

Spheksology with Eric Eaton

Ologies Podcast

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Oh heey, it's the Coconut LaCroix that tastes just like sunscreen and you wouldn't have it any other way, Alie Ward, back with an episode of *Ologies* I'm so proud of you that you're listening to. You're doing it! Maybe you thought, "No way in hell, Ward." Okay, fine. Or perhaps maybe you're listening with your arms crossed over your chest saying, "Make me like wasps. I dare you. You can't do it." Watch me... Wasp me... Watch me do it.

First off, how many species of wasps can you name? I know you're like, "Yellowjacket. Hornets. The big mean hornets. The paper wasp." Maybe you said the mud dauber. That's, what, five right there? Hmm. I'm sorry. There's tens of thousands of described wasp species! So many uncategorized, undiscovered ones. They are like the tiny sharks of the air. They're feared apex predators who get a bad rap. Most of them will not harm you. So, hating on wasps? So yesterday! So gauche. So we're going to dig in.

This ologist is a natural history writer; the principal author on the *Kaufman Field Guide to Insects of North America*. He has been a professional entomologist at the Oregon Zoo, the Cincinnati Zoo, the Smithsonian Institution. I have wanted to talk wasps for years with him, but we wanted to wait until his new book dropped, and it's called *Wasps: The Astonishing Diversity of a Misunderstood Insect*. And it did just drop. It just came out in March, so we will chat.

But first, we will thank patrons at [Patreon.com/Ologies](https://patreon.com/Ologies) for supporting the show. It will cost you a cool dollar a month to join and submit your questions. Thanks to everyone leaving reviews which keep the show kicking ass in the charts. We're going to read a freshie, which we do every week. This one is from Floodball, who left the Apple review:

I am a medical student in need of worldly wisdom and this podcast has absolutely changed my life. No other words. I love you!!!!

Floodball, I love you back. You're about to love wasps. Hunker down.

This totally unpronounceable ology is derived from the Greek word for 'wasp', although so many people online just use the term Waspology. We're going to discuss that. We're also going to cover homicidal hornets, the most painful stings, bug corsets, modified egg cannons, breathtaking biodiversity, some gardening tips, why a wasp wants your sandwich, some barbecue strategies, underdogs, zombie victims, and snack vaults, as we do our best to make you horny for hornets. It's gonna happen, with author, entomologist, and champion of your soon-to-be-former enemies, Spheksologist Eric Eaton.

Alie Ward: The first thing I'll have you do is if you could say your first and last name and your pronouns.

Eric Eaton: Sure. Eric with a C, Eaton, and he/him.

Alie: Sweet! Okay, now we discussed what the ology for this would be, and it was [*smearing a bunch of sounds together*] speckamowmickologist? How do you say it?

Eric: [*laughs*] There's different pronunciations. There's "sfeeks-ology," and "sfecks-ology," and I'm not sure which one is preferred, if either.

Alie: I definitely think if there's a phobia attributed to it, there should be an ology, right?

Eric: That's absolutely right. I agree.

Alie: And perhaps even a philia for people who are drawn to study them, right?

Eric: I would agree with that as well!

Alie: *[laughs]* Can you tell me a little bit about how long you have been into bugs?

Eric: Okay. I usually go with my mom's account, which is that I became interested in all things nature in kindergarten. And I vividly remember... My teacher was a gifted artist and she drew a trap door spider on the chalkboard one day and I was just mesmerized by that. And then she told us how it behaved, and I was even more fascinated. So my affinity for nature has always been the underdog or the things that most people disdain. It was, like, sharks before they were cool, and snakes, and spiders, and insects, and things of that nature.

And if I'm truthful, I got interested in wasps initially because no one could call me a sissy for catching something that could fight back. *[laughs]* But then, when I learned about how they behave and their natural histories, my interest just took off all the more.

Alie: Were you ever interested in bees first, or did you go straight from, like, spiders and underdogs to wasps?

Eric: That's a good question. I think I've always had an affinity for flying, stinging things, probably. And by today's measure, bees are just a subset of wasps anyway. They've gone from the parasitoid lifestyle to the pollen-collecting lifestyle.

Aside: Pardon me. Bees are a subset of wasps?? Tell me everything!

Eric: Well, that's kind of an ongoing debate. But the trend is towards the idea that, yeah, bees are essentially pollen-collecting wasps. And there are other wasps, by the way, that are what you would call "true wasps" that also collect pollen.

Aside: Just a quick taxonomy aside. My friend Werkapedia told me that a wasp is any insect of the narrow-waisted suborder Apocrita that is not a bee, nor an ant. But wasps do share a common ancestor with bees and ants. So, wasps come in a whole big variety of genera, from *Vespa* (hornets) and *Vespula* (aka yellowjackets). But again, there's giant biodiversity including... wait. Wasps who collect pollen? What are those called?

Eric: They're called pollen wasps, not surprisingly. *[laughs]* And they're solitary, though. They're not social. Part of the thing about wasps is that our public definition of wasps is very narrow. It's basically what we call a hornet, or a yellowjacket, or a paper wasp; one of the social species of wasp. When in reality, the overwhelming majority of wasps lead solitary lives and only a fraction of them are capable of stinging us.

Alie: Really?!

Eric: Yeah.

Alie: The first thing you think about when you think of a wasp's nest is you think about a ton of them who want to hurt you. So you're saying both of those things are flimflam?

Eric: Well, it depends on the circumstance. If you aggravate a nest of social wasps, you're going to be in for it. I mean, their venom and their sting is used primarily in defense of their nest because their nests contain very soft and helpless grubs, and eggs, and pupae that can't defend themselves. So, the workers are unleashed at the slightest hint of hostility.

Aside: So again, not all wasps are social, and only a fraction of them sting, y'all! So when you think about a hornet's nest or a yellowjacket's nest, those are only one type of wasp. The

social ones. And what would you do if a bear pounded on your window and poked its snout in your door, hungry for your babies? Maybe you would brandish the venom gun attached to your butt to defend your several thousand newborns! They have so many babies!

Alie: What about when you describe the body of a wasp? What makes up a wasp? Is it the type of wings or mouthparts?

Eric: They're four-winged insects, and their wings are connected by these hamuli, which are little hooks on the hindwing that join to the hind edge of the front wing so that they act as one pair. They don't flap independent of each other. The sting, by the way, is really a weaponized egg-laying organ.

Alie: I love that.

Eric: Yeah. In the evolution of wasps, the females went from just this egg-injecting device, basically, to a venom-injecting device, and they then put their egg out through an oviduct rather than through what is now their stinger.

Alie: Ooh! Okay, let's ask the question that's probably on everyone's mind. How many times have you been stung, and how do you feel about it?

Eric: *[laughs]* Not very many.

Alie: Good for you!

Eric: And those times I have been, it's been my fault. I disturbed a nest by getting too close or netted the thing and it found a way to jab me. But most of the time I'm gentle with them and they're gentle with me. Right now we have a paper wasp nest with one wasp on it in the corner of our back door. And you know, we come and go out of there with no problem. It took us a couple weeks to recognize it was even there. So, the idea that wasps are super aggressive probably is misinformation and exaggeration, and the media does a good job of that. And if you're in the business of pest control, you know, it's to your advantage to paint them as very aggressive animals.

Alie: Maybe just because they're not fuzzy, people don't trust them as much.

Eric: *[laughs]*

Alie: And are they not fuzzy because for the most part they're not collecting pollen and nectar?

Eric: Well, they are hairy, actually. Some are really hairy. Like velvet ants, which are actually... The females of velvet ants are wingless so they look like big, furry ants running around on the ground.

Aside: So velvet ants are wasps, even though they're not ants, nor are they made of velvet. And they're called cow killers even though they cannot kill cows. So, the situation is indeed a little hairy.

Eric: Most other wasps have hairs that are called setae, and setae usually have some kind of sensory function. So they're either detecting scents or air currents. Their vision isn't necessarily really good. They're good at detecting motion. In lieu of that, their setae can detect air currents.

Alie: Can you imagine if... I mean, I guess, if you have a lot of back hair you probably could tell which direction the breeze is coming from. I suppose we use it similarly, right?

Eric: Maybe. I've got a ponytail right now because of covid. *[laughs]*

Alie: *[laughs]* I'm sure you're not the only one out there. For sure. I'm so excited to hear about, like, what work in the field did you have to do in collecting stories and data for your book?

Eric: I did study entomology as an undergraduate at Oregon State.

Aside: Eric's mentor was the late Dr. George Ferguson, who was a world authority on wasps and donated his collection of 80,000 specimens to Oregon State University. Oregon State, sup? Hi. Hi to your dead wasps. Anyway, Eric got to learn about their behavior from doing field research.

Eric: Some things are just stunning. I was in Massachusetts and I watched this mason wasp, which is a solitary relative of yellowjackets, and she was going over the surface of this curled up leaf, and I knew that there was a caterpillar in there, and I knew that mason wasps hunt caterpillars, but she didn't go after it the way I thought she would, which is to just bite a hole in the leaf and drag the thing out. She forced it to eject. And when these caterpillars eject, they basically bungee jump out of the thing. They release a thread of silk that they hang off of, but they just leap out of their little curled leaf. So what she does is she forces the thing to eject and then grabs it in mid-air before it can reach the ground.

Alie: Ah! Nice catch! *[laughs]* That's some NFL stuff right there. Nice work! You said "she." Are a lot of the wasps that we see or are familiar with, are those females?

Eric: Excellent question. Let me put it this way, when people ask, "Why are wasps such bastards?" Well, in actuality, it's only the females that sting so they're bitches, bitches!

Alie: *[laughs]* We got that question so much, of like, "Why are they such dicks?" But they're not!

Eric: Right!

Alie: They're the c-word, thank you very much! [*"See you next Tuesday, then!"*]

Eric: Yeah, but again, it's only the... Our definition of wasps tends to be these social species that we tend to have negative interactions with, and all the workers of social wasps are female. Males are only produced at the end of the colony life cycle. They're released to mate with queens or females from other colonies at the end of the cycle.

But, that said, we see a lot of male wasps also. The males are either lounging around on flowers, eating nectar and stuff because their only job is to find a female, right? But the females have to do all this other stuff. They have to build a nest, which is often a burrow in the ground or an existing cavity in a log or something of that nature. And then she has to go hunt food to store for her offspring, or for those that don't make nests, they just have to find a host and lay an egg on or in it.

Or in the case of gall wasps, they have to find the right host plant. So, they've got a lot of work to do, the females, and for that we should admire them. I mean, wasps are kind of a symbol of female empowerment as far as I'm concerned.

But the males, yeah, they're just either lounging around or they're defending a harem of females. So, often the males are the aggressors even though they can't sting. They're trying to chase off any intruders that might harm their group of females.

Aside: So, social wasps are a minority of wasp species but are simply more visible because they hang out in crowds and maybe you've seen their nests dingle-dangling from somewhere.

Now, the majority of wasps are solitary; they're chillin' solo. Maybe they're pollinating. Maybe they're laying their egg babies on alive spiders or cockroaches and just tucking them in to devour their victim alive and then getting out of dodge.

Oh, and word alert. A parasitic organism kills its host, but a parasitoid lets its babies kill you! Can you imagine getting eaten alive by a baby? How pissed would you be? So embarrassing!

But back to the social ones who hang out in cliques. How are these things that have a tiny knot of neuronal ganglia doing it?? How are they doing it?! I can't even organize a group text.

Alie: Do they communicate with each other, like, with social dances like bees do, or no?

Eric: No. For the social wasps, their main form of communication is something called trophallaxis, which is mutual feeding. So if you watch a paper wasp nest, which I recommend doing (maybe use binoculars), you'll see two wasps appearing to kiss. And what they're doing is, one is giving food to its nestmate. And they also do that with the young. The larvae are fed protein matter and then they, in turn, regurgitate kind of a sweet secretion that feeds the adults.

Aside: Okay, so you feed your baby, and your baby's like, "Nyum nyum nyum, thanks," and then burps up lunch for you, and you're like, "Thank you, my baby. Nyum, nyum, nyum." That is happening all over the globe right now and you never knew before! So many mysteries in the world of wasps. Some big, some teeny, teeny, like a tenth of a millimeter long.

Alie: One thing I think is so interesting about wasps, I didn't know until I visited the University of California at Riverside, their entomology department there, that wasps are not what we always think of with yellowjackets, and mud daubers, and stuff. There are these tiny little... Are they called fairyflies?

Eric: Yeah!

Alie: Yeah? Okay. So, can you tell me a little bit about the range, from these little fairyflies all the way up to so-called murder hornets?

Eric: [*laughs*] Yeah. Fairyflies...

Alie: I can tell you're already bristling at the murder hornet thing.

Eric: [*laughs*] That was unfortunate. First of all, let's lay out the lifestyle of most wasps, and that's a parasitoid lifestyle. And a parasitoid is, basically, a parasite that invariably kills the host. In the case of fairyflies, and several other families of tiny wasps by the way, they're parasitoids of the *eggs* of other insects. And you can get several tiny egg parasitoids out of one egg of the host. It's crazy.

Aside: So imagine an insect's egg, and into it a wasp has jammed dozens of her own babies into your baby, and her babies eat your baby from the inside out! Maybe *don't* imagine this, but the point is, parasitoid wasps, especially these teeny, tiny, black, shiny fairyflies, they get a lot of bang out of their buck for eggs. And they're sometimes used as biowarfare against agricultural pests.

Eric: And some fairy flies are nearly microscopic. There's one that barely exceeds the size of a paramecium, I think.

Alie: Oh my god!

Eric: Yeah! And it does this entire stuff with, you know, only a few hundred neurons or something. It's just ridiculous how complex such a tiny thing can be.

Alie: And they get bigger and bigger, then, until... I mean, obviously, we probably assume that some of the wasps we see out and about are gnats, right?

Eric: Probably, yeah. You're not likely to see these things because you have to set up flight intercept traps, and malaise traps, and then you can put them under a microscope to see them.

Alie: Yeah.

Aside: Malaise traps, side note, are the white tents that are covering a jar. And entomologists set them out in fields or yards to collect a sampling of local bugs. And all those little things that might just look like dust motes in the wind? They may be unidentified species! There are so many little bugs that we haven't formally met yet.

Alie: I lived in an apartment, and in the summer I'd get little gnats sometimes all over my bathroom mirror. And it wasn't until I found a dead one, looked at it, and sent a picture to Lila Higgins from the Entomology episode, and she was like, "Oh, that's a wasp." There used to be a fig tree right under my window, so they were probably fig wasps, which... so many of us have heard that if you eat a Fig Newton, you're eating so many dead wasps. Is this true or false?

Eric: [*laughs*] Oh, gosh. Even if it is... [*sigh*] They're so infinitesimally small...

Alie: Right! It's like, "That's fine!" But they do burrow into figs and live inside a fig, right?

Eric: This is correct. And one thing people may not know is that the USDA and the Food and Drug Administration, the two entities that control our food quality, have allowances for numbers of insect parts in your...

Alie: [*giggling nervously*]

Eric: Because it's just impossible to exclude them. I mean, that's how ubiquitous insects are. So, even if you're not eating a fig, you're probably getting another insect somewhere during your day. I had lettuce on my sandwich, I probably had aphid. I don't know. The only pollinators of figs are these tiny wasps that have developed this mutualistic relationship with figs, and it's ridiculously complex. There's a great many species. Some figs do not require pollination, by the way. But for those that do, there's not only the fig wasps but there are other wasps that are parasitoids of the fig wasp, and probably parasitoids of the parasitoids wouldn't surprise me either.

I mean, a lot of this hasn't been completely figured out yet. Unless an insect is of economic importance in one way or another, there's not a lot of funds to study them. So, a lot of what we know, we owe to really curious and determined scientists that said, "I'm going to find the funding to do this because it interests me." There's a shortage of that kind of money to do these kinds of things, but we desperately need that.

Aside: Okay, but one thing they have *figured* out is some hot-ass goss about how figs are made, a tradition that goes back, evolutionarily, about 80 million years. Are you ready for this?

So, a fig is an inside-out flower. Let's start by just trying to cope with that fact right there. And then a lady wasp digs into it via the bottom of the fig's little butthole. And in so doing she rips her wings and antenna off, and then uses *blades on her face to worm through the fig*, pollinating the fig's internal blossom, and then she dies. She dies in there. She's like, "Okay cool. I'm done here." And then her babies hatch, and the males of them have no wings! They just... They don't need 'em. They mature, they impregnate a female wasp *before she hatches*. A fig wasp born knocked up! Can you imagine? You're born pregnant from some wingless creep, who is also your soulmate, and he's like, "I gotta split, bitch," and he digs a tunnel out.

But once he's out, he's like, "Fuck! I just remembered I don't have wings!" And you're like, "Thanks do. I gotta motor." You go out his tunnel, you take some of the pollen with you all over your pregnant, newborn body, into the butthole of another fig, which, once again, is an inverted flower.

Now, before you dramatically retch at the thought of a fig, apparently the figs were like, “This is a convenient system for us. It’s probably bad PR though.” So figs make an enzyme called ficin that digests the dead wasps. So vegans, you’re pretty much in the clear. Don’t worry about it. There’s so many alive things all over everything we eat. Even when we try our plant-based best, everything’s crawling with something else.

Oh, and the crunchy things in a fig? You’re never going to believe what they are. Ready for this? They’re seeds. They’re just seeds. Calm down; enjoy the fig.

Alie: You know, when it comes to getting, say, bigger and bolder, what is next up the line? If we’re going from these fairy wasps to fig wasps, what are some of the ones that we commonly see?

Eric: Okay, well if we upgrade to the size where your naked eye is going to spot the thing, mud daubers are a really good example of a solitary wasp that we see frequently. And if we don’t see the wasp we certainly see their nests, which look like somebody just threw a clod of mud up under your eave or whatever, right?

So, that’s... Most of those are the creation of one female wasp. So, she builds one cell of mud after another, and in each she stores spiders that she gathers, paralyzes, and sticks in there, and seals the mud cell. And the larva that hatches from the egg she laid in there then consumes that stash of still-living, paralyzed spiders.

Alie: Oh my god! That is so hardcore. I didn’t realize that mud daubers were making pantries full of dead spiders.

Eric: Yeah.

Aside: Wait, is that right? Mud splats are acting as pantries full of dead spiders? Or is it *juicier* than that?

Alie: Do the larvae parasitize it while it’s living, or is it dead in there?

Eric: No, they’re living. They don’t have cold storage, *[laughs]* and most of these insects, they’re susceptible to the same molds and fungi and things that our bread in the fridge is and stuff. So, they’re paralyzed so they stay fresh, basically. Entomologists will tell you that insects do not have pain receptors so it’s not... they’re not feeling nothin’. That doesn’t make it any less gruesome, I don’t think.

Alie: Right! Are the eggs inside the body of the spider? Or how...?

Eric: No, they’re just feeding exteriorly. When they’re done there might be a few legs left or something.

Alie: Oh wow! *[gasp]* Okay, so mud daubers, we might see clods of mud. Inside, no big deal, it’s a tomb for a living zombie, like, mummy. No biggie. What other ones do you think people commonly see? I don’t know the difference, necessarily, between a wasp, and a hornet, and a yellowjacket. So, what’s the difference with those guys?

Eric: Okay, well if you want to talk about social species again then... Yellowjackets are primarily what we would call boreal insects. That is that they’re northern in their distribution. Some of them now are Holarctic. They either exist on all the continents or they’ve been introduced from one to the other. So that’s the northern hemisphere, basically. The further south you go, yellowjackets start to peter out a bit and they’re replaced by paper wasps, which are the ones that look a little more slender and they build paper combs that have no covering on them. So, those you often see under the eaves along with the mud dauber nests.

Alie: Okay, yeah. Those are the ones that you can see the comb. They look almost like those plants that people get really afraid of. You know those plants that have holes and people are like “That’s my trichananookaphobia!” Have you heard of that?

Eric: Right.

Aside: This is called trypophobia, and I just found out that two scientists, Arnold Wilkins and Geoff Cole, are studying the visual stress related to it. So, they may be the world’s leading tryptologists, and they put out a 2015 paper titled “Assessment of tryptophobia and an analysis of its visual precipitation.” They found that 17-18% of the population has a fear of clusters of holes or round objects – so it’s pretty normal – and that images in the natural world just don’t have that characteristic unless they are dangerous animals or potentially contagious skin diseases, so it’s in-built in us! Or maybe you’re afraid of the triple lenses on iPhone 11 Pro cameras. Those cost \$1,000. Also very scary.

On the flip side, if you’re all about gazing at bubbling pancakes or lotus blossom pods, you may enjoy the subreddit Trypophobia, which is really a tryptopheliac’s paradise. So many pictures. Or you know what? You could just stare up at the open comb of a paper wasp’s nest.

Alie: So those are paper wasps. What about the ones that make what looks like a papery beehive?

Eric: Yeah, those are aerial yellowjackets. Even though we call one of them the bald-faced hornet, it’s still a yellowjacket. It’s just a larger one and it’s black and white instead of black and yellow.

Alie: Oh! Why do they evolve to be striped and black and yellow so much, or these stark colors?

Eric: That’s something called aposematism. I think I’m pronouncing that correctly. Or more colloquially they’re called “warning colors.” So their enemies learn to associate those bold color patterns with the fact that they can sting.

Alie: Got it. Makes sense. It’s like a caution tape, essentially. *[laughs]* It’s like, “Don’t mess with my butt. I will hurt you.” Which makes sense. If my butt could hurt people, I’d want to let them know. “Don’t touch my butt. I might hurt you with it.”

If they sting you, the ones that can sting, will they die? Do their organs get ripped out like a bee, or no?

Eric: There are some tropical social wasps, I believe, and some yellowjackets that have barbed stingers, so yes, sometimes they lodge in you. That’s not something that happens every time, whereas with honeybees it pretty much is. Once they plant that stinger, that’s the end of the deal. But yes, occasionally, for some yellowjackets and other social wasps, they do have that kind of evisceration that comes with stinging.

Alie: Oof. Now, okay, I feel like when we hear ‘hornet’s nest’, we think angrier and angrier. I almost feel like if you had to go do, like, a *Family Feud* style “I’m going to poll 100 people,” we could put on a list, like, “Bumblebees are the nicest. And then honeybees. And then wasps, and then yellowjackets, and then hornets, and then murder hornets.” You know? We would give this a range. I feel like that’s probably not accurate. But do they get bigger and bigger as we go? Do they get angrier and angrier the bigger they get? Or is that just total myth again?

Eric: We have only one species of hornet in the US that’s established, and that’s the European hornet, which, as the name suggests, was introduced from Europe. They’re basically Eurasian, all the hornets. The different species exist over on the other side of the pond, so to speak, and I don’t know... I have come across a nest of European hornets once. It was in a hollow tree. I

got up in their grill. There was a small entrance to the nest. I got pretty close and, you know, they showed no aggression to me whatsoever.

If you linger in the flight path of hornets or yellowjackets coming and going from the nest, eventually they're going to, kind of, be annoyed at you, I think. They'll at least give you a loop-de-loop warning that, you know, maybe you ought to move your butt there. But, basically, yeah I've walked right up to a bald-faced hornet nest and watched them put paper on the nest and stuff, and I don't stay there too long. But unless you shake vigorously, [*laughs*] I think you're okay.

Alie: Now, what about... I'm sorry. I've got to ask you about murder hornets. And I know you heaved a heavy sigh like a heavy-hearted exasperation in all insect experts these days. Murder hornets, obviously, got their name kind of colloquially. But what are they? How aggressive are they? How many are there? What's the deal?

Eric: Well, I want to preface this by saying, once again, it's a human problem less than it is a wasp problem. We seem to have just decided that our global commerce, one of the acceptable risks of that is introducing species that don't belong here. They got the name murder hornet, not because they can murder people... That, in some extreme incident, I suppose that is possible.

But what they *do* do is they raid honeybee hives and they can take out an entire hive of honeybees because they're three times the size of the honeybee. They're enormous. They're twice the size of a yellowjacket at least. And they just fly in, crush the heads of the guard bees, go into the nest, keep crushing workers, and then they go and pilfer the larvae and the honey to take back to their own nest. [*"I mean, I'm only crushing your heads!"*]

So that's how they got the name 'murder hornet', is for the murder of honeybee hives, not the murder of people. So, that's the first thing. And secondly, it was a really irresponsible term for anybody to create. And you know, that's typical clickbait kind of thing now, right? I mean, it's typical media behavior.

Alie: And do they pose a big threat to apiculture here in the continental US?

Eric: Potentially, but again, they're not... One of the problems that was created by this is that in the monitoring for this species... It's *Vespa mandarinia*, the scientific name of this hornet. In the course of monitoring this, they're monitoring in places that this thing is never going to show up. It's never going to live in Texas. It's too hot. It's never going to live in the Southeast. But the northern tier of states, and especially in the Pacific Northwest where you've got so many ports where they can enter, yeah, you should be monitoring for these things, and yes there is a risk they could become established.

If we don't start inspecting cargo better, if we don't think about maybe assessing some kind of tax for invasive species and this kind of thing so that we can deal with it if it does happen... These are, again, human problems. Wasps are going to do wasp things no matter where they are, right?

Aside: And while many folks think that their darling, precious North American honeybees need saving, they're invasive but they have an incredible publicity team.

Eric: The problem is mostly with feral colonies of honeybees that establish in the wild and then start outcompeting native bee species. Apiculture has its own lobby. It's going to get a lot of money from the government, a lot of subsidies. And you have migratory beekeeping now where beekeepers truck their hives across the country depending on what crops need

pollinated, like almonds in California there. Your bees to pollinate those might have come from Michigan.

Aside: Storytime. So, one February I was stuck in a three-hour traffic jam on the Grapevine next to a Mack truck carrying hundreds of box hives. And I got excited because bugs. And I rolled down the window and I could hear and feel a really faint thrum in the air from just millions of bees. And I thought, "Aw man! It's winter. Let those ladies rest! Also, the bees are so lucky they can pee anywhere they want," which, on the Grapevine, I couldn't. It was too inconvenient for me.

Alie: And what do wasps do ecologically? Tell us some of the wonderful things wasps are responsible for.

Eric: They're pollinators as well. They're what you would call, technically, flower visitors because they're there for... with the exception of the pollen wasps that I mentioned earlier which *are* collecting pollen that they'll store for their larval offspring, wasps are there for nectar. The adult wasps need carbohydrates like we do to give them energy, whereas the larval insect, when it's growing up, needs protein to grow on and go through metamorphosis. And so, in the course of visiting flowers, wasps are going to pollinate flowers.

And by the way, some orchids depend on wasps for pollination to the extent that they mimic the female wasp and get the male to fornicate with them. [*Alie laughs*] I swear to god, I'm not making this up. In Europe, and I think Australia, and maybe South Africa, there's wasps that are literally intimately tied to orchids.

Alie: [*laughs*] How romantic! Can you imagine, there's a hot dog stand in the shape of your nude lover, just waiting for you? Amazing.

I have so many questions from listeners. Can I do a lightning round and we'll get through as many as we can?

Eric: Sure!

Alie: The other thing is, we donate to a charity of your choice. Any related charities...? You don't have to tell me now. You can email it to me later if you feel like it.

Eric: Well, I would give a shout-out to the Xerces Society.

Alie: Yes! I know them very well. Yes, Xerces, of course. Yes, I will shout them out and we will give them a donation. I have downloaded their guides on what to plant in my backyard for native pollinators. Yeah, I love them. Sweet!

Aside: So yeah, a donation went to the Xerces Society, and that was made possible by sponsors of the pod who you may hear about now.

[*Ad Break*]

Okay, your wasp-like, diverse, wondrous, and *pointed* questions.

Alie: Okay, lightning round. A lot of questions. The most frequent question I got is: Why are they so dicks? We covered it. We're good. Killian Dickson asks: What's the deal with wasps recognizing faces? Can they really do this? And if so, what facial features can they recognize or differentiate?

I wonder if wearing a mask these days helps at all or not.

Eric: [*laughs*] It's been demonstrated that paper wasps can recognize colony members from their facial patterns. Now, they can't recognize humans as far as I know. But the benefit of that is

that it's part of the social order. Paper wasps just don't have a queen in the sense of a physically different female like yellowjacket and hornets have a physically larger female that does nothing but produce eggs. But paper wasps are a little bit lower in the evolutionary scale, so all of the females are capable of producing eggs if they're not bullied by the dominant female. So they learn to recognize each other and act accordingly.

Aside: So a wasp's nest can produce, like, 4,000 new queens, and in the fall when the temperatures dip and all the workers die off, the queens are like, "See ya!" They go find an abandoned animal burrow, or a hollow tree, or a junkyard car, and they survive the winter because they have an antifreeze compound in their blood.

So then they build their own nest when it warms up, they make a bunch of new workers, and then the cycle starts again in the spring. Of course, that's the social wasps. Some queens, they duke it out. It sounds like a very brutal version of some of our high school experiences.

Now, speaking of painful external pressures, patron Rich Flight asked: What's the deal with the skinny waist? What's their diet plan? This question was also on the ganglia of Meagan Walker and first-time question-askers Lillie Taggart and...

Alie: Tegan Mortimer and a few other folks want to know: What is the point of the wasp waist (the insect one, not the 19th-century fashion one)? And how do the lower bits of their body not just fall off?

Eric: This is really bizarre. I had forgotten this until I was researching the book. But the abdomen of the wasp actually starts on the rear end of the thorax. It's called the 'propodium'. So that's the first dorsal segment of the abdomen, so everything posterior to that is called the 'gaster'.

Aside: So in general, that teeny, tiny tube waist of some Hymenoptera like ants and wasps is called a petiole, and their shapely rump area is the gaster, which you're welcome to call yours from now on.

Now, I was looking at pictures of paper wasp's nests and how they hang from a cord like a chandelier filled with wasps, and it turns out that that stalk at the top? Also called a petiole! Okay, but why?

Eric: And not all wasps have that thin waist, like the sawflies and horntails – which are more primitive wasps, if you want to frame it that way – still have a cigar-shaped joint to the thorax, a broader joint to the thorax. But when you have that hinged abdomen, it gives you great flexibility when you're trying to sting your host.

Alie: So it's like a gooseneck lamp?

Eric: Yeah! That's an excellent analogy. Yeah.

Alie: Why thank you. I hope never to encounter one up close, but I commend it. That makes tons of sense.

So, do they have their guts... Is there, like, one little intestine that goes from the top to the bottom?

Eric: Yeah, there's an esophagus and then, basically, the alimentary canal runs through the thorax. The thorax is almost all muscle, by the way. It's what operates the wings and the legs, so it's a really dense muscle structure. And then the abdomen houses the stomach, and the reproductive, and the excretory organs.

Alie: That is amazing. I've always wondered what's in there, because it's such a little pipe cleaner too, of like... Ooh!

Aside: Also, did you ever wonder why a Vespa scooter is called a Vespa? I did, so I decided to google it for several hours.

So, upon seeing a redesign of the little motorbike, which has a front part with two handlebars, and a thin floorboard, and then a juicy badonk that houses the motor, one of the engineers said in Italian, "That frickin' thing looks like a wasp! Are you kidding me? I love it." And so Vespa means wasp in *Italiano*, and they've been buzzing around the world ever since then.

And I thought, "Goddamn! That must be where the cocktail Vesper gets its name." But nope. The vodka and gin martini with Lillet, it is called a Vesper, but it comes from the word for evening, not because a giant, freezing cold, chalice of straight grain alcohol packs a bit of a sting.

Alie: First-time question-asker Exuro Piechocki wants to know: How is it that wasps and bees look so similar but wasps have evolved to consume meat while bees are content just to rub their butts in flower dust?

Why do some wasps eat meat? I know when I used to be a caterer, when there were yellowjackets they'd be like, "Just throw a piece of ham over there to divert them." What's up with that?!

Eric: Well, again, the adult wasps are not consuming protein matter. They're taking it back for their offspring. I've watched a yellowjacket cut a piece out of my turkey sandwich and fly off with it.

By the way, one thing I want to caution all your listeners about is serving beverages outdoors. Do not serve them in cans or opaque bottles or glassware. You could get a yellowjacket crawling in there. And if you get stung on your tongue, even if you're not allergic, that can be a life-threatening experience. Serve your beverages in clear glasses.

Aside: About a million people go to the ER every year for insect stings. Most are just fine. But about 60-70 people die every year from allergic reactions to stinging bugs. So just look for symptoms like tingling sensations, dizziness, hives (the skin kind), swelling of your lips or tongue, maybe having a hard time breathing or wheezing, or if someone just straight-up passes out. No matter why, you should probably go to the ER for that last one anyway.

But one of Eric's pals, he says, you may have heard of him...

Eric: Justin Schmidt, the King of Sting he's called, who created the Schmidt Pain Index of insect stings...

Alie: Yes!

Eric: Yeah, he occasionally will self-inflict a sting upon himself, and then describe it, and rate it on a scale of one to four; four being the worst thing and one being barely detectable, basically. A honeybee is a number two on his scale, by the way. But he found that tarantula hawks, which they need their venom to paralyze their tarantula prey... I mean, you've got to have a pretty wicked sting, I would think, to paralyze a tarantula anyway. But it turns out that it's absolutely excruciatingly painful if you get stung by one of those things, but in about three minutes you're fine and it doesn't do any damage. It's totally tailored to the prey item they're after. And for solitary wasps, that's the deal. They're tailoring their venom to a specific host. They're not worried about self-defense.

Aside: So for solitary wasps, their venom is really prey-specific. Now, what about the city wasps? The ones who live in big, papery buildings on the side of your house, or underground with thousands of other ones and they just love the hustle-bustle of the nest life.

Eric: Now, for social wasps, that's another story. I mean, that is the purpose of their sting. "Get the hell away from our nest. We got babies in there. Get out." They can rout a bear out of their nest, so...

Alie: What's the highest on the Schmidt Index you've ever been stung?

Eric: *[laughs]* Wow. Somewhere around a three probably. A paper wasp got me once and that was pretty painful.

Alie: Yeah. Myrmecologist Terry McGlynn talked to me about his bullet ant sting. Did not feel good.

Aside: Will Eric ever be sticking his face into a nest for YouTube clout?

Eric: My feeling about myself is that if it ever becomes about me, I need to find another line of work because I want it to be about the message. My message is that, you know, these things deserve an appreciation and a respect that we're not giving them right now.

Alie: Right. Coreen Weilminster wants to know: What's up with wasp venom and cancer treatments?

Have you heard anything about their venom being heroically used?

Eric: There's certainly research going on. There's some kind of Brazilian wasp, I think, that shows promise in that regard, that it targets specifically some protein or something that's specific to cancer cells while leaving healthy cells alone.

Aside: One 2017 Brazilian study titled "Phosphatidylserine lipids and membrane order precisely regulate the activity of Polybia-MP1 peptide," (... sure) found that a toxin in a species of South American wasp targets cancer cells while sparing healthy cells. The wasp venom contains a toxin called MP1, which globs onto fat molecules on the surface of cancer cells, making the tumor cells leak out what they need. But in healthy cells, a lot of the business is on the inside of the cell, so the MP1 doesn't affect it.

But hey, don't go getting stung as medicine. We are not there yet. Also, don't grind up oak galls and shove them up your cooter. Some folks do take tree galls, which are created by flies, or mites, or yes, wasps, and they pulverize them to market as a... tunnel tightener, if you will. Not a good idea. Not medically sound. Also sounds a bit grainy, to be honest.

Eric: This is an excellent point. We're not funding basic research the way we used to, so there's not a lot of money to go into this kind of thing. And we haven't even scratched the surface of all these insect-based chemicals that are unique to insects that could have really impactful implications in medicine and other technology for that matter.

Alie: Thanks in advance, wasps. Your millions of years of evolution... Your stingy butts might be saving ours. Who knows!

Daisy Goldstein Cross had a great question. Wanted to know: Do they ever use materials besides wood pulp to make those hanging paper nests, like plastic? It's so beautiful and they've used it in some collages before...

Eric: Do paper wasps ever use anything other than wood pulp? Basically, any woody cellulose source is something they can use. Some of the social wasps also build mud nests rather than paper nests. Basically, any woody cellulose source is something that they can use. It need not be from an old fencepost or something, but you'll often see them gathering material from sources like that.

Aside: I never thought of how we use wood pulp for paper and so do they! They just chew up wood; they mix it with spit. We could probably do that for stationary if we weren't so lazy.

Now, a lot of you – lookin' at you, patrons Sara VanDeventer, Ashley Konon, Lisa Burbidge, Charlotte Fjelkegård, Kelly Semon, Meagan Walker, and Yuri Young – have gardens and needed advice on how to co-exist with wasps, as did:

Alie: Kimberly Hoffman wants to know: How in the heck can I create a pollinator-friendly property, including wasps, without having them make nests on the house? Is there some sort of box I could make for them to have a safe home and reduce negative human interactions with wasps?

And actually, another great question to pair with that is, Kadie Spino wants to know: Do the fake wasp's nests work to prevent them from making a nest near your house?

Eric: Okay, the answer to that is no. Don't bother with paper bags and what have you. Don't bother painting the underside of your eaves sky blue either. Basically, our architecture mimics where they nest naturally, which is like on cliff faces, under rock ledges, and things like that. So, your house is just a big cliff to them, and of course they're going to nest there. You know, if they're in a place where you can't tolerate them... Remember, I just said we had a nest in the corner of our doorframe here that I didn't notice for two weeks. Just let them do their thing.

Tell your guests that come over, "Please be careful of that. I'm supporting biodiversity." [laughs] I say that about our messy house, too. "We're not messy housekeepers. We're promoting biodiversity!"

Alie: Exactly!

Eric: And my wife is going to kill me when she hears me say that.

Aside: So much biodiversity on dirty dishes. You're doing great, everyone! Wait, where were we? Yes, outdoors.

Eric: How can you create a pollinator-friendly garden? Well, if you plant for bees you're going to get wasps by default anyway. If you have a vegetable garden, you're going to have a few aphids. They're going to attract little wasps that sting them and lay an egg in the aphid, and the aphid becomes an aphid mummy, and then the wasp eventually cuts its way out through a little hatch that looks exactly like a round door coming out of what used to be the aphid.

So yeah, again, learn and celebrate these little things when you find them. If you put up bee hotels, or bee condos they're called sometimes, solitary wasps will nest in those as well. And welcome them because they're taking care of pest caterpillars in your garden and other critters that might be gnawing on your veggies.

Aside: Also, when it comes to bee hotels, do some research and make sure you're getting ones that have removable tubes so you can replace or clean them because things get dirty, mites get in there, and you want your little pollinator babies to be healthy. So, research cleaning your birdfeeders too. Did you know dirty ones can transmit birdie disease?

Also, I neglected to mention in the Wildlife Ecology episode that you should do some research on bears in your area too because they can be attracted to bird feeders, and that is how bears get labeled as a nuisance and shot. And I just want to say thanks, Ashley the Ologist on Twitter. You can follow her @TheAngryOlogist for more wildlife tips.

And yes, consider that some native wasps are just out there like bouncers in your garden 86ing some little critters munching on your lettuce.

Alie: Ooh! Thanks, wasps! Going around and doing some cleanup for us.

Also, Sikwani Dana is up in Maine and says: I've seen a couple of the giant ichneumon wasp females, I believe, around my house and they're beautiful. Can you please talk a little bit about them and their lifecycle?

And yeah, these wasps, I've seen them before. I can't remember how to pronounce them. But what's with their lifecycle?

Eric: Yeah, you had it right, "ick-new-men" wasp. [*computer spelling "ICHNEUMON"*]

Aside: Certainly google these mostly non-stinging critters who are like, "You will know me by my butt wand."

Eric: They're now being called Darwin wasps by some of the experts on that group. Now they're thinking there might be as many as a million ichneumon wasp species alone that we've only described a small fraction of those, in the thousands.

But anyway, these guys, yeah... the females, rather. Their body is maybe a couple inches long, but their ovipositors, their egg-laying organs are streaming out the back end, adding another four inches to the wasp. And so, when these things fly by it looks like one of those sky riders or something, you know? And what they're using that long ovipositor to do is to drill into trees, dead or dying trees, that are either inhabited by another wasp called the horntail wasp. And its grubs are borers in dead and dying trees.

Somehow, the ichneumon is able to divine – like those old water witches, you know? – where this larva is inside this tree. And then she arches up her abdomen, and flips that ovipositor underneath her, and drills down to reach that grub, lays an egg on it, and then leaves the scene. And her own larva will then feed on the horntail larva.

Alie: Wow!

Eric: Yeah.

Aside: Drama!! So much drama. Also, Eric's book, *Wasps: The Astonishing Diversity of a Misunderstood Insect*, is so pictorial and beautiful, and the cover features these two delicate orange and black wasps that are huddled on a flower stalk, seemingly having some kind of business meeting. Does he have one wasp that he just can't stop staring at? Does he have a secret favorite?

Alie: Do you have a favorite wasp?

Eric: [*laughs*] Do I have a favorite... Well, not anymore. Not after learning about these wasps that I was less familiar with. I have to say I have a true, honest appreciation of all of them now. I do like the colorful ones, of course, the cuckoo wasps, and velvet ants, and things like that that are either metallic in the case of cuckoo wasps or bright fuzzy critters.

But the wasp that is on the cover is called *Ammophila*. And I happen to be good friends with a world authority on these, and he just wrote a new scientific key to them, describing a couple new species in fact. And the ones on the cover are sleeping. Believe it or not, wasps sleep. And in the case of these thread-waisted *Ammophilas*, they grip some little twig or stem in their jaws and then prop their body at a 45° angle and spend the night that way. Sometimes they gather in loose clusters and they can look like a little cluster of seed pods or something. But yeah, if you go around a field at dusk or something and you look closely, you might find them settling down for the night.

Alie: Oh my gosh. Gorgeous! I mean, is there a good way to start going on a wasp safari if you want to let them into your heart?

Eric: Well, that's a good question. Just go out of your house. Or go up into the attic. There might be a mud dauber nesting up there for all we know. By the way, a lot of things I see on social media are posting of wasps that found their way indoors. And often this is because they nested indoors and then the offspring are now emerging inside rather than outside.

So, people often are just astonished to find this weird mishmash of things in the window track. Or their windchimes. Sometimes they nest in there too.

Alie: Oh! Up in the windchimes. Gosh, I love the idea that just... we're just kickin' around, walking around with a cup of tea, no idea that there are semi-alive spiders that are mummified in the... Like, so cool.

Ethan Chapman asked: Just how smart are they? I've heard they're much more intelligent than bees and other stingy bois. And Kristina Weaver wants to know: I want to know how the parasitic wasp mind control works. How do they do it?

Eric: Wow, a lot to unpack there. [*"You okay, buddy?"*]

Alie: Yeah! [*laughs*]

Eric: All right, well here's the thing. I think one of the reasons... I think we, kind of, hold this latent envy of wasps that they're maddeningly efficient at exploiting our every weakness and they do it without this burden of ethics and etiquette, [*laughs*] and a moral compass that we have to deal with. So, they're ragingly successful with stimulus response and instinct, and here we are with these big brains and we can't remember where we parked the car. And yet a sand wasp female can find her nest in a dune, right? So they have a way of making us look stupid.

But instinct, I think, is a lot more plastic than we used to think it is. It has some malleability and wasps still have to make choices and things, and sometimes those choices are evolutionarily successful and sometimes they're not. Just like any other organism. I think... Are they intelligent? Only as much as they have to be, and I think that applies to just about every animal. There's no waste in nature. Everything is just at the point it needs to be to survive. When we throw in our very rapid changes to the landscape, that makes it a little bit harder for them to succeed.

Now, changing gears completely to the zombie wasp kind of thing, our definition of venom is changing a lot. It used to be kind of a, "Is it a lethal thing? Or is it a toxin? And if so, what kind of a toxin?" Well, basically, a venom now is anything that impacts the host in one fashion or another. And in the case of most wasps, it's either partial, temporary, or complete paralysis of the host. But in the host of some of these wasps, especially braconids and ichneumons, which are very closely related groups, they also have a virus that is peculiar to them that the female injects when she lays her egg. And she may inject a mild... some kind of venom that also influences the host in some way or makes it easier for the virus to do its thing, which is to basically, yeah, mind control the brain of the host to bend its will to facilitate the wasp's offspring.

So in the case of some caterpillars, or in one case a ladybug parasitoid, the host survives the parasitic experience and winds up hovering over the pupae stage of the wasp and is responsive to stimuli in a defensive fashion, and is thus a kind of brain-controlled guardian, robotic guardian, of its own parasitoid.

Alie: WOW. Augh! I mean, what a beautiful thing, though. I mean, that is just evolution... years, and years, and years, and years. Just to think of how many iterations to get the right type of neurotoxin that would work like that, you know?

Eric: Oh, there's wasps that have Rube Goldberg lifecycles. It's just insane. Where they don't even attack the host directly. They attack *its* host and won't complete their life cycle unless the intended parasitoid takes the host. It's just... It's insane.

Aside: If you need a new genre of horror or suspense to get into, may I suggest reading about parasitoid wasps, for hours, as I have just done past 2am? So many species. So many stories. So many victims! It's bananas.

Really quick, there are these earthly beings called jewel wasps that are gorgeous and metallic, and they can use their stingers to, essentially, do brain surgery on their cockroach hosts. And they feel around with their stingers inside of its head and inject venom into very specific regions. And their venom does things like simulate a flood of neurochemicals that makes the cockroach compulsively clean itself for about half an hour, making it a nice, clean host for her baby. And then as the roach is primping, the wasp is off finding a good burrow, comes back, breaks off a roach antenna, and gets a nice, long, quench from its body.

And then, uses the remaining antenna to lead this newly unfettered zombie roach like a frickin' farm donkey to a tomb! Seals it up, lays an egg on its leg, and then her babies feed off of this alive, stunned roach for days and days until it makes its debut in the world, busting out of the burrow like a curtain. Like a shiny, metallic, bejeweled queen at the best Palm Springs drag show you have ever witnessed.

Wasps! I mean, are you even able to even right now?

Eric: I had to go around the room picking up the pieces of my brain every day after writing this book.

Alie: *[laughs]* I love that you just got to be inundated with wasp facts. Like, what a dream! I love that.

Katherine Morse asked: Is it just random chance that I'm stung in the palm frequently by wasps on metal railings, grab bars, and even metal wheelchair parts? It's always a wasp and not a bee. This is a disability challenge no one mentions!

Do they like shiny things?

Eric: Aww. First of all, that's not something anybody should endure more than once at least. But... Well, they'll perch on different surfaces to groom themselves a lot. So, I often... If I want to take pictures of wasps, I'll often hang out around the edge of a field where there's shrubs and things with broad leaves. So, they'll land on there, and they'll groom themselves. Or they'll land on there to mate. Or the males will land to guard territory or something on that order.

So, yeah, they'll land on surfaces you wouldn't expect just in the course of needing to groom, or rest for a minute, or something like that. But they're not going to be there that long if it's a hot surface. So, the metal thing kind of surprises me a bit. I would expect them more on wood surfaces, and foliage, and things of that nature.

Alie: Interesting. I wonder if they're perched on it being like, "Why is it every time I sit on metal someone squishes me with their hand? Why does it keep happening to me?" You know?

Eric: *[laughs]*

Aside: I did some more digging on this, and I couldn't find much. However, wasps do gravitate toward metallic car grills because they like to snack on bug guts. So maybe, Katherine, you ran over a bug? Or a little bit of fresh sidewalk pizza cheese that was on your wheels that was just irresistible? I don't know. Very much a hypothesis, but I hope it doesn't happen again.

Everyone, don't litter. Even if it's pizza. The repercussions can go on and on. Anyway, speaking of sucky stuff:

Alie: Okay, the questions I always have to ask. I know that we are here to absolutely adore wasps, and we do love them, and they are beautiful, but what is one thing about studying them that sucks?

Eric: Oh. They're so bloody fast.

Alie: *[laughs]* That's a compliment. I love that.

Eric: Yeah. They just don't sit still for anything hardly. I consider it a privilege when I get a chance to get up close to one for any period of time more than a nanosecond.

I don't know, I guess the fact that I'm in a minority of people that appreciate them may be the thing that sucks the most. I'm put on here to defend creatures that don't have a lot of... And our entomology community has failed you, to be honest. We haven't done our due diligence in pointing out the positive aspects of wasps and their diversity.

There's insectaries where they raise itty-bitty, teeny wasps that they release into agricultural fields, for example. But nobody hears about that. We only hear about murder hornets!

Alie: Exactly! And just the fact that I have said on podcast episodes before, that wasps are dicks, is a huge flag to me that I don't know enough about wasps. You know what I mean? And I love this.

Eric: You're doing your homework, though. And I mean, my hat is off to you. Your audience is already educated and eager to learn, and I wish that applied to more people. I want to thank your listeners, in fact, right now. Yeah.

Alie: Aw!

Aside: The wasp guy likes you! Isn't that the best?

Alie: This is going to be a hard question to answer but: your favorite thing about wasps? Or your favorite wasp? I don't know! How do you even answer that?

Eric: *[laughs]* Their diversity is just astonishing. I mean, that's the subtitle of the book, in fact. And more so even than I dreamed of. I mean, I had an inkling. I'm learning new stuff every day. So, it's hard to pick a favorite, but I certainly adore the shiny ones, the cuckoo wasps, and the fuzzy wingless female velvet ants and their winged males, and tarantula hawks and their metallic blue and orange and what have you. Yeah, they all have a place. And you don't have to like every organism as long as you understand that it has a place, and you can respect that, and act accordingly. There's plenty of organisms I don't like. But thankfully, I understand their role in the ecosystem and their impact on humanity enough to pay them some respect.

Alie: I think we should start conversations with, "What's your favorite wasp?" And if you know that's going to be an icebreaker, you better find a favorite wasp!

Eric: That's fine by me!

Alie: My favorite wasp is probably the tarantula hawk wasp. I mean, they're so beautiful. They have that brilliant, midnight blue body and these golden, almost caramel-colored wings. And whenever I see them in California, I freak out. I get so excited! I've been on, like, a hike before where I've pointed strangers toward it, being like, "Look! Look at this beautiful thing! It's so nice to see one!" So, I think that's my favorite. They're so beautiful.

Well, congratulations on your book!

Eric: Thank you!

Alie: I mean, *Wasps: The Astonishing Diversity of a Misunderstood Insect*. It says it all! I love it! So exciting. Thank you so, so much for being on. I love wasps now.

Eric: Well, it's an honor to be here. Thank you.

So ask passionate people about unsung underdogs. And look! You respect wasps now! I know you do. Just let them have their space and everyone's going to be fine.

Get [Eric's book](#), *Wasps: The Astonishing Diversity of a Misunderstood Insect* wherever books are sold. You'll find a link in the show notes. You can find his work on his blog BugEric.blogspot.com. He's on Twitter [@BugEric](https://twitter.com/BugEric). We are @Ologies on [Twitter](https://twitter.com/Ologies) and [Instagram](https://www.instagram.com/Ologies). I'm [@AlieWard](https://www.instagram.com/AlieWard) on [both](#). Please be my friend.

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Thank you, Susan Hale and Noel Dilworth for keeping *Ologies* engines running. It's been a whacky couple of months. We are shooting double our usual schedule for *Innovation Nation*, plus I took a few extra TV show consulting jobs this year. And I'm getting married in a few weeks to editor Jarrett Sleeper, a very handsome, smart person. Hi Jarrett! Things have been, let's just say, very active at Ward HQ lately. Thank you, as always, to co-editor Steven Ray Morris. Always a busy bee and a wonderful wasp himself. And Nick Thorburn of the band Islands did the theme music.

And if you stick around to the end of the episode, I tell you a secret. And this week, I will tell you, in grammar school... I still feel guilty about this. I was mucking about just getting filthy at recess a lot. I would build, like, tiny mud houses or what have you. And one day, my friend Steve was like, "Hey, you wanna see a yellowjacket nest?" And I was like, "Hell yeah, dude!" And me and his friend Brandon walked over to a hill and stopped in front of a hole in the ground. And I'm like, "Where's this nest, y'all?"

And Brandon stomped on the hole! And the yellowjackets were like, "Not cool, Brandon. Not cool. We got babies in here." And then they flooded out like a cartoon, and yeah, I got multiple stings in my hand. And yes, I cried like a b-word.

But also, I was like, "Yellowjackets, well played. A worthy adversary. I have learned." Even though it wasn't me, it was Brandon that stomped on it. I never would have condoned that. However, I did get to go home for the rest of the day, which kind of ruled, and watched *The Price Is Right*.

So respect your flying sharks and drink out of clear glasses. Okay, that's all.

Berbye.

Transcribed by Emily White at TheWordary.com

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