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SPEAKERS

Honey Bee, Guest, Guest 2, Cameron, Jamie, Stump The Chump, Amy

Jamie 00:05

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 back to Two Bees in a Podcast. We have a really exciting episode for you today. In the very first segment, we're going to be joined by David Westervelt who will be giving us a history of beekeeping in America, how bees got here, how long they've been here, etc. We're going to be introducing the second pest in the apiary with Dr. Bill Kern. He'll be talking about wasps and I will be giving you my top 10 recommendations for being a good beekeeper. So thank you for joining us for today's episode of Two Bees in a Podcast. Welcome to Two Bees in a Podcast. For this segment, I'm your host, Jamie Ellis, accompanied by co-host --

Amy 01:30

Cameron Jack.

Jamie 01:31

Cameron Jack.

Cameron 01:32

Glad to be back.

Jamie 01:33

The Cameron Jack. Glad to be back, I like that. See, Ellis rhymes with nothing.

Amy 01:37

Yeah. Well, Jack, it was a rough name growing up.

Jamie 01:40

Okay. I'll take your word for it. All right. So this is a good segment because we have with us, Mr. David Westervelt. Hey, David, how's it going?

Guest 01:49

Good morning, Jamie.

Jamie 01:51

So David, you have a lot of titles. Currently, you are the chairman of the Extension and Outreach Committee for the Florida State Beekeepers Association, you are the Vice President of Bees Beyond Borders, you're the Chair for the American Beekeeping Federation Research Committee, you're a second-generation Florida beekeeper, and perhaps, how I know you best is you're the former Assistant Chief of Plant and Apiary Inspection for the Florida Department of Agriculture and Consumer Services. So for many years, our jobs overlapped while you worked at FDACS leading apiary inspection program, and I worked here at UF. So it's great to have you on this podcast.

Guest 02:24

Thank you, Jamie. Just call me Dave.

Jamie 02:27

I have to. Well, David, we were thinking about what to talk to you about on this podcast and one of the issues -- so for those of you are out there in listener land, if you don't know Dave, Dave knows really, like, everything about beekeeping. So it's one of those things when you bring him in to interview, really, you could spin the wheel to decide what you're actually going to discuss with him. But Cameron and I, and Amy behind the scenes, we thought maybe we could talk with you, David, specifically about the history of beekeeping in the United States.

Guest 02:58

Well, I'll be happy to answer any questions you have.

Jamie 03:01

Oh, gosh. Bee puns. Well, as you know, we probably can't do the entire history of beekeeping in the US because we're trying to segmentize this thing and keep it short. But on the other hand, there are some points that I think we want to hit with you. So, we know that honey bees are not native to North America, at least the currently living species of honey bees aren't, right? So when were honey bees first brought into North America?

Guest 03:25

Well, the first records actually show that they came in around 1622 into Virginia, Jamestown, the first colonies there were brought in.

Jamie 03:34

The first colonies in the first colonies.

Guest 03:36

Correct.

Jamie 03:37

I think that's pretty good.

Amy 03:38

What about St. Augustine, Florida?

Guest 03:41

That's a good question, Cameron. We know that beeswax and honey was shown on their records dating back as far as 1565, when that colony was started. We have no records showing colonies of bees were brought into there.

Jamie 04:01

So again, for the listeners, St. Augustine is actually the oldest European city in the settlements, right? Because everybody gives that to Jamestown, or the one that's right before Jamestown, I forget. The Eastern Apiculture Society met in Virginia just close to Jamestown a couple years ago, and I was the speaker there and was able to go to Jamestown, the former settlement. And they did talk about importing bees in 1622, kind of where it all began. I think that's really neat. So how do you come over on ships with bees? Like what was that length of time and how did you bring, not you specifically, David. All these titles here, you've done everything else. So how did settlers bring these things over?

Guest 04:44

They would've actually transported the skeps, woven skeps that we see fairly often and it's actually the international symbol for beekeeping, and sailors would have brought them over. Hopefully, they had enough honey to come over, they'd had pigs and sheep and everything else with them.

Jamie 05:02

How did they contain the bees?

Guest 05:03

They would have plugged them down just the same as we would do transport.

Jamie 05:07

I guess skips are breathable because they're kind of that basket material. I never thought about that. I wonder what percentage of them died in shipment.

Guest 05:15

I do not know that. I'll have to ask somebody.

Jamie 05:19

You're coming over, there's bees in your boat. How long does that trip take?

Guest 05:24

Three to six weeks, the average was, and they would normally stop if they were going from like, let's say, Spain through and they would have stopped over in some of the northern parts in the Canada, Newfoundland area.

Jamie 05:37

I wonder if they offloaded bees at that point.

Guest 05:39

There is evidence that they did offload but they didn't survive very well.

Jamie 05:44

Yeah. So they brought them down to Jamestown in 1622. They landed on shore and then what?

Guest 05:51

They transported them out into there and allowed them to actually start pollinating and gathering honey. If you think about it, pollination was not the main reason they dropped them off. It would have been for the sugar supply.

Jamie 06:04

And I wonder if they even made the connection at that point, if I have a skep in my backyard, my garden is going to do better.

Guest 06:11

Being in England and European area, most of them don't worry about the pollination.

Jamie 06:17

Because the density of honey bees are probably high enough anyway. So in the 1620s, they get into Virginia, and then from there, how did they spread?

Guest 06:25

It's always said that they spread at the same rate that the white man traveled across, or Europeaners traveled across.

Jamie 06:32

You know what's funny? I hear that all the time that the Native Americans had never seen honey bees. I often heard that in the literature. I've never seen this, I don't want to spread a myth. But I'd heard in the literature that they referred to them as white man's flies because they had never seen them.

Guest 06:46

Correct.

Jamie 06:47

That's interesting. So how far and how fast did they move?

Guest 06:52

Actually, the records show that it took roughly 200 years to get over to the West Coast, which would have been about the same time as the Gold Rush.

Jamie 07:04

Do you think that was predominantly people moving them or do you think it was swarms?

Guest 07:10

I think a combination of the two. When you look at how fast they repopulate areas that had been annihilated by the Varroa mites, they seem to go about five to six miles a year.

Jamie 07:21

That's a good point. So were colonies kept exclusively in skeps?

Guest 07:25

Yes, at that time skeps and the log gums that we see every now and then. Actually, I have one that we use in the museum here.

Jamie 07:35

Yeah, sure.

Guest 07:37

The problem with either one of them or the long hives that they even had, transporting them made it a little bit hard.

Jamie 07:44

So for all of you out there listening to this podcast, a skep is one of those basket-shaped bee hives. If you think about a basket turned upside down, that's how bees were originally housed in a lot of places in Europe. The honey was destructively sampled. The beekeeper would have had to go in through the bottom of that skep, essentially cut through the brood to get to the honey above. So you mentioned log gums, could you define for us what a log gum is?

Guest 08:10

A log gum is nothing more than where the hollow inside of a tree, the bee person, if you want to call him, beekeeper, would have gone in and actually sawn the tree down or found a hollow log and then place some sticks across it to allow them to build on.

Jamie 08:30

I know the answer to this question, but I want to ask it anyway. Why did they call them gums and not just log hives?

Guest 08:35

There's two different stories behind that. In Europe, when they actually managed the log gums in the forest, they would gum back over the tree in order to hide it. When you think about it here, some of the people call a stump a gum.

Jamie 08:56

What I heard is that eucalyptus trees are referred to as gums, and if you go to Australia, that's how they refer to eucalyptus trees. So the bees were nesting a lot in eucalyptus trees, later introduced here, gum trees, so they were cutting out those sections of the eucalyptus trees and calling them gum hives. So I guess we'll never know.

Guest 09:17

A lot of difference in stories and where they come from.

Amy 09:22

Well, Dave, we've talked about moving as far west as California, I mean, when did beekeeping really become commercialized?

Guest 09:33

When you think about it, the New Yorkers actually started transporting bees, they would move them by ship or barge down the intercoastal into Florida. And that started in the 1880s. They actually brought them down into what is part of Daytona, not Daytona Beach, all of us know where the beach is, but the bees don't like to sit on the beach. So they went over in Daytona. There was a family there, the Wards, and they started commercial beekeeping there in 1883. You're saying the 1880s, that's 260 years after the introduction to the US. So those earlier 260 years they were using exclusively gums and skeps or had they migrated into using some early kind of box hives, movable frame hives? Once Langstroth patented the Langstroth hive, removable frames, that really helped mechanize or be able to transport bees.

Jamie 10:35

When was that? When was Langstroth doing his thing?

Guest 10:37

1864-1865.

Jamie 10:39

Okay, so somewhere in the 60s. He didn't create the movable frame hive, he discovered bee space and kind of made the movable frame hive what it is today. But at that point, that allowed, essentially, the commercialization of beekeeping.

Guest 10:54

You really think about it, actually, you can go further back into Egypt and stuff, they have found commercial beekeepers over there. They were in clay pots.

Jamie 11:03

Yeah, sure.

Guest 11:03

But the US really didn't have very many clay pots that they found. It's all been --

Jamie 11:10

The clay pot is essentially --

Guest 11:12

A skep.

Jamie 11:12

Yeah, it's essentially a skep or a gum hive. But people have been keeping bees that way for thousands of years. But still, those aren't movable frame hives so you can't inspect the hive, which is really what Langstroth and others who helped contribute to this idea of the movable frame hive, really, that's their contribution to beekeeping is the ability to go into a colony, take the frames out and inspect those frames for diseases and pests and other maladies that you can address.

Guest 11:36

And that was part of what our Florida Department of Agriculture started over 101 years ago was inspecting bees.

Jamie 11:43

Yeah, sure.

Guest 11:44

That's a big important part of the industry.

Amy 11:47

So this early commercial beekeeping in the United States, I mean, is it primarily honey production? Are they moving just for honey?

Guest 11:54

At the time, it was all honey production. It was brought in and they were actually producing citrus honey in Florida. During the time when they weren't moving honey back up to New York, they were actually transporting oranges and vegetables up. So it would take three to five days to get up from here to New York with a power barge.

Jamie 12:14

So again, I've tried to wrap my mind around this because in today's commercial beekeeping, it's such a pollinator-driven industry. When was there a shift in the commercial industry from focusing maybe exclusively on honey production to providing pollination services?

Guest 12:33

Here in the United States, most of your pollination you're going into almonds started in the 40s and 50s, when they first started planting almonds. But most of that was not commercial beekeepers moving out, it was provided by California. When they started doing vegetable pollination and row crops, that was in the 70s and 80s.

Jamie 12:55

Interesting. But starting in the 70s, beekeepers were making money, essentially renting their colonies to growers.

Guest 13:04

Your larger ones.

Jamie 13:05

Gosh, that's still sometime after 1880. It's hundreds of years after we had the bees. When did commercial queen breeding and packaged bee production, things like that become a thing?

Guest 13:18

We have records of showing queen breeding started in the US in the 1820s. There were queen breeders that sold queens. Some of the records show they sold queens for as high as \$20 at that time, which would have been --

Jamie 13:33

Whoa. Adjusted for inflation?

Guest 13:34

6 months. But they were only selling one or two queens at that time, compared to now, you go into the early 1900s, 1910 in that area, that's when your packaged and bulk bees are sold.

Amy 13:49

Yeah, I was gonna say, I mean, we're talking 1820s. I mean, this is 30-40 years before we even have Langstroth hives.

Jamie 13:59

How do you rear --

Guest 14:01

Rear queens.

Jamie 14:01

That's exactly what I was thinking. How do you rear queens in a hive that you can't remove combs?

Guest 14:07

Actually, there are people that do them in top bar hives and so if you've got to use that method -- we know there were other, they wouldn't be frames like we think of the Langstroth frames, they would have been virtually a stick across her, which they raised queens and they did other things, combed honey, a lot of other stuff.

Jamie 14:29

So if commercial queen production started in the 1820s, when did it begin to look like what it looks like today?

Guest 14:36

It's probably around the 1910-1920s when they started using mail to ship bees in packages. The package industry in South Georgia and into North Florida really got going in 1914-1920, right before World War One, and then really took off right after World War One.

Amy 14:58

What about breeding for specific genetics and traits? I mean, we're still talking 1820s?

Guest 15:04

Not that early. It started later into that when you went into Brother Adams. That's really where we started looking at genetics, took on even later than that, but we were looking for traits.

Amy 15:17

But traits.

Jamie 15:17

Hygienic behavior and all that stuff, Rothenbuhler and others were looking at that. When was that? Was that the 60s?

Guest 15:24

60s.

Jamie 15:27

Those are often the response to chalkbrood and American foulbrood, if I'm not mistaken, and these days, of course, it's all Varroa-centered. I still think it's pretty interesting, the evolution of of beekeeping over these years. I think back when you keep skeps and gums, yeah, cutting out those combs of honey, that's one thing, but did they make liquid honey there? Was honey principally sold as a combed commodity?.

Guest 15:51

There was actually both. When you're cutting combs and stuff, what most beekeepers did in Europe and in the US at that time, they would kill off half of their bees, and the ones they were killing, they'd use different means of smoking them out to kill them. And then they would actually cut the comb and discard the brood. It's a lot different than what we have anytime you're cutting comb or you've got some liquid honey left there. But a lot of it was combed.

Jamie 16:20

How did they get the liquid honey?

Guest 16:22

They normally extract, squeeze it through --

Jamie 16:25

Cheesecloth or something?

Guest 16:26

Cheesecloth, yeah.

Jamie 16:26

They didn't step on it?

Guest 16:27

Not like grapes. Made some mead out of it.

Jamie 16:31

That's good to know. So in the history of beekeeping in the United States, what are some of the wackiest inventions that you've seen that kind of helped address whatever the need in beekeeping was at the time?

Guest 16:44

I've seen some glass beehives, which those worked real good until the sun comes up.

Jamie 16:48

Those are great in the dark.

Guest 16:50

Solar wax melter. There have been some other ones. When you get a beekeeper that thinks he needs to find something, he becomes an inventor.

Jamie 17:01

Beekeepers are incredible inventors.

Guest 17:03

You get a lot of interesting ideas. Probably, the best one I've ever seen was Styrofoam cup queen breeders. They would use a Styrofoam cup. actually cut a small hole in the top and a slit in the top also, for a little piece of beeswax foundation, the queen cell would be put into there and a teacup worth of bees, and then put a piece of cardboard on the back. Three to five days and then open them up, allow them to go til the wind blows them all over the place.

Jamie 17:39

Then you come and see your entire day's work scattered around the yard.

Guest 17:42

200 baby nucs blown everywhere.

Jamie 17:44

Alright, I keep going back to 1622. What bees came over in those skeps?

Guest 17:49

Those, at that time, would have been your European honey bees. Most likely, we know we've got some of the ones coming in would have been the mellifera mellifera. We've got some idea, we showed the genetics that we did have Iberian.

Jamie 18:07

Okay, so essentially, there are the bee we keep, which is *Apis mellifera*, it's distributed in the Middle East, Europe and Africa. And so within Europe, there are different subspecies or races. So you're saying the race or subspecies it was brought over was *mellifera mellifera*. So the first *mellifera* is the species name, the second *mellifera* is a subspecies name. That bee is distributed really across northern Europe, perhaps into the British Isles, etc. So what are some characteristics of this bee?

Guest 18:36

It's a good pollen producer, it's a good propolis gatherer. It likes to get a little more defensive sometimes.

Jamie 18:44

Yeah, that's what people -- what color is it?

Guest 18:46

It's a darker color.

Jamie 18:47

If you read the old literature, it talks about the black bee that's defensive. Some people called it the German bee, but it's not distributed exclusively to Germany, it's across, really, Northern Europe.

Guest 18:56

We always used to leave it the first hive in our bee yard and the last hive, that way, if somebody messed with our bees, they didn't like to mess with them.

Jamie 19:04

Yeah, but my kids were saying, -- I shouldn't even say this on the podcast, but I just bought a lawn mower and my kids are like, "Keep it from getting stolen Dad, you need to put beehives close to it so people won't come." That's a good idea.

Guest 19:11

That would work.

Jamie 19:17

So you said iberiensis, right? That's the Iberian Peninsula bee in Europe, Spain, Portugal. Well, then, how did we end up not using those bees here a few hundred years later? What happened?

Guest 19:30

We saw them in parts of Florida. And the genetics, when we sent them off to get them, they came back as the Iberia, and they are not as easy to manage. They don't store as much honey, it seems like. But they finally just disappeared out of Florida.

Jamie 19:50

Well, let me ask a question that will maybe kind of bring this to conclusion. It's only sort of about the history of beekeeping, but we have this continent, North America, that does not have *Apis mellifera*, and in 1622, European settlers bring in *Apis mellifera*. Now, we don't know with certainty, but how do you think *Apis mellifera* changed the landscape?

Guest 20:14

Because you think about what they're pollinating. Apples and blueberries and all cranberries, those are native to the US, which do require pollination. So they help hybridize some of the fruits and vegetables and now that we've gotten to be growing all of our food, 99% of it is hybridized. So that's what they've done, except for the corn, wheat and rice.

Jamie 20:40

If it's not a grain, probably some bee has to make it possible.

Guest 20:43

Correct.

Jamie 20:46

Well, David, I really appreciate you spending your time with us today talking about the history of beekeeping in the US. So thank you for joining us. Will you join us in the future? Because you're such a

wealth of knowledge, I think we could probably open the book that is David Westervelt and talk about nearly anything.

Guest 21:00

I'll be happy.

Amy 21:02

Okay, we have a strict no bee pun policy that I'm starting to implement from this time forward.

Guest 21:07

All right, I'll be happy to --

Jamie 21:09

He'll be happy to oblige. Alright, so that was David Westervelt, who is currently the Chairman of the Extension and Outreach Committee for the Florida State Beekeepers Association, the Vice President of Bees Beyond Borders, the Chair for the American Beekeeping Federation Research Committee, a second-generation Florida beekeeper, and former Assistant Chief of Plant and Apiary Inspection for the Florida Department of Agriculture and Consumer Services. David, thank you for joining us on Two Bees in a Podcast to talk about history of beekeeping in the United States.

Guest 21:35

Well, thank you Jamie. And you forgot to add in there, I'm the only person who has attended every Bee College.

Jamie 21:40

UF Bee College, that's right. You're better than even me, David. Well, thanks for joining us.

Guest 21:46

Thank you.

Honey Bee 21:51

For more information about this podcast, check out our website at UFhoneybee.com.

Jamie 22:00

Here at Two Bees in a Podcast, we have started a discussion on apiary pests, things that bother bee colonies or beehives from the outside in. We are joined today by Dr. Bill Kern, Associate Professor of Entomology at the Entomology and Nematology Department based at the University of Florida Fort Lauderdale Research and Education Center. Hey Bill.

Guest 2 22:20

Hey, how's it going?

Jamie 22:20

Hey, Amy, you're here as well.

Amy 22:22

I am.

Jamie 22:22

Guys, today's topic from apiary pests as we continue this series of apiary pests, we're talking about yellow jackets, hornets and paper wasps. In other words, these wasps. Bill, could you give us an overview of what these critters are, what they do, what their life cycles are, etc.?

Guest 2 22:38

The yellow jackets and hornets are broadly categorized as hornets. They form large colonies, and they make a paper nest. So they chew up wood and they have comb for their brood. And then they have a paper shell around the nest.

Jamie 23:01

Their biologies are pretty amazing. I actually have an untreated wooden rocking chair on my back porch that wasps come and chew the legs for their paper nests. And so every year while we're sitting and rocking, they'll come and start chewing the wood and carry it off. We've got all these chew marks. So biologically, these are fascinating, making paper nests, large colonies, etc.

Guest 2 23:23

And then if you compare that to the paper wasp, paper wasps, generally, are going to have smaller nests and they have paper comb, but they don't have that paper shell around the outside. They tend to form smaller colonies, and that's one of the reasons why they are less of a problem. For beekeepers, they can be a problem because, if you have a paper wasp nest underneath your beehive and you go to work your bees, you might irritate those wasps.

Jamie 23:56

So let me see if I can make some broad statements about their nesting behavior, Bill, and get it right. So paper wasps tend to not encapsulate their nests. They tend to be like under the eaves and overhangs of houses. Naturally, I find them under big palm fronds, etc. in Florida, like big leaves and structures like that. The hornets, what I would call like the true hornet, they tend to be the things that nest from tree limbs, right? And they will build these paper structures that look like basketballs, as it were, with a hole in it, that's the entrance. Now, these are the things that in popular culture are often mistaken as honey bee nests. But honey bees do not build that structure around it as the hornets do. They tend to build a paper structure, go into it, and make their comb.

Amy 24:41

Those are so cool by the way.

Jamie 24:42

They're pretty fascinating. Now, yellow jackets, on the other hand, tend to nest in cavities in the ground, right? So they'll build these paper structures around them. But you don't see that because they're nesting physically in the ground.

Guest 2 24:55

You'll see if you dig up the nest.

Jamie 24:56

That's right. And so you've got, broadly, these three categories. Paper wasps that don't build the structure around their nest, they hang suspended from something, hornets that will build this spherical paper structure around their nest, often suspended from tree limbs, and then yellow jackets that go into ground cavities, still use paper, but you don't see it because they're physically in the ground.

Amy 25:14

Okay, wait. But my question for you is, what does this have to do with honey bees?

Jamie 25:18

A lot, of course.

Amy 25:19

Tell me.

Guest 2 25:20

It can have a lot to do with honey bees. One of the important things to realize, and this is true for paper wasps, hornets and yellow jackets, is they start out as a single queen every spring.

Jamie 25:34

Exactly.

Guest 2 25:34

So they have what's called an annual colony, and then the numbers of the colony build up. And in the case of yellow jackets, they actually will excavate and make their hole in the ground bigger, and they will enlarge their nest. So by August, September, they start to produce the reproductives.

Jamie 25:59

The queens and drones.

Guest 2 26:00

The queens and drones that will produce the next generation of wasps or hornets or yellow jackets. During that period of time, that late summer, early fall period is where we really start to see problems with yellow jackets and hornets because they're going to be desperate for protein to feed those new reproductives.

Amy 26:28

Now, are you talking about Florida, specifically, when you're talking about the seasons?

Guest 2 26:32

I'm talking about virtually any temperate part of the world. The tropics are a little bit different because we see different life cycles in the tropics. But in temperate regions, whether you're talking about North America, or even, including Mexico, Europe, Eurasia, or southern parts of Australia, the southern parts of probably South Africa as well, you have this annual production, and it's at the end of the season. That's when they really start getting desperate for protein.

Jamie 27:12

Think about it this way, Amy. So Bill is right. These colonies don't overwinter as colonies. They overwinter as a single individual queen. She comes out in early spring, like what Bill said, and she grows her nest initially. And then she starts just staying behind, laying eggs, and her offspring then continue. But these things are carnivores. They raise their larvae on meat. So as that colony grows, you have this ever expanding need for more and more and more and more meat. Early in the season, spring and early summer, there's a lot of insect meat available in the environment.

Amy 27:52

I didn't realize they were carnivores.

Jamie 27:53

Yeah. Caterpillars, grasshoppers, things like this. But if you think about it, at the end of summer towards the beginning of fall, the colonies are as strong as they are all year round, but their meat availability starts to decrease significantly. So they will transition from taking easy prey, caterpillars, grasshoppers, whatever they go after, to much more difficult prey, social beings, because it's just a resource. Think about it. Early in the year, there's so much meat available in the environment, they don't have to risk a fight to get it. But later in the year, they'll do whatever it takes to get food for that large colony, meaning even attacking a well-defended honey bee colony. That tends to be when we see these issues, when yellow jackets or hornets start to really invade and cause a problem in the apiary for the beekeeper.

Guest 2 28:43

And you can usually tell when that's happened because if you look at your hive, you're going to have, not only lots of dead bees with their heads cut off, but you're going to see a fair number of dead yellow jackets as well.

Amy 28:58

Okay, so you're saying that they actually rip their heads off?

Guest 2 29:01

Yeah. They'll go in and they just bite the heads off. And you'll see the front entrance of your hive just strewn with body parts. And then, occasionally, you'll see dead yellow jackets and that's how you know.

Amy 29:15

They've had a battle to the death.

Jamie 29:17

Yeah, well that's the case. So we're speaking, listeners just know this, we're speaking in generalities here, but in general, they'll decapitate or attack in some way to immobilize the bee. But if you think about it from inside of an adult bee, most of the quality protein is in the thorax, right? That's full of muscle because that's where the legs and the wings attach. But it's also in the abdomen because you've got all that juicy goodness in the abdomen. So a lot of them will decapitate bees to make it easier to take them back to their hive. But also, in Asia as an example, some of these Asian species of hornets decapitate bees to kill them, so they can then go into the hive and pluck out the brood, which they then take back to their nest. This is, generally, generally again, what yellow jackets, hornets and maybe, occasionally, the paper wasp will do. So let's think specifically about some of these groups, Bill, these yellow jackets. What makes them such a large threat to honey bee colonies?

Guest 2 30:12

Well, the biggest problem is that they can produce very large colonies, comparable, in size, to a honey bee colony. They are very aggressive. Most of the year, they're feeding primarily on caterpillars. But then, in the fall and late summer, they get so desperate for protein, they'll actually even go after carrion. And you'll see yellow jackets on dead animals on the side of the road.

Jamie 30:43

Yeah, we've lost entire research colonies and had to move apiaries here in Florida because we've had yellow jacket problems so bad. It's not an every year thing. Every five or six years for us here at the University of Florida, we'll just have an entire apiary attack. We'll lose colonies, they're at the nest entrance, they're fighting and killing bees, they're going right into the nest. I just didn't believe it until I saw it here as well.

Amy 31:08

So what do we do to control it? Is there a way to control these?

Guest 2 31:11

Probably, the simplest thing to do is to figure out where the colonies are, the yellow jacket colonies and treat them.

Jamie 31:17

Yeah, to kill them.

Guest 2 31:18

And I would normally use an insecticidal dust applied at night at the entrance. And then you let the bees or the yellow jackets actually track the poison into that underground nest. We discourage people from using materials like liquid insecticides because they just go down, run off the shell and never get to the

yellow jacket nest proper. Also, we strongly encourage people not to use gasoline and diesel fuel because just a small amount of gasoline or diesel fuel will actually contaminate an awful lot of groundwater. And I've never tried using yellow jacket traps around the outside perimeter of the bee yard. But that might be a possibility too.

Jamie 32:01

And incidentally, Bill, I don't usually even tell people to go deal with the nest themselves. Yellow jackets make me nervous when someone doesn't know what they're doing. So I often tell them just to contact a pest control operator come have that eradicated. Amy, there is no substitute for finding and destroying the nest. Another thing that you can do, Bill, is you can physically move the apiary. If the bees are getting attacked enough, you can't locate the nest, move your bees. We've had to do that here before. We've also tried to keep the apiary in place, but making it very difficult for the yellow jackets to access the nest, we would reduce the entrances significantly to maybe where only one bee could come and go, we would make sure there's no cracks or crevices around the rest of the hives, we would try to limit the reasons that the yellow jackets would want to be in the apiary. But we have not stopped for moving entire apiaries if it's been a big problem. Sure. So Bill, I want to get into a scarier topic. I want to talk about hornets specifically. In the US, we have our own species of hornets. There's the bald faced hornet, etc. that we have here in the southeast. I've seen it at colonies but not really decimate colonies. Our bigger problem is the yellow jacket. But there's a few hornet species that are moving around the world and causing significant issues for beekeepers. And so, as an example, I'm in Europe quite a bit and there is a new species of hornet from Asia that is now in Europe. It's called Vespa, that's the genus, velutina, that's the species. And this hornet came from Asia. It does all the same things hornets do when fall comes around, it tends to attack honey bee colonies. But in Asia, the Asian species of honey bees can handle it quite well. When it made it to Europe, the Apis mellifera really didn't have an answer for it. So this hornet will do everything we said, hang out at the nest entrance, decapitate bees, steal brood, etc. What do you know about this hornet? How big of a problem is it? Is it a risk of moving outside of Asia and Europe and even North America, as an example?

Guest 2 34:12

I haven't actually ever dealt with that one. I have dealt with Vespa crabro, which is the European hornets.

Jamie 34:19

It's a hornet native to Europe, but now it's outside of Europe.

Guest 2 34:22

And is now here. It actually came to North America in 1840.

Jamie 34:29

Oh, we've had it for a long time then.

Guest 2 34:31

It took 180 years or so to reach Florida from Pennsylvania. So it didn't spread very fast. I actually used to see it in Indiana in the 1980s. The one difference is instead of making that traditional paper-like nest that looks like a gray box basketball up in the tree, they actually build their paper comb inside a hollow tree.

Jamie 35:08

Yeah, sure. Well, that hornet I've never seen in our colonies in the US, even though we've had it, I've not seen it as a big problem. But I know in Washington state for example, either late 2019, early 2020, I can't remember, a second species of Asian hornet *Vespa mandarinia* has been found. And that is the Asian giant hornet, and it is similar to *Vespa valentina*, Asian hornet that's in Europe. And both of these pose a significant threat to the beekeeping industry in the US, in my opinion, if they were to spread to areas that they can really take off. It's gonna be the same thing that we see with yellow jackets, they're gonna show up at nest entrances, try to do the damage. In Europe, they are frantically scrambling to try to figure out how to control this thing. They start exactly the way you said, find and destroy the nest. And if you can't do that, try to create barriers at the colony entrance so that the hornets can't physically get to bees. But these things are clever. A lot of these hornets will just wait right outside the barrier for the honey bees and it seems like there's very little defense that the honey bees have. What's the natural defense that the Asian honey bees have against these hornet species?

Guest 2 36:16

Well, I know the famous one is where, for *Vespa japonica*, when they attack *Apis cerana* in Japan, the Asian honey bees will actually ball up, and they vibrate their wing muscles and generate heat, and literally will cook the hornet inside this ball of bees. And that's how they're able to defend themselves their colony from the Japanese giant hornet.

Amy 36:46

So I don't believe everything I see or hear online, but I have seen a video.

Jamie 36:52

You should.

Amy 36:52

Yeah, well, but I have seen a video of that happening, where they had a video looking at the infrared heat and it was just unbelievable what those honey bees could do to defend their colony.

Jamie 37:03

Yeah, well, behaviors like that are kind of largely absent in *Apis mellifera*, which is one of the issues that they have. And furthermore, these hornets, these Asian species and some other things we've talked about, their exoskeletons are just so tough. So honey bees have a difficult time stinging them to death. They're usually the smaller dog in the fight. So the hornet will usually be able to win that out every day. As we kind of wind down this discussion on hornets, yellow jackets, paper wasps, etc., you mentioned earlier for yellow jackets, finding the nest, you've mentioned baits. Are baits a good thing that you can do in general for the other hornets?

Guest 2 37:40

I've never seen any baits that are very effective. There are traps available. So there are yellow jacket traps that you hang up, and it has a protein-based bait matrix that lures them in, they go into the plastic bag of the trap and are trapped there. In terms of killing the colony, for some of these yellow jackets, remember that yellow jackets can sting through a bee suit.

Jamie 38:14

Hornets too.

Amy 38:15

Multiple times.

Guest 2 38:15

Oh, yes. And so the idea is if you're going to wear a bee suit, and you're gonna go after a yellow jacket colony, put on lots of layers underneath your bee suit. Because it's space, the stinger of a yellow jacket is actually almost twice as long as the stinger of a honey bee.

Amy 38:36

I'd rather just pay for pest control operator to come and take care of that.

Jamie 38:38

I think, in many cases, that's the best option. So a couple of pointers as we kind of wind down. If you can find, locate and destroy the nest, either you do it or a pest control operator, and we prefer the latter for safety reasons, secondly, reduce access to your colony by reducing entrances, removing reasons in the apiary that the things might want to be there. For example, I see yellow jackets hovering around feeders, sugar water feeders quite a bit. Number three, if you really are having a problem, you need to consider barriers. There are these traps that you can put up, these barriers. And fourth, and finally, if there's a really big issue, you might have to move your bees away from that because they can really be destroyed, the entire colony can be destroyed in a very short period of time.

Amy 39:18

Can we say that if the colonies are strong and we're keeping them healthy, that they have a better chance of fighting them off?

Jamie 39:24

I would say, Amy, they have a better chance, but it's certainly not guaranteed. My colleagues in Europe regularly talk about how strong colonies, strong apiaries are taken out by some of these things. Yeah, it's pretty incredible, pretty incredible biology. These insects by themselves are fascinating, but they certainly can become a significant pest when they turn their attention to bees.

Guest 2 39:45

And remember that yellow jackets, hornets, even paper wasps, they're also Hymenoptera just like our honey bees. So anything you do that can kill a yellow jacket or a hornet could potentially be killing your bees. So you always follow label directions on pesticides if you choose to use pesticides.

Jamie 40:08

Ladies and gentlemen, that was Dr. Bill Kern, Associate Professor in Entomology from the Entomology and Nematology Department at the University of Florida Fort Lauderdale Research and Education Center. He was joining me and Amy today as we talk about the apiary pests yellow jackets, hornets and paper wasps. Thank you for joining us for this segment of Two Bees in a Podcast.

Honey Bee 40:30

Have questions or comments? Don't forget to like and follow us on Facebook, Instagram, and Twitter @UFhoneybeelab.

Amy 40:41

So we get a lot of questions on a daily basis just from beekeepers calling in or messaging us on social media and emailing us about questions that they have as far as beekeeping goes. There's so much information out there. Jamie, do you agree? There's just a lot of information.

Jamie 40:57

We're gonna do a future podcast, probably, on resources for beekeepers, right? Because you've got to be able to separate fact from fiction, know what's vetted, etc. So you're right, there's a lot of stuff out there. So how do you know it's true?

Amy 41:06

Exactly. So I mean, what are your recommendations? If someone were to come up to you and say, "Hey, what do I need to focus on?" What would be your recommendations for beekeepers?

Jamie 41:16

Yeah, if you read the books, or the periodicals or magazines, etc, or the blogs, you're going to kind of be overwhelmed with beekeeper information. Some years ago, I wrote a column, a series for the American Bee Journal called "Field Guide to Beekeeping." And in one of those articles, I wrote, I listed kind of a top 10 priority list. They're not prioritized within the top 10. They're just my top 10. Number one is not necessarily the most important thing, it's just the first thing that popped into my head, but I did. I created a list of 10 things that I think really every beekeeper needs to focus on, or know or do. And that's funny, because I now write a column for the American Bee Journal that's the Q&A session and someone asked me, "Jamie, what are your top 10 things?" So it allowed me to bring back out that list for my old article series, dust it off and answer.

Amy 42:03

Isn't that nice when you get to reuse some of the information you have?

Jamie 42:05

Recycling is always good. Recycle, Reduce, Reuse, right?

Amy 42:09

All right. So tell me what, in no particular order, what would you say, 10 things that beekeepers need to take into consideration or should be a priority for them getting into beekeeping?

Jamie 42:18

The first thing I put on my list is making Varroa control a priority. In my opinion, a lot of Beekeepers just don't give this enough attention.

Amy 42:28

And that's all we talk about. It's Varroa.

Jamie 42:29

Absolutely. We teach about it, we think about it, etc. But Amy, the way that I explained this is when I first started teaching people to keep bees, all we had to do was tell them to put Apistan in their colonies twice a year, spring and fall, you're done with Varroa, that's fine. Then everybody got really nervous about the impacts of acaricides or Varroacide on colonies. And so for about a 15 year period, everybody was looking for the softer things, powdered sugar, all stuff that we --

Amy 42:54

Picking them off one by one.

Jamie 42:56

All of the stuff that we've eventually shown doesn't really work. So now we're back to -- I feel like we've created a generation of beekeepers who don't take Varroa seriously. So, one of the things I would tell beekeepers is make Varroa control a priority. You've got to kill the mites, otherwise they're going to impact your bees.

Amy 43:14

So you wanna hear something really funny real quick?

Jamie 43:15

I cannot wait. You can't laugh before you say it.

Amy 43:18

I was eating. I know I know, I'm just thinking about it. I was eating a chia breakfast bowl the other day.

Jamie 43:24

I don't even know what that is.

Amy 43:25

You don't know what chia is?

Jamie 43:26

Chia is a little shape of a thing that you spread plant seeds on and it grows.

Amy 43:31

It's a seed. It's a type of seed. Have you heard of a chia pet?

Jamie 43:34

Yes.

Amy 43:34

Okay.

Jamie 43:35

You can eat those things?

Amy 43:36

The seeds, yeah.

Jamie 43:37

You can eat a chia pet?

Amy 43:38

Gosh, yeah, no. Well, I mean, sure. Not the actual structure of what the chia is growing in.

Jamie 43:44

Continue your story. Chia bowl.

Amy 43:46

A little chia seed fell out on the table and I thought it was a Varroa mite on the table, because that's all I think about is Varroa, Varroa, Varroa.

Jamie 43:54

Do you want to hear the second thing that you need to think about?

Amy 43:58

Yeah, and the third, fourth, fifth, tenth.

Jamie 44:01

Number two, again, not necessarily the second highest priority, but just the second thing on my list is experiment with resistant queen stock. It's kind of hand-in-hand with Varroa, but I think people should purchase and use queens that have been bred for tolerance to Varroa or some other characteristics. Most of us will just purchase a queen from any equipment or any queen producer we can find. But in

reality, we should we should invest in giving tolerant queens a chance. We should purchase tolerant queen stock, Minnesota hygienics, Russians, VSH queens from Baton Rouge, things like that, we should give them a chance.

Amy 44:38

Awesome. What about your third?

Jamie 44:40

Third, you need to practice effective swarm control. A lot of natural beekeepers are going to be upset with me about that statement. But frankly, bees swarm when you least need them to. The colonies try to swarm at the beginning of the major nectar flow. So when your colonies swarm, you're going to lose honey production. So if you're interested in producing honey, you've got to control swarming.

Amy 44:59

it's funny because people are always really surprised when all of a sudden a swarm happens, but we should really be prepared for that, right?

Jamie 45:05

I don't mean this negatively, but when your colony swarms, you lose. I just made a lot of people unhappy with that statement. But when your colony swarms, you lose honey. So practice effective swarm control. Number four, focus on bee nutrition. And when I think about bee nutrition, so many people think that it just kind of stops with the addition of sugar water. If your bees are, quote, hungry, you feed them sugar water. But really, nutrition is really all encompassing. Are they getting enough pollen? Are they getting a diversity of pollen? Are they getting high-quality pollen in addition to their carbohydrate needs? So focus on bee nutrition. The fifth thing is kind of like the third. You want to make sure that your colony is headed by a good-quality queen. So I just said invest in good queen stock, a tolerant stock, VSH, Minnesota hygienic, what have you, but you don't want to just invest in having a queen, you want to make sure that she's a good queen. So many beekeepers are satisfied with just having a queen in their colony that they don't insist that she is a good-quality queen producing a lot of brood, productive colony. So I always tell people, if your colonies aren't headed by good-quality queens, the welfare of your colony is suffering.

Amy 46:17

Sure. All right, you're over halfway, so that's fine. All right.

Jamie 46:20

Number six, conduct an honest assessment of the quality of forage resources in the area where your bees are located. A lot of people say that I've got bad bees or good bees and they don't know that it has nothing to do with their bees at all. It's because they could be in a high-quality forage area or a low-quality forage area. So you need to recognize when your bees are in an area they can succeed. What's the pollen availability, the nectar availability, is it available throughout the year, when do your bees have lots of incoming pollen or not so much incoming pollen? So I just said a few points ago, focus on

nutrition. Well, this is the outside the colony focus on nutrition, and do you have quality forage in the area?

Amy 47:07

All right, number seven.

Jamie 47:08

Number seven. Control the pests and pathogens that are manageable. We sometimes freak out about the things that are a struggle to control, small hive beetle as an example, or some of the viruses. But you know what? Chalkbrood is controllable. American foulbrood and European foulbrood, they're controllable. Varroa, if you work hard enough, is controllable. So if we focus on the diseases and pests that are manageable, some of those ones that keep us up at night will be less of a problem.

Amy 47:39

Does it keep you up at night?

Jamie 47:40

Lots of things keep me up at night.

Amy 47:42

You just can't sleep because of Varroa mites.

Jamie 47:44

Dying bees are on my mind all the time. The moment they're not on my mind, some beekeeper emails or calls and puts them right back on my mind.

Amy 47:51

Sure. Sure. All right. We're going towards the homestretch.

Jamie 47:54

That's right. Number eight, spend time researching the latest information related to beekeeping. And incidentally, number nine is kind of like it, join and actively participate in the local, regional, and state beekeepers association. So let's back up to number eight. Beekeepers should not be ignorant beekeepers. I don't mean ignorant in the negative sense. I mean, ignorant that you're just not aware of the newest things, the newest diseases, the newest pests, the newest trends in nutrition research, the newest information related to the new pests that have been found on our shores, or quality queens or new management strategies or hive topics. We can't just grab our bees and go and run and hive. Haha, hive. Hide. Freudian slip. We need to be aware of the newest trends. That's number eight. So we should be constantly reading, constantly research, constantly aware, which then lends itself to that. Number nine, we should join and actively participate in local, regional, and state or even national beekeeping associations. One of the best ways to stay up to date on bees, bee science, beekeeping in general is to surround yourself with other beekeepers, both, not just both, but on the local scale, on the

regional scale, on the state scale, and to a larger extent, if you're able, on the national or international scale. So surround yourself with beekeepers, that's a great way to stay up to date on that issue.

Amy 49:16

And that's really part of our job, too, is sharing that and being able to communicate that information as stuff starts coming out, and recycling some of that information too, just as a reminder for people.

Jamie 49:26

Absolutely.

Amy 49:27

Okay, number 10.

Jamie 49:28

Number 10. Don't forget the small things that matter. So this is kind of a catch all category right? For example, have you rotated your combs out of your hives in the past 10 years? Do your bees have an adequate water source nearby their hive? Do you believe your bees are being exposed to pesticides? Do you live in an area where bears are present? In other words, these things that many of us consider kind of minor, are they things that can creep in and cause a problem for your bees and beekeeping? So let me go over that list again and just promise our listeners that we're going to have podcasts episodes on each of these, but just to say them again, make Varroa control a priority, experiment with resistant queen stocks, practice effective swarm control, focus on bee nutrition, ensure that your colony is headed by a good-quality queen, conduct an honest assessment of the quality of forage resources in the area where your bees are located, control the pests and pathogens that are actually manageable, spend time researching the latest information related to beekeeping, join and actively participate in local, regional, and state or national beekeeper associations, and finally, don't forget the small things that matter. What do you think about that, Amy?

Amy 50:42

I think that's great. What I really liked is that they go in line with the BIP, the Bee Informed Partnership.

Jamie 50:48

Absolutely.

Amy 50:49

The top stressors of honey bees, that we acknowledge that.

Jamie 50:53

That's right. If you do these things, I think you'll have a good chance of being a successful beekeeper who is fortunate to keep healthy colonies.

Amy 51:00

Absolutely. Thanks so much.

Stump The Chump 51:11

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

Amy 51:26

It is that question and answer time. Jamie, I've got some questions for you from the audience.

Jamie 51:30

I will do my best to have some answer for you from my brain.

Amy 51:33

Awesome. And it's kind of funny because I've been getting from your brain.

Jamie 51:35

Well, you said you have questions from the audience. Where do I get answers?

Amy 51:39

Your brain?

Jamie 51:39

Of course. You'll figure me out someday, Amy.

Amy 51:43

Maybe. My first question is from JK, who's actually an extension agent in Orange County.

Jamie 51:49

Is that just kidding?

Amy 51:49

JK, JK.

Jamie 51:51

Oh, yeah. I'm with you.

Amy 51:53

I don't know what that stands for, we'll have to figure out what. His question is, can you smoke bees too much?

Jamie 51:59

JK, thanks for the question. So in theory, you can smoke bees too much. And so what I like to do is I have my smoker going and sitting beside me on the ground. And when I am working my colony and my bees increase their agitation, which is evidenced by them popping me on my veil or flying and chasing my hand, then I'll smoke them lightly until that's subdued. The moment that happens to me again, I'll

resmoke. Now, in a very defensive colony, that might be every 30 seconds, but I don't sit there and puff and puff and puff and puff and puff. I mean, again, in theory, you can smoke them too much, and if that happens, they'll abscond. But I have never caused a problem by oversmoking colonies.

Amy 52:40

What about with honey harvesting?

Jamie 52:42

So it can be an issue with honey harvesting, because if you oversmoke them, then the honey can take on the taste of that smoke. The same is true for wax. So really, what beekeepers need to learn is they need to learn how to smoke before they go into the colony. They'll lightly smoke the nest entrance, they'll smoke under the lid, they'll smoke as they remove supers. But that's it. Then they need to learn how to smoke in response to the bees. What are the bees showing them that would require them to puff? And when they do puff, it's just light puffs over the top. With regard to the honey super specifically, if you are doing what I just said to keep the bees' defenses down, then you won't be causing a problem for your honey supers. I have worked super hot colonies, colonies that are very defensive, and those I've almost had to smoke the entire time I was working. But the colony reset afterwards and it wasn't a problem.

Amy 53:31

I did that last week and I got stung in the face.

Jamie 53:33

Well, clearly you weren't smoking them well enough. Or wearing your veil, Amy. You know that's a policy.

Amy 53:39

I was, I was, I got through. Okay, so we have two questions from Russ, who I will admit was one of my previous master gardener in Orange County.

Jamie 53:49

Hello, Russ.

Amy 53:50

He went to a class with JK and then he asked me questions on the side. So I'm gonna ask two of the questions that he has. The first one is, how does the hive keep a balance between drones and workers?

Jamie 54:00

So that is completely driven by workers. So the queen will be laying eggs, fertilized or unfertilized, making females or males, and when it's drone production season, which usually comes in late winter, early spring, the workers will carry those unfertilized drone eggs through to adult maturity. When it's not good to have drones around, in other words, when reproduction season is over, they will abort those

eggs if the queen lays them. So the workers are the ones who decide if they're going to allow drones, or even for that matter, workers, to develop and they do that by removing eggs or prohibiting queens from laying.

Amy 54:39

That's pretty awesome. So can the queen lay different kinds of eggs? That's the third question I have.

Jamie 54:43

This, obviously, is a very natural good extension from the previous question. The queen can, in fact, lay different types of eggs. A lot of people think that they can lay queen eggs and worker eggs and drone eggs, they can't. What they can lay are female eggs and male eggs. So a female egg is one that they allow to be fertilized and a male egg is one that is unfertilized. So male eggs, these unfertilized eggs, become drones. The female eggs become either queens or workers. That is not at the discretion of the queen. That decision is made by the worker. So the workers will take a female larva and either feed it a lot of high quality food to make a queen, or less low quality food, which makes it a worker. So queens can control the sex, workers can control the number of individuals produced and the type of individual produced.

Amy 55:32

That's pretty amazing. We always talk about how the queen is really not the one making all the decisions in the hive, right?

Jamie 55:37

Yeah, her decisions are pretty simple. Should I lay an egg or not? Should it be fertilized or not? And that's pretty as complicated as the queen's life gets.

Amy 55:45

Sure. Awesome. Thank you so much. Well, that's our Q&A for today.

Jamie 55:49

Keep those questions rolling. We love to hear from you on our social media accounts or via email or any way that you want to reach us. We'll look at your questions and do our best to answer them here on Two Bees in a Podcast.

Amy 56:05

We'd like to give an extra special thank you to the following: to our editors, Shelby Hal and Bailey Carol, and to our audio engineer James Weaver. Without their hard work, Two Bees in a Podcast would not be possible. So thank you.

Jamie 56:20

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



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