates or in a lunchbox. So that's really the importance of honeybees specifically in the terms of what they provide to the agriculture industry.

P

Phillip Stokes 08:38

Were honeybees brought to the US originally for agricultural purposes. Was that why they were brought over?

J

Jamie Ellis 08:44

Yeah, so they were brought over probably principally for honey production. You know, that's why the original settlers would have thought of honeybees from that perspective. But then it became very clear, you know, thereafter that they are such important pollinators. And so a lot of people will ask the natural next question, which is, well, what pollinated crops before, you know, honeybees were here in North America, but —

P

Phillip Stokes 09:02

You can read my mind.

J

Jamie Ellis 09:03

Yeah, but you know, there were 4500 bee species here, and all of those contribute to the pollination of the cropping systems and the natural systems. One of the advantages that honeybees bring with them, is when we have large scale production agriculture. It's really difficult to match what honeybees can provide in regard to pollination services at that level that a lot of other bees can't. So prior to, kind of, production agriculture, you could argue that honeybees weren't really even necessary in North America, so all the other bees that were here were more than sufficient to provide those pollination services. But now, given the scale of agriculture, honeybees have become such an incredibly important pollinator, just like what Lauren had said.

P

Phillip Stokes 09:42

Yeah, so you've mentioned how important they are for agriculture. I mean, you both have talked about that. So what is kind of the current state of honeybees, you know, how are their populations? What's the, kind of, the health of populations and I'll let both of you answer that. So what is the current status of honeybees in the US? And then we'll kind of get into maybe some of the things that are threatening them as well.

L

Lauren Roberts 10:11

I'll kind of take Dr. Ellis', you know, lead on this, based on what I've always heard him tell others, is that, you know, when colony collapse disorder, the phenomenon in which our honeybees were dying, it was all in the media, it got a lot of people's attention. What was really figured out was, you know, there's specific factors that are playing into the decline. And so, at that point, honeybees, you know, it was being recorded that I believe 30 to 70% of colonies were dying. But then you also have to look at that, from the fact that we are able to split colonies. It's the process of, you know, honeybees swarm, that is how they reproduce at a colony level. And so we're able to, as a commercial beekeeper, just a beekeeper in general, we're able to manipulate that colony, put a new queen in, or, you know, raise our own, and you're able to double. So if you look at it from that perspective, I believe it was really only a decline of about 1% annually, but still, you know, honeybees are so needed in all those industries. And that decline caused, you know, the price of colonies to shoot up, and consequently, you know, could affect our food. So we definitely don't want that trend to continue.

J

Jamie Ellis 11:32

Yeah, Lauren's just spot on. I mean, the idea is pretty simple, right? You know, if I'm a beekeeper, I think the national average now is about 40% loss rates yearly. So if I'm a

beekeeper, I'm going to end up losing around, you know, 40% of my colonies a year, if I'm the average beekeeper, according to these surveys. So if I have 100, I'm going to lose 40. So now I've got 60. But Lauren is absolutely right, if you look at the gross trends, our gross losses are around 40%. But if you look at the actual net change, we're almost a flat line. And what happens is, is if I lose 40 of my 100, and then am left with 60, I do something to those 60 to recover my losses. And like Lauren said, I ended up splitting those colonies and making more. So right now, beekeepers are able to compensate for the loss rate. But it is, of course at great cost to them, both in money and time. You know, you could argue that if you're not having to, you know, regain 40 of 100 colonies every year, then you would be able to make beekeeping more economically sustainable. And so we've got this issue, you know, being preached out there, this idea that honeybee populations are dwindling? Well that's not exactly true. What's really happening is that we have high gross loss rates, but beekeepers are largely shielding us from the impacts associated with that because they're going to great lengths to try to recover their colonies, you know, probably at a significant cost to themselves and their businesses.

P

Phillip Stokes 12:57

Yeah, and Lauren, you mentioned colony collapse disorder, and probably a lot of people listening have at least heard of it, right? Like, I feel like the Discovery Channel or something probably made a special on it, you know, akin to like Shark Week or something, you know. So what are some of these factors that are impacting bees? You know, you mentioned mites. Dr. Ellis. So, Dr. Ellis if you just want to, yeah, what are some of the things that are impacting honeybees and causing some of the decline that beekeepers of course are having to manage and split and protect their hives from?

J

Jamie Ellis 13:30

All animals, you know, everything, right, all animals have things that make them sick or compromise their health and honeybees are very similar. Honeybees get bacterial diseases, viral diseases, fungal diseases. I've been alluding to this mite pest early on and you have as well. The name of this mite is actually Varroa "v-a r-r-o-a" quite a tricky sounding word, but all beekeepers know it. And this mite will feed on bees and transmit viruses to it. So the mite by itself is, you know, not a nice thing. The viruses by themselves are not nice things. But when you put the two together, honeybee populations just suffer. So you've got all these biological threats, you know, diseases, pests, etc. But you also get other stressors, for example, nutritional stressors. Honeybees can suffer nutritionally. When you poll beekeepers and ask them what their biggest issues are, they tend to say Varroa, nutrition, queen quality, they'll note that weather plays a role every year, you know, weather as a significant contributor to honeybee colony losses. And so there's just really a suite of stressors. A lot of the stressors that you would imagine could impact livestock, dogs, cats, etc. it's similar things that can impact bees. And so beekeepers are constantly trying to manage against these stressors so they can keep their colonies strong and healthy.

L

Lauren Roberts 14:49

Right and you know, just tagging on to everything Dr. Ellis just said, and to just put this in proportion, you could think of Varroa that's on an adult honeybee as the equivalent to a tick if it was the size of a volleyball attached to our side. So it's very big in proportion to that adult

honeybee. But the worst part is all the viruses that it's spreading that can cause deformed wing virus, which, you know, wouldn't allow the forager, if it even, you know, becomes that old, to be able to do the most important task, and that is to go out and forage for pollen and nectar and bring those items back to the colony. So, all of those things, but really Varroa is probably the one that we need, as beekeepers, that we need to be treating for and integrating, you know, proper pest management practices into our operations in order to defend our colonies against those.

P

Phillip Stokes 15:48

Yeah, I like that imagery. It's like, a volleyball attached to you, a tick the size of a volleyball. Yeah, that would be pretty horrible. So yeah, it'd be horrible for the bees as well. So yeah, let's move right along to some of the work that you both do, as a student and as a faculty member, in UF's Entomology and Nematology Department, and also the UF Honeybee Lab. So tell us just a little bit about how you study honeybees. What are some of those primary questions that you're trying to address? And some of the work that you do. So Dr. Ellis, I'll start with you.

J

Jamie Ellis 16:25

Yeah, so I'm going to even take a step before that and just kind of make a broad statement, right. The University of Florida is a land grant institution. So we have responsibilities in research, teaching, and Extension. And so within the program that I'm fortunate to be a part of in the Entomology and Nematology Department at UF, my team and I, we figure out ways to address honeybees and beekeeping from both, you know, from a research perspective, from a teaching perspective, and from an Extension perspective. So, you know, when people find out, I'm a faculty member, they always ask me what I teach. So of course, we teach courses on honeybees. We have multiple courses on honey bees. We train Master's and Ph.D. students with honeybees. So all of that kind of falls under our instructional activities. But we also do research which is what you're alluding to, right, where we try to figure out how to address the issues that bees are facing. So essentially, our research program is structured around addressing beekeeper needs, you know, what's killing bees and what's stressing bees and how can we help, as well as more of a broader and longer term focus on honeybee conservation health and beekeeping sustainability. So that's, you know, research, but we also do Extension, and this is what Lauren is a part of, and she'll be able to tell you a lot about that. But Extension is essentially getting information about honeybees and beekeeping to clientele. So right now we're doing Extension through your podcast, right. But we also do Extension by working directly with beekeepers, or Master Beekeeper Program that we have, or an annual Bee College that we have. And so, you know, we try to make sure that when we address beekeeping, sustainability, and the issues that honeybees face, we try to do it through all three missions of the University of Florida.

L

Lauren Roberts 18:05

Right, I like to say that I have really been impacted by the great programming that the Honey Bee Research and Extension Lab has been able to do, because I was in high school and I was impacted by Dr. Ellis and Ph.D. students helping me think through those research projects, and then through Extension by attending that Bee College that really helped me learn the

fundamentals of beekeeping. And now, the instruction side, I'm taking a couple honeybee courses right now. So I've really had the full experience of all three of those circles really coming just together for me.

P

Phillip Stokes 18:42

That's wonderful. I do have a few questions related to you know, if people are listening, and let's say there's someone who's listening who's considered maybe starting some hives or getting into beekeeping themselves. What do you recommend to do if you're starting out? Do you recommend to go for that and try to start some hives? Or, you know, is that something that's even worth their time? You know, what are some of the things they need to think about in that process?

L

Lauren Roberts 19:10

I would definitely recommend, if you're first getting into beekeeping, don't just get one colony, get two or three and that way you're able to compare the health of one another. That's my first recommendation. But really before I got involved, before I purchased my first colonies, I got a bee mentor. That's what I call it â€” a bee mentor. So find yourself a bee mentor and shadow them. And you know, there's a really great resource if you visit our website, you're able to find your local beekeeping association and so that's all based on counties here. And so most counties have a beekeeping club, or at least an Extension office that you're able to contact and find someone nearby. And that way you're able to really see what you're getting into. So really doing all of those in addition to, you know, if you have the time, attend Bee College. It's a two day event and you really have the option to make your courses as specific as you want to fit your track.


J

Jamie Ellis 20:09

Yeah, I completely agree, but I will say you know, beekeeping is not for everyone. People can be allergic to bees or maybe you live in an area where honeybees aren't permitted. But there are other ways to be involved without necessarily working specifically with bees. You know, homeowners, for example, can plant pollinator-friendly landscapes, or develop pollinator-friendly landscapes and plant pollinator-friendly flowers, and all these things are things that help not only honeybees, but a lot of native bee species that we have as well. Just being educated about bees and beekeeping and offering support to bee programs are really great ways to help out plant pollinators. But yeah, for those people who are interested, they can certainly check out our website, they can check out a lot of our resources, and if they're listening to this podcast outside of Florida, there's probably a lot of resources that are local to them as well to kind of help them out. But I really do like Lauren's advice and support and echo what she says about finding a mentor. It's a really great idea to find someone who keeps bees close to you, they will know the ins and outs. What bees do well there, what you can expect to produce, and really provide a good voice of support for you as you get into the beekeeping endeavor.

L

Lauren Roberts 21:18



And I also want to add as well, don't get discouraged your first couple years beekeeping. I'm sure Dr. Ellis and I both went through " when I lost my first colony, I'm like, oh my goodness, maybe just beekeeping isn't meant for me. So having that support group is really helpful when you do get discouraged if you really want to stick with the idea of having some hives in your backyard.

R

Ricky Telg 21:47

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