



EPISODE 232 TRANSCRIPT

Jamie

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

Welcome to this episode of Two Bees in a Podcast. Today, we are joined by Cameron Jack to talk about oxalic acid. Jamie, are you ready to interview Cameron about this topic?

Becky Masterman

Why, I sure am. This is going to be a great topic about oxalic acid in the beehive and what it can do for your bees.

Jamie

Whoa, whoa.

Amy

Hello? Hello?

Jamie

Who are you guys?

Amy

Who is this?

Jamie

Is this Becky Masterman and Jeff Ott from Beekeeping Today podcast?

Amy

What podcast are we on?

Becky Masterman

An Equal Opportunity Institution.



Oh boy.

Jeff Ott

Thought you were out of town.

Becky Masterman

Jeff, they caught us. We had the link. I thought we were going to be good to go.

Jamie

Busted.

Jeff Ott

Oh, my goodness, we better high tail it out of here.

Amy

Happy April Fools, everybody. From your favorite podcast hosts, Becky, Jeff, Amy, and Jamie. Now, back to the original schedule. Yeah, what are we talking about today?

Jamie

I don't even know anymore.

Amy

Happy April Fools.

Jamie

Hello everyone, and welcome to another episode of Two Bees in a Podcast. Today, we are joined by Jack Silberrad, who's a Regional Bee Inspector in the western region of the National Bee Unit, Animal and Plant Health Agency in the UK. Jack, thank you so much for joining us on Two Bees in a Podcast.

Jack Silberrad

Thank you for having me.

Jamie

Yeah, it's really exciting. I think we've got a great list of questions for you. I can't wait to explore everything you do as a regional bee inspector in the UK. But this is your first time with us on the podcast, so our listeners want to know how in the world you ended up with honey bees. Start from the beginning and get us to where you are today.

An Equal Opportunity Institution.



Jack Silberrad

So, that's a great question. And you know, as beekeepers, people often want to know, you know, how did you come to be working with a stinging insect? It's not the most natural thing that people lend themselves to.

So, for myself, I grew up with the stories of my grandfather through my father, who, during his time in the summer holidays when he wasn't boarding here in England, he would be living out with my grandfather, Roger Silberrad.

He himself was educated at Cambridge Emmanuel College University in tropical agriculture and he then went out to work in what we would now call the developing world for the British Development Agency. And so, through the British Development Agency, he would end up in places as far-flung as what is now Singapore and the sort of Thai peninsula, but also in German East Africa of the time.

I would eventually finish up working up in West Africa, in Nigeria and Central Africa and Zambia. So, it was the stories of my grandfather's role in beekeeping really, that I grew up with as a child, from collecting swarms from presidential palaces to shooting Guinea fowl.

And I always thought this sounded fantastic, fun, sounded really adventurous, very outdoorsy. And so, through my childhood, I was of course very outdoorsy and very geared towards nature. Fell into more than just a few wasps' nests. But my grandfather died when I was just about four years old.

So, most of those stories came to me second hand through my father's lived experience. I went through life, got educated at university in microbiology at Leeds University. And it was about that time that facing, you know, sort of a future where I'd be moving around a little bit less, could perhaps settle down in a particular area of the country.

I then turned my mind to what I might like to do in my spare time. So, as is the case for a lot of beekeepers, they decide that, you know, they'd like to take this thing up as a hobby. And so, I did, living at that time in Cambridge after university, and I was helping some friends with around 30 odd colonies.

At that time, I was working a job which I was very highly qualified for, if I do say so myself, in [inaudible] continents, working for a biotech company, speaking to nurses in our National Health Service and trying to improve patient outcomes. But it wasn't work that I relished, not because of the nature of the work, shall we say, dealing with patients with neurological conditions and the nature of biology, but just the car to client, client to car element of life.

I'm not really somebody who's suited to shirts and ties and suits. I'd much prefer to get out into nature, boots, mud and that sort of thing. So, it was at a family funeral where the obituary for the

An Equal Opportunity Institution.



past family member was being read and it was, you know, literally their life's work and their achievements.

And it sounds morbid to say, but at that time I thought, well, if I expired tomorrow, what would they be reading in my obituary? And it would be my life today and this work that I've just described. But that wouldn't necessarily be a reflection of me, Jack the person. So, I decided, you know, at that time, I didn't have a mortgage.

I didn't have dependents. I now have a mortgage. I still don't have dependents, unless you count two cats and a girlfriend. But I decided I was going to make a step change. I wanted to change what I was doing. I wanted to do work that used my mind, used my body, used my microbiology if I could.

But cheese, disease, and beer was all I've known up to that point. And I had this real hankering for work that I could live with. So, cheese, disease, and beer became cheese, bees, and disease and I moved into a bee farming apprenticeship which was being run by the Worshipful Guild of Wax Chandlers based down in London through the Bee Farmers Association, sponsored by Rouse Honey.

And I was hosted by the London Honey Company under a gentleman called Steve Benbow. And this is where the cyclical nature of beekeeping and the very sort of close-knit community of beekeepers in the UK comes together because Steve Benbow, who is the founder of the London Honey Company, he himself as a bee farmer founded his company in 1999.

Prior to that he was apprenticed to a gentleman called David Wainwright who runs Tropical Forest Products, a very successful bee farmer in his own right. He had visited and spoken to my grandfather Roger about beekeeping in Zambia sometime before my time.

And so, although up until recently I hadn't met David Wainwright, I've known about him for some time. Of course, he worked with Steve Benbow, didn't know my grandfather directly particularly well, but through this beekeeping journey came to know quite a bit more about him.

There are still beekeepers around in the UK now that, my grandfather died in 98 and his name does occasionally float up and people remember it. So, that's all quite nice and romantic. So, having finished my apprenticeship through Steve Benbow and the London Honey Company, I've since started keeping my own bees, running my own small business since 2019, late 2019-2020, and began working for the National Bee Unit, as you've mentioned already.

And so now I find myself in my having completed five years, going into my sixth year of working for the National Bee Unit with all sorts of additional responsibilities and projects and bee health from Northern Ireland to Ghana, working across England, doing a whole lot of talks in education besides absolutely fully invested in bees.

An Equal Opportunity Institution.



And I can't really imagine my life without going out into the field to work hives or speak to beekeepers. It seems as natural to me now as perhaps to somebody based in an office or working in a factory or whatever they might be doing. My commute to work to the apiary, to the hives is my bread and butter and I love it. And I certainly couldn't see myself going back to [inaudible] continents, not in a heartbeat.

Amy

That's so funny. I have so many comments but maybe I'll just say them off air later. Some of the things that you said. No, I'm kidding. I was wondering, do you think your grandpa, when he was talking to people, said cheese, bees, and disease, that he worked with that too?

Jack Silberrad

So, my grandfather was, well, I'm told he was quite a cantankerous fellow, so whether he would say something as jocular as that, I'm not sure. But I did find a letter that my grandmother wrote me, probably about a decade ago. So, this is before I started keeping bees.

My grandmother has since passed away as well. But in the letter, she says something along the lines of, you know, wouldn't it be funny if you ended up doing bees just like your grandfather? So, I have that letter now and I've just rediscovered it in the last few months. And I'll probably get that framed and propped up on the wall. I guess I'm overly sentimental about my role in bees and the sort of familial heritage.

But I think you speak to a lot of bee farmers. I think they have their own similar whimsies, if you like, even if they don't necessarily admit to it.

Amy

Absolutely. We can definitely hear the passion in your voice and love that story. All right, so I'm going to move over. You'd mentioned the National Bee Unit, and so I'm wondering if you could tell our audience what the National Bee Unit is, and is it a regional inspection system? What do the regional inspectors do?

Jack Silberrad

Sure. So, the National Bee Unit, that itself, I'll just give you a very brief rundown of its recent history. It was founded in the 1940s. There was this thing going on. You might have heard of it, the Second World War. And Britain is an island nation, was a bit short on food. So, food security was a huge concern.

And of course, one of the main contributors to food security are pollination services provided by honey bees. So, the National Bee Unit was founded in the 1940s as experts in foulbrood, experts in the diseases of bees. The idea being that, at that time, because so many beekeepers, I think it

An Equal Opportunity Institution.



was something like maybe one in four or one in five, had experienced either American or European foulbrood.

They wanted to essentially provide a service that beekeepers could tap into to better the health of their bees and enhance food security. So, fast forward, then, we have the Bees Act 1980 that comes in, which gives us our powers of entry, our powers of seizing and destroying material.

So, this is kind of the legal basis for, you know, if we have to wag the finger. And I stress, that's absolutely not what we do, but that's the legal basis for the work that we do. And it ties in quite closely with the way that we manage other animal diseases in the UK. So bird flu, foot & mouth disease, blue tongue virus, these are all really serious animal diseases that certainly hit the headlines when they, you know, become more abundant and break out.

And actually, as a notifiable disease, that term notifiable meaning that you're legally obligated to tell somebody if you think you see one of these diseases, the foulbroods that I've mentioned in bees, they fall into that same category. So, although it's not quite as dramatic and doesn't grab the headlines, you know, and operates on a different kind of scale, it still falls into that same category.

So, the bee unit itself, then, has gone through several sorts of iterations about how we work, and how we do our inspections. But the base sort of reason for our being is to provide a source of information, of advice, to be experts in our craft, which is beekeeping, the health of honey bees.

And we operate across England and Wales. So that's APHA. You have to remember, for those international listeners, that the United Kingdom is made up of nations, four nations. So, we have, of course, England and Wales, that's the remit of APHA, Animal Plant Health Agency, in which we find the National Bee Unit.

Then Scotland has its own devolved equivalent and they have their own inspectors that we work closely with. And then Northern Ireland has its own equivalent. I work closely with them. So, when we talk about the National Bee Unit, we're talking really about working within England and Wales, although we do, as I say, have our partners in the other devolved governments as well.

So, we work on a seasonal basis, at least in the capacity of our inspections. We work for six months for the year, 6-7 months for the year depending on how the weather goes. And our primary remit is to go to areas where there are suspicions of disease that we would expect to find it.

And to do this, we have a traffic light system. So, we have a red, amber, and green. The red areas or the red apiaries from our database would be areas where there has been history of disease.

An Equal Opportunity Institution.



Perhaps it's very close to disease, within 3 kilometers, or maybe it's been flagged up because of some piece of intel.

Maybe we have learned that some bees have moved there or there is something indicative of a problem going on there that we've heard through the grapevine, something like that. But we have to have a reason to go and inspect. So, we can't turn up at your door and say, "I would just like to come in and have a look at your bees, please."

We go there on the suspicion that there is a disease to be found. Even if there isn't, we still need that rationale in the first place. Equally, quite curiously, because of that Bees Act 1980 that I discussed, as inspectors, we have something called the power of entry.

We don't often use it. In fact, we work primarily on a rapport basis. So, we want to be a service, we want to offer our assistance. We're not out there throwing the rule book at beekeepers. They're not really what we're about. But in theory, we have similar, if not greater powers of entry than a policeman.

We don't need to see a stolen motorbike in the living room or a murder taking place in the backyard. We just need that suspicion of disease and the suspicion of the presence of bees or beekeeping equipment. And if you go through the Bees Act 1980, and of course, being a civil servant, I love my bits of paper and I love my legislation.

There is an article that very, very explicitly describes the kinds of premises that we can access. And it talks about buildings, it talks about boats. Well, I've done beekeeping on boats on the Thames, I've done rooftop beekeeping in London. It talks about airfields and aircraft.

And I've certainly taken swarms from the wings of airplanes when, in Cambridge, there have been swarms landing on that airfield. But it also very explicitly states hovercraft, that specific vehicle may possess beekeeping equipment or bees.

So, it's even that is catered for in our legislation. I've never done an inspection on a hovercraft, I would absolutely love to. So, if any listeners out there are keeping bees on such a vehicle, do get in touch, I'll be there in a heartbeat. So, I've talked a bit about our inspections and how we sort of organize them.

In line with our inspections, we are, of course, looking for notifiable diseases and we have this sort of search and destroy mindset. But that's maybe a little bit of a misnomer, because, actually, a lot of what we spend our time doing is discussing husbandry, answering questions from beekeepers, talking about disease management where it's relevant.

And for the most part, where we find European foulbrood is very often a shook swarm that we carry out. So, just briefly then, I'm sure many of our beekeeping listeners will know full well what shook swarm is. But for those who are perhaps a little newer to this term, you're moving all

An Equal Opportunity Institution.



of the bees from their existing comb and hive box to absolutely fresh comb or fresh frames, really, fresh foundation, clean hive boxes, clean material.

So, you clean everything up, move the bees and the queen across to clean equipment, and with a healthy colony and tender love and care, that should clear the infection. So European foulbrood is very normally swarm. And this approach is different to a lot of other European nations where European foulbrood isn't managed at all.

It's not a reportable disease. A lot of European nations, in particular European beekeepers that come to work in England, Wales or the UK generally, often, you know, query this because we do operate differently to the European mainland in that respect. And then for American foulbrood, of course, the outcome in that case is destruction. So that's the end of the line for those bees.

But besides inspections and looking for notifiable diseases, of course, we manage exotic pests as well. So, things like small hive beetle which are not in the UK at the moment, yellow-legged Hornet, *Vespa velutina nigrithorax*, very much in the South of the UK, or the South of England specifically, very much in the process of managing that.

And we also do horizons. So, we're looking to manage emerging threats such as *Tropilaelaps*, which is now confirmed in Georgia, it's confirmed in Ukraine, it's confirmed in Belarus, it's suspected in Iran. We know that it can parasitize the European honey bee and there are, of course, lots of queen movements throughout Europe and to the UK as well.

So, we don't just manage problems we have today. We're constantly scanning and trying to develop strategies and educate the wider beekeeping community, the wider beekeeping industry, bee farming industry so that they're aware of these emerging threats as well.

So, that's a real tour de force, and there's an awful lot of work that the department does that I'm personally not involved with as well. So, there'll be policy decisions, there'll be higher level strategy. I am but a small cog in a very big civil service machine. And our department of about 60 to 70 people, it's a relatively small department compared to our cousins in plant health or animal health, which constitute thousands of civil servants.

So, we are very specialized and very specific niche. But if you wanted to put a price on it, we protect an industry of pollination services worth about 3000 Ferraris annually. Other makes of car are, of course, available. So, you know, we certainly do have a big impact on both our food security and the economic output that farming and agriculture sectors can produce.

Jamie

I like that, Jack. I'm actually giggling because what you just said brought up a joke I saw recently when it was making fun of Americans where you said that the value is, 300 Ferraris you said?

Jack Silberrad

Thousand. Three thousand Ferraris.

Jamie

Three thousand, yeah. The joke was that Americans measure everything using any sort of measurement except the metric system. It was like the height of something was measured in giraffes, the weight of something was measured in the number of whales, the length of something was measured in school buses. And now it's good to hear that you guys are measuring your impact with Ferraris.

Jack Silberrad

That's it. I think the equivalent might be like, I don't know, maybe 12 million freedom units or something of that nature. But it's making it relatable, isn't it? You know, what is 22 million pounds? I mean, to me, that's a lot of money, but to a government, that's a drop in the ocean, yeah.

Jamie

For sure. Well, I appreciate that, Jack. It's really cool that you guys are doing so much. And you answered, really, this next question with all that you just said. But I would like maybe some summary statements.

When you go to a beekeeper, and I know how it's perceived here. You know, we're the government, we're here to help, people get nervous about that kind of thing. So, what do you tell beekeepers? You know, this is how we help to improve colony health. What are those talking points you have?

Jack Silberrad

Yeah. So, I would start off straight away by saying, you know, getting a bee inspector is a bit like going to your doctor and they say, OK, now take your trousers off, or in the states, take your pants off. And for us that's a, yeah, that's a sort of an edgy thing. But you know, as bee inspectors, we really have seen it all. So, for beekeepers that are a bit worried about the state of their apiary or the state of their colonies, you know, we're actually only really interested in healthy bees.

And so long as people are open-minded and receptive to, you know, discussing that and want to make genuine improvements and changes where they can, then we're generally pretty happy with that. And in terms of threats to honey bee health, then, so you know, globally, the number one cause of colony death is of course the Varroa destructor mite, and you know, these days there are lots of conversations and different organizations pursuing different ways of managing this mite.



So, that can be from a chemical direction using acaricidal treatments, it can be from a husbandry-based direction using biotechnical methods. And then, of course, there's a growing body and some very, very vigorous practitioners within that body for developing lineages of bees which have tolerance for the Varroa mite or can manage the Varroa mite to keep its level of replication low in the colony and to minimize the damage that they might experience.

And that's a journey that we're on. We're certainly not there yet. And there's a lot of science happening all around the world. I've just come back from Apimondia where there's, you know, some really, really rigorous science going on. Ralph Buchler, COLOSS, just to name, you know, one person and one organization, you know, rigor and record keeping is there.

So, I think, we're not inventing the same wheel again and again. If we can build on the findings of really rigorous science, that's fantastic. Other threats in the UK, I think really, you know, small hive beetle is there. But actually, from what we see around the world, particularly the States, you know, and Australia as well, you can bee keep with small hive beetle.

If you keep strong colonies, small hive beetle is less of the disaster that perhaps it might otherwise be. But what is certainly a huge challenge here and now that we're managing and trying to eradicate is the yellow-legged hornet, AKA the Asian Hornet, AKA *Vespa velutina nigrithorax*.

So, I had the opportunity to speak to an American beekeeper Apimondia working out of, now this is where my American geography fails me. But on the East Coast, I think South of Florida, I want to say Carolina, but there might be people laughing at me now, saying what? That's not on the coast.

Amy

It is, but it's north of Florida.

Jack Silberrad

It's north of Florida, okay, thank you so much. But I'm pretty sure it was Carolina because I remember thinking horses at the time, but regardless, so he was talking about this Hornet had arrived on the coast and spread all around this bay of kind of marshy areas, and it moved about 40 kilometers. He did ask me, you know, do you think this hornet is going to do well when it gets inland? Do you think it's going to be okay in this area where you have, I think you call it the bold-faced hornet.

We call it the European Hornet, *Vespa crabro*. And I said to him, my friend, you know, if *Vespa crabro* is doing well there, then you can bet this yellow-legged hornet is going to do well as well. And so, we're facing, you know, upwards of 150 nests this last year overwintering queens.

An Equal Opportunity Institution.



We're doing the science, the genetics to understand, you know, where these hornets are overwintering and persisting. And not just coming across from the continent, but seeing the challenges to French beekeeping, to German beekeeping, to Luxembourg, to Spain. There have been huge changes in what they have to do to manage this pest, and things like viticulture vineyards and so on.

And they're suffering as well. And this is a pest that we have here and now. So, that's probably a big, big pest that looms large in people's beekeeping vision. And then, of course, as I mentioned, *Tropilaelaps* coming across from Eastern Europe, native to the Indian subcontinent.

And unlike, *Varroa*, which is a fairly polite feeder, has a nibble, has the one feeding site, *Tropilaelaps*, having spoken to my colleague Dan Etheridge, who's a rising star alongside Maggie Gill doing a lot of research at Thailand, and I'm sure you'll have some kind of interaction with them at some point.

But Dan posited that *Tropilaelaps* and the way that it feeds on bees, you know, it's really a savage feeder. It may not even be native to honey bees, but regardless, it replicates three times faster than *Varroa*, does significantly more damage. It's genetically diverse and can evolve relatively quickly to overcome some of the acaricides that we use.

And it's very, very hard to spot. So, just again, to briefly summarize, if you take a business card and you put five *Varroa* mites on it amongst a bit of dust and a bit of, you know, wax particles, you'd struggle to see it. You'd really struggle to see it. And so, if you think of a queen cage with a queen and ten attendants coming in from Eastern Europe, we've got a vet who might have up to ten whole hours training in bee health who's going to sign off and say that that's a healthy queen.

Off it goes. I think the risks are real. And I think, when it arrives because I don't think it's an if, I think a decade or less would be a realistic timeline, it is going to change the face of beekeeping in the same way that *Varroa* from the 90s changed it.

I think those would be our main threats. Really, the threat is being educated and being prepared and being proactive. Those are the things that I think we have to do because we can't, you know, with globalism, we can't throw up walls and barriers and say, don't come in. We have to know how we're going to respond when these things arrive.

Amy

Yeah. Absolutely. So, Jack, you know, you mentioned *Varroa*, we talk about *Varroa* a lot on this podcast. You brought up the yellow-legged hornet and you brought up *Tropilaelaps*, and that's kind of been the hot topics, right, the past a couple of years and beyond. But specifically, in the past couple years. The yellow-legged hornet person, it's probably our friend Ben Powell.



He's great. He's a good, good friend of ours, great collaborator. So, yes, the yellow-legged hornet was found in Savannah, Georgia, and it, you know, kind of made its way up to South Carolina. A question that we receive often is, you know, what do the beekeepers in Europe who have yellow-legged hornet, like what do they do? And how do you guys control it? And what is really your unit's role with the hornet?

So, I think the first thing to distinguish is the European response, by which I mean the European mainland, and the response that we have here in the UK. So, take Germany, for example. Because of their laws, they're not able to use pesticides in the same way that we are.

And so, their approach to managing it is very, very different in terms of devolution from local authorities down to being the responsibility of beekeepers or pest controllers on the ground. Again, we're very different. So, when I talk about yellow-legged hornet response, I'm really referring to how we've been managing it in England and Wales.

And really, I think for the Bee Unit itself, when I signed up, you know, five plus years ago, there was nothing in my contract that said you're going to be responsible for managing yellow-legged hornet. I think because it's got wings and stings, it naturally failed to the people that deal with stinging insects.

But that said, the bee unit does collaborate with plant agency and animal, and we have a non-native team that helps us as well. But our role principally is search and destroy. A question that we often get is, you know, why we're not allowing more pest controllers to get in on the action and to help us.

And the reality is because the bottleneck is not in the destruction of nests. The real challenge is going from a reported sighting. So, it won't be a nest or very seldom is it a nest. It'll be somebody who's got a hornet in their Conservatory, or there's a hornet inside the house or on the pavement or it's hawking in front of their homes.

So, we've got a sighting. And from that point, then we confirm the sighting. We get all sorts of people from lay people on the street all the way up to entomologists and professors who swear blind that they've seen a yellow-legged hornet and it's anything but. So, we have to triage those sightings very carefully.

We get thousands of them. And then from that, we then begin track and trace. So, track and trace then allow us to triangulate from a single sighting using bait traps. We get more hornets, catch and release, which again, because of our legislation, only people that are licensed, of course we're famous for our licenses.

Have you got a license for that, mate? Yes, I do. To catch and release yellow-legged hornets is an invasive species and non-native species. So, you can't legally release it once you've caught it



without a license. We triangulate the position of the nests, or nest, I should say, in any one particular instance and then destroy it using pesticide, and then that nest is removed.

And up until very recently, all of the individuals in that nest would then be genetically analyzed to understand how related it was to other nests that we know about, nests and genetic information from the mainland Europe, and to understand relatedness there. And to really work out, is this a queen that's maybe come across on a caravan or a boat or a car moving from the continent or shipping or cargo trade traffic, something like that.

Or is it actually related to a nest that we found 20 kilometers away? And, you know, it's an overwintered queen and we can see that descendency. So that's our main, main role to be honest. And this year, as I say, we've had more than 150 nests, the vast majority of them being down in the South Coast, which, really, this is our other sort of challenge.

We as a bee unit, you know, we're paid to go and do this work. I've spent upwards of 40 days down in Kent this year. Other people in the agency have spent longer. For volunteers who want to get involved, we really welcome that. But it can be boring and it can be laborious and it can be uncomfortable if you have to watch a bait station for hours on end.

There are health and safety implications, there's land access and confidentiality. There are all sorts of reasons why after one or two days of doing something very boring, people just want to up sticks and leave and get back to their own lives, their businesses, their families and such. So, I suppose what I'm trying to say in round, in the round, I should say, is that I'm part of a small team and we make personal sacrifices to be down there to make this happen.

And we work very, very hard. The upshot is wherever we have confirmed a sighting and linked it to the nest, every nest has subsequently been found and been destroyed. And you can do a quick Google search, and you can look up our recent use of Bluetooth trackers.

And these have been a really, really useful tool in our toolbox of managing these hornets. So, going from map and compass through to using Bluetooth receivers about the size of an earring hooked onto a hornet. And you can use the receiver and that last 100 meters, trying to find this thing high up in a tree where there's a tree canopy, really, really difficult to spot in a forest of trees with tree canopy.

You can go from that one hundred meter area of question to exactly where the nest is, you know, in a very, very short space of time.

Jamie

Well, Jack, I'm going to pivot to something less stressful. I really think this is just a good question to elaborate on because we've got listeners from around the world and we talk about hornets, we talk about *Tropilelaelaps*, and you make me scared to be a beekeeper.

Jack Silberrad

It's a scary time, for sure.

Jamie

But I know, I know with certainty, though, I know with certainty that you guys have some amazing honey in your area. So, let's pivot to that.

These beekeepers who you serve for honey bee health purposes, What are those honey crops? What are those significant honey crops that they're making?

Jack Silberrad

So, I think in the UK, then, we can broadly define our honey seasons into a spring and a summer crop and we get very, very defined honeys to either side. So, spring, then, there are lots of sources of nectar, but those sources which are going to provide a good crop of honey.

If you're on pollination, then you know that could be things like cherry and apple, but realistically you're going to be leaning towards hawthorne, black thorn, maybe oilseed rape or canola oil, you might know it as, lovely yellow brassica. Very smelly, very hard, rapidly setting honey.

Filled bean gives you a lovely golden honey, buttery taste. Lots of broad beans being grown for animal fodder or export. And then moving through to the summer in my area, and I suppose, also, for a lot of urban conurbations because I keep bees both in the city and in the rural areas.

So, in the city we have a lot of areas that are planted up with lime trees. In Europe, you might know them as Linden. And these give honey an absolutely fantastic golden yellow color. Zesty, citrusy flavor and if it's very, very monofloral, very pure, you can even get a bit of a minty after taste. Borage, which is grown for its oil seed.

It's known as star flower or cucumber flower. It's the traditional garnish in a glass of Pimms. And if you're not familiar with that great British summer drink, then I hasten for you to search it and make your own. That makes an almost transparent, almost clear, very, very delicate tasting honey, which is actually great for mixing because it doesn't like to set.

So, if you're making a spicy honey, hot honey, or maybe burning it with spices, cinnamon, turmeric, or whatever, it doesn't like to set. So, it's absolutely fantastic for infusing. And it would be remiss of me not to talk about heather honey. So, heather honey is really the Rolls Royce of British beekeeping.

So, I used to migrate around a hundred colonies from the South of England up to the North Yorkshire Moors. And there are other areas, particularly Shropshire and also Scotland that



produce huge amounts of heather honey. And we have two heathers. And this is sort of around August time, the glorious twelfth when sport shooting for grouse begins, is generally kind of earmarked as the time to be up there.

And this is when the Highlands, the Moors, they go purple with the heather, and there are principally 2 species. That's the Ling heather and the Bell heather. So, the Bell heather gives you a plummet fruity, kind of dark, dark, kind of runny honey, very delicious.

Whilst the Ling gives you more of an amber honey. It has this mixotrophic consistency. So, it's jelly-like and it's spicy. It's spicy and it's aromatic and it's highly, highly sought after. So, that's just a very, very quick tour of British honeys, but we absolutely have some wonderful mono floral honeys.

Amy

Jack, it's kind of crazy to – it's always fun to speak to people who are all around the world because we do all have similar challenges in the beekeeping industry. But then, we ask about honey and it's just so fun for people to describe the different honeys. And I can't believe I didn't meet you at Apimondia because I was also at COLOSS and Apimondia. I enjoyed, you know, they had the world honey bar and that was really fun to experience.

Jack Silberrad

So many flavors.

Amy

I know. I got sick after eating five of them.

Jack Silberrad

You have to kind of give it a break, come back.

Amy

Pace yourself.

Jack Silberrad

Yeah, exactly. Yeah.

Amy

Definitely, but it is always fun to hear about honey, and you know, just the different honeys that are out there. It's just incredible.

Jack Silberrad

An Equal Opportunity Institution.



So tasty. It always blows my mind. You can take the same colony, in the same place, the same time of year, and based on climatic conditions, you know, you can have a wildly different crop, you know, if one particular plant does a lot better this year versus last year. So, yeah, the variation and changing of the seasons is something I really relish.

Amy

All right, so as we close this episode, what are your final thoughts? And where do you see the industry in the next ten or so years?

Jack Silberrad

I think if I was to judge anything by where the industry has come from, beekeeping in the UK is dominated by people that have been in the industry for some decades. The average age of a beekeeper is 66, and the hobbyist sector is growing.

But also, in addition to that, the commercial beekeeping industry is also growing, which is crucial. You know, people like myself going through the apprenticeship scheme, bringing in new blood, new and keen ideas and younger beekeepers. You can go to any particular beekeeping meeting and if you're sub 40 years old, you'll be in the minority.

And if you're sub-30, you'll be, you know, pretty special indeed. But with that, that attention and that enthusiasm both to the hobbyists and the commercial sector, that's being fed by a greater than ever demand for real honey.

Honey that has provenance. We know where it comes from, we know that it's, you know, produced by somebody within our nation or we know which nation it's actually come from. It's not a mysterious blend of EU and non-EU honeys. And crucially, it hasn't been adulterated.

And these are all the signs of quality then that people want to eat this wonderful honey, taste those differences, those seasonal or provenance or differences, and they want to feed that to their children, and they want to seek that and then go and look for it. Which means, you know, there's never really been a better time to be a honey producer.

But in the next ten years, alongside that enthusiasm for a real product and new people coming into beekeeping and practices changing and evolving, of course, I've mentioned those challenges as well. So, I think the next ten years will present some fantastic opportunities and some very, very difficult challenges.

And I think the people that will flourish the most are people who are receptive to that change, receptive to practice evolving over time and can adapt, because, you know, beekeeping in the last 300 years has changed dramatically.

An Equal Opportunity Institution.



So, it always has. Things don't stand still. And I think with attention to things like stewardship and care for the environment, this will very much, you know, dovetail with sustainable beekeeping practices and also managing those pests and challenges.

So, I think we will have a stronger, better beekeeping industry. There is a piece of legislation that's just passed in Europe called the Breakfast Accords, which will mean honey jars have to specify where the honey comes from.

So, we do this already, we say EU and non-EU or product of Britain or whatever. But if you've got a blend of EU and non-EU honeys, you will now have to specify, you know, what percentage comes from China or from Mexico or from France or from Romania or whatever.

So we can inform our consumers. And again, dovetailing with that demand for honey with the provenance, I very much hope that that will also come into British beekeeping, and we'll be able to say, you know, this is my locally produced honey, and that's a jar that comes from 20 different countries.

And we don't really know what it's supposed to be. And I think that will, again, allow the consumer to find the honey that they're really after. And for those people producing honey with provenance, quality products, they will then reap the rewards.

Jamie

Jack, that's sounds fantastic. I mean, your job sounds amazing. I'm very envious. It sounds like the National Bee Unit does a lot on behalf of beekeepers and honey bee health, for that matter, in the UK. You guys have a lot on your plate with the yellow-legged hornet and Varroa control and all the stuff that you guys are dealing with. So, I just want to thank you so, so much for joining us on this podcast episode.

Jack Silberrad

It's been an absolute pleasure, and thank you for having me on your platform, and thank you to your listeners for giving up their time to hear me speak.

Stump the Chump

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

Amy

Welcome back to the question-and-answer segment. Jamie, we've got three questions today, and these are questions that I came up with after I went to the 2026 American Bee Research conference. You know, while there were amazing speakers at this conference, there were 15-

minute research talks, and I just came up with some questions that I thought would be fun for us to talk about on the podcast.

Jamie

That's kind of scary because if I don't get the answers right, then you are the one who stumped the chump, right? And so, you'll be able to not let me live that down forever, right?

Amy

Well, some of them were research products or some of them were just like things that I thought about while I was listening to some of the research. So, I don't necessarily have all the answers. OK, so the first question is, are all small hive beetles the same size?

Jamie

I actually know the answer to this question. So, colleagues of mine, Keith Delaplane, who's retired from University of Georgia, and Mike Hood, who's retired from Clemson University, and when I was an undergraduate student, actually measured small beetle adults using a caliper.

I don't know, hundreds or thousands of beetle adults. And we published a paper, I believe, in the American Bee Journal, but it was so long ago that I can't quite remember. And the whole premise was, what's the size of small hive beetle adults? And we found quite a range in size, just a few millimeters in general.

So, they may all look the same to us. But when you actually do measurements on adults, you can get quite a range. And on top of that, there is a difference between the sexes. Small hive beetle females tend to be wider and longer than males. Now, you can get some really small, small hive beetles.

I guess that's kind of hard to talk about. Small smalls. And the primary reason for this is likely the amount and quality of nutrition they get while they're immatures. And so, my guess is that when there's explosive reproduction in the nest, at some point, the food resources get exhausted and those last few larvae that now have dwindling food resources available to them have to essentially pupate earlier than they otherwise would.

And those are the ones that come out smaller as adults. And I'm not quite sure the age of a larvae that has to be reached or the size of a larvae that has to be reached before they can pupate successfully. But nevertheless, nutrition does impact ultimately the size of the resulting adults. And sex plays a role as well.

Amy

Interesting. So, we have small, small hive beetles and large small hive beetles.

Jamie

That's right. That's right.

Amy

And medium small hive beetles.

Jamie

And some in between. That's right.

Amy

That's hilarious. So, what is – OK, so that leads me to another question, like what is their diet? I know that, you know, people say that they like pollen patties and they will obviously eat things in the colony, but like, what is their primary nutrition source?

Jamie

Yeah. So, a lot of it, it's funny enough, a lot of it's not been worked out clearly. We know what they eat in a hive, but we don't know what information is biasing that decision to eat it. So, for example, we know that larvae will eat honey, but we strongly believe they cannot material on honey.

Probably honey is kind of a secondary food for them. So, they are probably going for pollen and brood most often because those have more protein available in them. So, if you give them a choice, they'll eat all of them, but they preferentially feed on pollen and brood, and that likely has to do with the protein and lipid quality in it.

And so, I know when they're eating pollen, they grow predictably and at a steady pace. When they're eating brood, they can grow very quickly, kind of almost explosive reproduction. So, I suspect even though they will feed on honey, that that's more of a secondary interest to them, that they're really going after the pollen and the brood because that provides the most bang for their buck, you know, the most nutritional bang for their buck and allows them to develop quickly.

Amy

All righty. Thank you very much. Now next to question number two. So, you know, here at the University of Florida, we've got a lot of different research sites that we have bees on. And one of the locations, specifically, we have just built some flight cages and they're super awesome, very cool.

These flight cages, we put a colony in each one. And during the conference there were multiple studies that were conducted in flight cages. And so, I guess I just wanted to talk about why



researchers or why anyone would want to put flight cages up. Like what are they used for? What kind of studies are used inside of them?

Jamie

I think this is a very important question from a research perspective, and certainly an important question from a beekeeper perspective, because beekeepers, you're going to listen to people talk about research results where the studies were conducted in flight cages. And like the name implies, a flight cage is just a cage in which honey bees can fly.

Now, the best way to think about this is we have multiple tiers of research that we can conduct in the laboratory. So, think about it this way. We can do stuff at the molecular level where we're extracting DNA from individual bees, and all of this happens at the lab bench, so to speak.

Then we can step it up a notch where we can do whole organism research with adult bees, and we can do this in cup studies. We often call them cup or cage studies. These are little cups or cages into which you put adult bees and you can put them in an incubator and there's pros and cons associated with this.

The pro is that you have amazing control of what you're exposing the bees to. Some of the cons are associated with how realistic these exposure scenarios are when bees are in plastic cups or in plastic cages in an incubator. To take a step up from that, you can do flight cages where you're doing whole colony studies or groups of bee studies, but rather than being in cups or cages in an incubator, they're in much larger enclosures.

Think greenhouse level things, but instead of a greenhouse, instead of the plastic material on the outside walls of the greenhouse, it's a mesh material. And then I'm going to circle the wagon back to this. But before I do that, I'm going to step up kind of the fourth and final level, which is where you do whole colony studies in the field where these colonies are free to do what they want to do.

They're not enclosed in anything. They're foraging as they normally would. And there are pros and cons to doing whole field studies. From a toxicology standpoint, they actually recognize three tiers of studies. These kind of cup/cage studies have happened in the lab, tier two studies that are these flight cage studies, and then tier 3 studies that are these field studies.

But going back to the flight cages, which is the original question, flight cages allow you to put whole colonies under these caged enclosures to allow the colonies to do whatever you want them to do. Maybe it's a forage study where you expose them to flowers of a certain plant species.

These flowers are grown in pots. You put them in the cages with the bees, and you can see how the bees respond to the flowers. Maybe you do toxicology studies where you put blooming plants



in these cages, and you treat the blooming plants and now the bees are exposed to the compounds that you put on those plants.

So, what a flight cage does for you is it allows you to control variables that you cannot control in the field. Let's think about the field study then and then double back to the flight cage. From a field study, if you're doing toxicology research and you plant a field of, let's just say canola and you treat it with a compound, yes, your bees are going to forage on canola and get exposed to that compound, but they're not going to forage exclusively on canola.

They may go to other plants that are blooming in the area that have been treated. They may go collect water from sources in the region that's been treated. And so, you get these kinds of cloudy pictures because you're getting multiple exposures because bees are doing whatever they want to in the field. Well, the flight cage allows you to fix all of that.

The bees are only exposed to what you give them in the cage. And I've seen very small cages, just a few meters by a few meters, to very large cages that are almost the size of these big greenhouses where an entire colony is allowed to forage this entire cage.

So, really, what you're trying to do in a flight cage is control. You're trying to get it as close to a field study as possible but allow you complete control over the variables that you lose control over when you move the colony to the field. And I'll say this last thing about flight cages.

As great as they are, they also have some significant drawbacks, the most notable of which is bees just don't perform well in enclosed spaces. If you think about it this way, bumblebee colonies can be put into greenhouses for pollination purposes and they function quite well.

The bees fly out, pollinate the crops, and come back to their nest. When you put a honey bee colony in a greenhouse, you do get honey bees foraging on the plants, but a lot of honey bees just get confused and will bang their heads up against the roof of the greenhouse trying to escape and expand their foraging range.

Well, you get the same behaviors in a flight cage. So, if you put a colony in a flight cage, you can predict that 10 or 20% of your bees are just going to die from exposure kind of on the cage walls, because they just don't function normally in a flight cage.

So, usually, flight cage studies are short, they're to answer a very specific question, and you usually keep smaller colonies so that you don't run the risk of all these adverse side effects. But nevertheless, they're quite useful for answering some very specific questions for which you need to control a lot of variables.

Amy



Yeah. You know, I think our listeners know this, but I always kind of tell people that keeping bees in a research or educational setting is a lot different than just managing bees, right, Jamie? It's incredibly different.

Jamie

Amy, that's 100% true. The thing about research, in order for us to trust the results, we have to control every variable we can. The only variable we want to change is the thing that we are testing.

And the moment you do field studies where bees can freely forage any direction they want, you lose a tremendous amount of control. The best way to do field studies to overcome that extreme variation is you just have to use huge sample sizes because you know you're going to get some data washed out simply because of the variation that you'll get from colony to colony.

So, in the research world, we look for ways that we can control as many variables as we can while still keeping that real world touch. Flight cages often provide that happy medium for us.

Amy

Alright. So, for the third question, I guess this does still kind of have to do with research a little bit. We've talked about this before. I don't think this is the first time this topic has gotten brought up, but food conversion ratios. So, someone had mentioned food conversion ratios, and Jamie, I think you've mentioned a couple times at just, you know, the potential of nutrition and what that could look like in honey bee research.

And so, I wanted to just kind of talk about what food conversion ratios are. We can revisit, you know, what this looks like maybe in other ag commodities or other animals, and then what that could look like and what you see that looking like with honey bees.

Jamie

Maybe I first thought about this topic when I had a master's student in my lab named Emily Nordyke. And now, she graduated years ago and she's on to do great things on behalf of the bee industry. At the time of this recording, she's working in Australia and she was the one who introduced me to this topic.

She was interested in looking at pollen sub research, how bees utilize pollen subs that they're fed, etc. And she and I had talked a lot at the time about food conversion ratios and how we might be able to use that. So, let me explain what's meant by food conversion ratio. In other ag commodities, for example poultry or pork or beef producers, these individuals know the food conversion ratios of the feed that they provide to their animals.



And so maybe the best way to explain it is the food conversion ratio is roughly the amount, unless, in the case of a beef cow, as an example, the amount of meat a cow will put on based on the amount of food it is fed.

The easiest way to think about it is if you feed a cow one kilogram of food and they gain half a kilogram of weight as a result, that is a food conversion ratio of 0.5.

So, they were fed a kilogram, and they gained 1/2 a kilogram of weight. And so, for our American audience, they are fed a pound, and they gain half a pound of weight. So, for every pound of feed they feed the cow, the cow will gain half a pound of meat.

And so that's a food conversion ratio of 0.5. So, 50% of the amount of food that they were given, right? So, the idea is, depending on what metric interests you, you can calculate can food conversion ratios for that metric. So, let's bring it back to bees.

What is it that we want when we feed pollen subs to colonies? We want more bees, right? We're not feeding pollen subs to make bees better foragers or some other thing.

We just want them to turn it into more bees. We want brood. People say we want brood; well brood is just more bees. So, ultimately, when we put a pollen sub in a colony, we want more bees as a result of that. And in theory, you can rate the available pollen subs using food conversion ratios.

So, if pollen sub A, you feed a kilogram of it to the bee colony, and they gain half a kilogram of bees. So, there's half a kilogram more of bees because you fed them a kilogram of pollen sub, then that's a food conversion ratio of 0.5.

Well, if you feed pollen sub B to the colony a kilogram of it and they gain 0.75 kilograms of bees, that's 0.75 food conversion ratio. So, that tells you that feeding the same amount of food of pollen sub B as you do A will get you more bees.

Then you would say, well, maybe I need to use pollen sub B because bees are better at converting that into more bees. And then you have to make an economic decision. If the cost of pollen sub B is twice that of pollen sub A, you have to say, is it worth getting, you know, that small amount of bees more?

But that's the idea. The idea is, if we're feeding bees pollen subs, how much are we getting in return? And so, Emily tried to work on some of that. The research is still in its infancy, but I really like this idea of using food conversion ratios in our field to try to put a quality indicator on the pollen subs that are available and challenge us to do better in the field of pollen subdivide.

Amy



Yeah. Absolutely. You know, it's just one of those things where it's a decision that beekeepers have to make, right? Is it worth it or is it not? And a lot of it is economic. And it's like, if I'm going to feed them, am I going to get bigger, stronger bees?

Jamie

Yeah. You know, Amy, we've talked about this a lot. And I'm not sure how pervasive this idea is in the industry. But you know, a lot of times when beekeepers feed a pollen sub, they feed it to all their colonies and then they say, "Well, look, it worked." Well, you can't know it worked unless you have a set of colonies you don't feed it to.

And that was the beauty of Emily's research. She always had these control colonies, and we were finding these things weren't working more often than they were working. And that's why we really like this idea of food conversion ratio. What are we getting in mass of bees in return for our time and our money? And that's why we like this concept.

Amy

Yeah, very cool. All right, listeners, don't forget to send us questions. We are always looking for questions, so feel free to send us a question either on our e-mail, you can e-mail us, or you can send us a message on one of our social media pages.

Hey everyone, thanks for listening today. We would like to give an extra special thank you to our podcast coordinator, Jeffrey Carmichael. Without his hard work, Two Bees in a Podcast would not be possible.

Jamie

Visit the UF/IFAS Honey Bee Research and Extension Laboratory's website, UFhoneybee.com, for additional information and resources for today's episode. Email any questions that you want An Equal Opportunity Institution. answered on air to honeybee@ifas.ufl.edu. You can also submit questions to us on X, Instagram, or Facebook @UFhoneybeelab. Don't forget to follow us while you're visiting our social media sites. Thank you for listening to Two Bees in a Podcast.