

Native Melittology with Krystle Hickman

Ologies Podcast

June 21, 2023

Oh hey, it's that suitcase that you haven't unpacked yet, Alie Ward, this is *Ologies*. You're here, I'm here, we're here, the bees are here, the bees are everywhere. But in the US, 18 states have declared that their state insect is *Apis mellifera*, the honeybee. Here's the thing, that's not native to this continent, it's a European honeybee; it was imported for wax, honey, and pollination. Every honeybee you see in the US is feral. What you may not know about are the native bees, the ones that have been here for eons, yet none of them are state insects. So today, we'll meet them and within an hour you're going to become the kind of person who is obsessed with indigenous bee species.

So, this episode started in my backyard over a year ago when we decided to pair up with my old friend David who runs a native plant nonprofit in LA. Fast forward 18 months and we have this thriving, buzzing hill of plants. David mentioned a native bee expert he knew and I begged her to hang out with me. Before I knew it, she and her camera were here, making mems.

Alie: What kind was that one?

*Krystle: It was a *Halictus tripartitus*, a little sweat bee.*

Alie: A sweat bee.

Krystle: I know. Oh wait, she's back, she's over here. She's right here. Oh, she's flying away... Now she's on the stem, maybe that's a good place to...

So, this ology is Indigenous Melittology, it comes from the Greek word for 'bee', so if you know anyone named Melissa, their name means bee. And you may remember that we did a Melittology episode in 2018 that was wonderfully informative and charming, it touched on some native bee species, and it also covered a lot of *Apis mellifera* and backyard beekeeping. So, we are returning to the topic of bees but this time with a more focused lens with a photographer, an educator, and a conservationist. She has been a TEDx speaker, she's a 2023 National Geographic Explorer Grant recipient, and she's an author and an advocate for these native creatures and their habitats. She also just launched a deck of flashcards all about native bees, and in some of the audio, I decided to use some outtakes from this interview because I got a super sneak-peak at the deck, which is for sale now and will be shipping later this month.

So, we'll sit down with her, but first, a quick thanks to everyone supporting this show at Patreon.com/Ologies and submitting questions, for telling a friend, for rating, and for wearing *Ologies* merch from OlogiesMerch.com. Also, you know I read all your reviews, including this fresh one from an unpronounceable string of consonants, I think it looks as though it was typed with the smear of an elbow, but they said:

Thanks to this podcast, I was able to respond to my therapist telling me, "Don't drink out of a firehose," with a full explanation of dolphin reproduction. I love that so much.

As do I.

Okay, go grab a sunhat, fill up a water bottle, let's stare into the bushes to meet some native bees and learn about their tunnels, turrets, fuzzy butts, sexual dimorphism, taxonomic fisticuffs, bee hotels, the mustard blight, monocultures, the tiniest livestock, and how to appreciate and photograph all of the marvels you've been overlooking with native melittologist, Krystle Hickman.

Krystle: My name is Krystle Hickman, and my pronouns are she/her.

Alie: [*“Let’s get into it.”*] Now, were you excited about photography, the outdoors, bees, bugs? What was the door that opened for you?

Krystle: All of that.

Alie: Sweet.

Krystle: Yeah. It’s weird to say this but I feel like I came kind of pre-programmed because everything I was really into as, like, a toddler, I’m doing now as an adult.

Alie: That’s dope, that’s amazing.

Krystle: Yeah, so I was obsessed with my mom’s camera. We had rosebushes on the side of our house, and I used to stare at the ladybugs and the honeybees in there for hours. And I remember one time there was a snake in our yard and I was so excited to see it. I really love insects, photography, all of it, and it just kind of came together.

I think as an adult though, I kind of got away from it because it wasn’t a career. So, I went to college for something I wasn’t even interested in and then I started working these office jobs and I just, kind of like, left with no backup. I had a little money in the bank, but I was like, “I’m going to do every single thing that I’m interested in and I’m just going to see where it goes.”

Alie: Oh, that’s great. What was that day like when you decided, “Fuck this job, I’m leaving.”?

Krystle: I mean, it was very slow going. I felt like for a little while, I was getting dumber.

Alie: [*laughs*] I’ve felt that, for myself.

Krystle: Yeah, I was literally– I remember I was looking at my schedule and I could predict what I was going to be doing every single day for the rest of the year. [*Alie groans*] And I was just, like, on autopilot and I was like, “I am *so* sick of this.” The first thing I did though was art, because I’m also really into art.

Aside: Wait, she draws too?!

Krystle: So, I actually picked up a pen while I was sitting at the desk and I just drew, I think it was a dog, and I was like, “Oh, let me just keep drawing,” and then I kept drawing and it was, like, a month of me drawing every single day from the show *Skins* that I was obsessed with.

Aside: So, this was a darkly comedic, British TV series about teens and college students. It came out in 2007 and it is heavily steeped in what is known as the indie sleaze culture; an era of DJs and side swept bangs and chunky jewelry. There were carbonated-caffeinated malt liquor options, and this show featured some well-written subplots about mental health and disordered eating and frustrated sexuality, at a time before everyone had face filters on their social media. So, *Skins* was co-created by Bryan Elsley and Jamie Brittain, and Krystle, as a fan of the show, started drawing portraits of the series actors, starting with a character who usually wore a fedora which, I’m sorry, that was groundbreaking for the era. [*“The guy at the store said I’m the only guy he’s ever seen pull it off.”*]

Krystle: And then after I finished drawing, I put it in a video and put it on YouTube, and then I found the creator online and I sent him the video, and within a month of me starting to draw, he hired me to work on the show.

Alie: No!

Krystle: Yeah.

Alie: [*gasps*] What?!

Krystle: Right? I was like, "Oh, hey!" So, for quite a while I was just doing a lot of art, and it took off really well.

Alie: Wow. What a shoot-your-shot moment.

Krystle: Right?

Alie: How glad are you that you just went for it?

Krystle: Yeah, it was so random, and I was like, "Oh, someone wants to pay me for this? And it's my favorite show." Yeah, I came here originally for acting so I wrote and directed my own short film, and then I was just following every single path. So, I did the same thing with the bees and it kind of linked to the artwork because I wanted to get a camera where I could take original photos for my artwork but then also photograph bees because I'd been drawing everything based on other people's photos and I was like, "I want to take my own photos."

Alie: Oh, that's a great point.

Aside: So, Krystle picked up photography by taking source photos for her ink drawings.

Alie: I think so much we don't think about that is how much we use photo references but having your own must feel like it's really, really yours.

Krystle: Yeah, and I started creating really strong messages. At the time, I'd just met this girl, we did a talk together, and she was one of the founding members of Black Lives Matter.

Alie: Oh, wow.

Krystle: Her name is Shamell, so she had a fro and I saw a picture of her, like, at a Black Lives Matter protest and I told her she looked like Angela Davis and then she's like, "Hey, I actually know her. Do you want to meet her?"

Alie: Whaaaat?!

Krystle: Yeah, and then like, I think it was maybe less than two weeks later, I met her.

Alie: The stars aligning.

Krystle: Right? It was very random. So basically, we recreated that image of Angela Davis with her fist up. So, she came to my apartment, I put a whole backdrop up. She was in ballpoint pen and then I used black spray paint for the Black Lives Matter logo/name and then I did a custom frame where I put, I think 44 people who had basically lost their lives in activism. I've been working on one forever, it's a chicken, and my friend brought her chicken over to my place.

Alie: Augh, lucky.

Krystle: And I got one shot of the chicken looking directly into the camera, and that's the one I'm using.

Alie: Oh wow. What's the chicken's name?

Krystle: Honey.

Alie: Thank you, I needed to know. When someone has a pet chicken, you need to know what they named it.

Krystle: Oh yeah, yeah.

Aside: That piece features a live chicken standing on a dinner plate as a commentary about eating meat. Also, if you want to know more about chickens, we recently did an entire Chickenology episode, it was a two-parter.

Also, after we recorded this, I pulled up the 2018 timelapse video of Krystle's hands with nothing but a blank sheet of paper and a ballpoint pen rendering a photo-realistic and stunning portrait of the *Black Panther* character T'Challa, which was shared tens of thousands of times on social media, including by the late Chadwick Boseman who added, "Krystle Hickman, your penwork is incredible. Thank you." I watched this video, this timelapse video, of her making this art and it was so stunningly gorgeous, I started crying which was very embarrassing because I had just met her, but it was absolutely gorgeous.

So, she was already finding success and acclaim in the art world, but she started picking up more and more skills and you will learn that that is kind of what she does. She is one of those people that is just good at everything.

Alie: You got this camera so you were making art and you thought, "I want a camera that maybe I can shoot people, and bugs, and nature." How much googling did you do to find a camera?

Krystle: Oh my gosh. So much, so much. [*Alie laughs*] Because I was doing bee photography with my cell phone for two years. Like I was saying, I pick a lot of hobbies, and like, I try to go through with all of them and I wasn't sure I was going to stick with this one, so I wanted to know I was going to stick with it first.

So, after I knew that I was, I did so much googling and I was trying to decide between Nikon, Canon, and Sony and then I ended up picking a Nikon D500 which is a crop sensor lens, and this was before mirrorless was really big. And I just YouTubed the crap out of this camera [*Alie laughs*] because I was like, "This is a great camera for making small things look large, you don't have to crop as much." And I absolutely love this camera. It was a camera that I knew I was going to have to grow with, I didn't want something I would outgrow because it was pretty expensive too, it was the most expensive piece of equipment I'd bought.

Alie: When you had two years of bee cell phone pictures down, were you using Olloclips, or what types of lenses?

Krystle: Nothing.

Alie: Really?!

Krystle: Yeah, yeah.

Alie: That's cool.

Krystle: My old photos, people thought I actually had a camera.

Alie: I mean, you did, it was just part of a phone, right?

Krystle: Yeah, that's true, actually yeah. I think honestly, cell phones, especially when you're learning how to use a camera, you can take better pictures with your cell phone.

Aside: And for more on macro photography, I will link our whole episode on it, it's called Aperiology and it's with Joseph Saunders, that'll be in the show notes. Just a life of bug portraits awaits you.

Alie: Did you find that you really liked taking the pictures, having the source material, and then also getting that practice of getting out and looking for them too?

Krystle: Yeah, I really enjoy the process of just going out into nature. I think that's one of the main reasons why I keep doing this, going out to places where there's no cell phone reception, it's just you and whatever you're doing. I also feel like a lot of times in nature, just nothing revolves around people, which is really nice, so you can't really be selfish in nature and it's just, I don't know... it's kind of like therapy or meditation.

Alie: I bet, the idea of getting out of your head and off of your phone is so hard to do, literally unless there's no service or you've dropped your phone down a well.

Krystle: I mean, yeah.

Alie: Which is expensive.

Krystle: Oh, you've done that?

Alie: No. But I'd think so. [*both laugh*] It's funny when people come back from, like, camping or something and they're like, "It was great, I had no service."

Krystle: Yeah, it's amazing too because the longest trip I'd ever been on was a 10-day trip, I was in the Trinity Alps, it was, like, two years ago now. It was just so interesting coming back because all of this media that I consumed before really regularly, I didn't realize how negative it was. It's really refreshing. That's why I try to go out somewhere every single day and I'm so happy and I also, like, everyone around me, I don't know if I'm just attracting people who are happy or what exactly, but everyone is super positive.

Alie: It feels like when you know you're doing something you really like, that enthusiasm is really infectious, people want to get on your team because it's clear you like what you're doing, you know? Which is great. And then you never know, the bees might be talking to each other about you...

Krystle: I mean, they could be.

Alie: Just a general, you know, general buzz about town.

Krystle: Buzz about, ha-ha.

Alie: I know, that's the worst thing I've ever said. [*Krystle laughs*] Now, you liked ladybugs as well growing up, and other types of bugs, what was it about bees that really just got ya?

Krystle: I wish I had a really definite answer. I would just say that I liked all insects, all bugs, but the thing that got me specifically into looking at bees was... there's this quote that's attributed to Einstein, I saw it on Facebook it says, "If the bee disappeared off the surface of the globe, man would only have four years of life left." It was like, no more bees, no more man, no more pollination. So, turns out the quote is not real.

Alie: I was going to say, that doesn't...

Krystle: Yeah, and it's like, it's funny because now, when I actually think about it, I'm like, "That doesn't make any sense." Also, Einstein never said it either, someone just put Einstein's name on it in, like, the '90s. So, that got me into... I was like, "I want to save the bees because I love insects, I love nature, so I'll get involved with this." It was an idea I wanted to follow through with, so I followed through with it. And then I was doing that for quite a long time and then I accidentally took a photo of a native bee.

Alie: Accidentally.

Krystle: Accidentally. I was looking for honeybees. What's funny too, is I photographed the native bee on mustard, so it was, like, super, super invasive, which I think is really funny.

Alie: Especially the history of why mustard is so prevalent in California. From what I understand, missionaries would just, kind of, throw it behind them on their path.

Aside: Yup. West Coast missionaries led in the 1700s up what's now the California coast by a Catholic priest named Junipero Serra, tossed out invasive mustard seeds as they went along this El Camino Real, or the royal road, that connected all the missions creating what was described as a ribbon of gold in their wake. Botanists have even broken apart the adobe bricks of the missions and as time marched on, they were able to see more and more mustard seeds within these mud bricks and they could trace the spread of them.

But what is the issue with mustard flowers, you ask? Well, it's choked out indigenous plants and thus animals. And just like he left a wake of highly invasive weeds, Junipero Serra also believed that Indigenous people could be modified to suit religious aesthetics. According to one book, *Into the West: The Story of its People*, "Indigenous people were punished for the sake of salvation," the missionaries said. Junipero Serra also said at one point that so long as they were converted beforehand, their death could be seen as a joy.

So, California nature lovers, when they see these sunny yellow fields of wildflowers, nnnh, many don't know that a lot of it is mustard and it's anything but native. And the El Camino Real route in California is still commemorated with these rustic roadside bells along the highway shoulders. But recognizing the face of Junipero Serra might be harder because many statues of him have been beheaded in recent years so thanks for the genocide and all the mustard, dude.

Krystle: I was actually at a farm last week and they were using mustard as a cover crop; it was just fields and fields of mustard. I was like, [*hushed tone*] "Oh my gosh..."

Alie: Oy-oy-oy. It's funny because until you learn that it's invasive you just think, "Oh, wildflowers! They're so yellow! Isn't this nice?"

Aside: Now, I love a native plant, so much that in the past year, Jarrett and I have enlisted the help of one David Newsom of a nonprofit called Wild Yards Project who has made our dry backyard full of invasive weeds into this thriving pollinator garden and a critter habitat. And because of him, I see the hillsides of LA so differently; I really appreciate native, untouched, or reintroduced native species. And also, before this, I had never cringed at a flower and now I do.

Alie: One of the funniest conversations to have is just to ask him, like, "What do you think about ___?" and name any invasive plant and then just sit back. Those rants are so good to hear because they're so impassioned. When it comes to native bees versus the European honeybee that we're accustomed to, most people don't know that honeybees, at least in the US, are feral, right?

Krystle: Yeah, I call them just flat-out invasive.

Alie: At this point.

Krystle: Yeah. It's really frustrating too because people mix up facts between honeybees and native bees and also, you see all these things about "Save the Bees" and then there's a honeybee. On World Bee Day I was at a fair, I had a booth. And you had all of these people so happy about supporting the honeybees and I realized, after a while, it probably wasn't the best place to throw out facts about native bees. It's just interesting that science has become so debatable when there are, like, really solid facts about what's happening, and people still want to debate you.

Aside: So, these Save the Bees campaigns you might see in America, well, they're usually focused on honeybees, which are a *completely* introduced species in America that are still used, obviously, as farming livestock. So, each hive has around 30,000 workers, who farmers take to different orchards and fields for pollination services. So, a Save the Honeybees campaign in the US is kind of

like a big, well-funded push to breed more feral cats. And granted, backyard beekeepers do rescue feral swarms which is kind of like, I guess, homing stray kittens, which is fine by some people, not fine by others. But the biggest issue facing bees isn't the loss of livestock bees, but really, monocultures and habitat loss for all kinds of creatures, including native bees.

Krystle: A positive thing I've seen at least in California is that there are a lot of farms that are actually starting to farm alongside native ecosystems.

Alie: Really?!

Krystle: Yeah.

Alie: Since when?

Krystle: I started seeing it within the last five years.

Alie: Wow.

Krystle: I don't know if I should say the farm's name, but I saw so many native plants. Specifically, I was looking at this tomato field and I actually took a lot of photos of there; native bees, they also have a lot of birds, they have a lot of butterflies. So, it doesn't just encourage native bees but it's, like, anything that's in the ecosystem. So, instead of relying on one invasive pollinator, you have a whole ecosystem of creatures that will pollinate your plants for you, and they'll do a better job.

Alie: Without the need to truck them around.

Aside: While Krystle is originally from Omaha, Nebraska, she is beyond fluent in local native species.

Alie: We're in California now and you are also making a very cool product for native bees of the Western United States, which we will touch on in a bit – putting a pin in that because it's *very* exciting – but when it comes to different habitats, how many native bees are out there? Like, thousands of species?

Krystle: Yeah, so in the entire world, there's a little over 20,000.

Alie: Oh my god.

Krystle: Yeah. In the US there are a little over 4,000 and last year, someone actually counted in California, so there are 1,643 as of last year in California.

Alie: Ahh! That's so exciting.

Krystle: So, we have more bees in California than in some countries.

Alie: Nuts. I mean, we have so many different climates too.

Krystle: I'll say specifically too, I'll just stick with California, is that we have a Mediterranean climate. And Mediterranean climates are really unique just because we get winter rain, we're next to large bodies of cold water, and we normally have mountains and, like, a desert. Mediterranean climates take up only about 2% of Earth's land but they also have about 20% of Earth's biodiversity.

Alie: Wow.

Krystle: So, we're in a crazy biodiverse hotspot here. And I think that's one reason why I absolutely love documenting not just bees but nature here and what's happening to their ecosystems, because land loss is just a huge factor in the decline of bees. So, I started taking landscape photos of areas I've been visiting because I realized, even just after going for, like, 5 years, there is so much development happening, there are people living close by, and if there are neighborhoods within a

mile, people are starting to do fire abatement, and it's destroying areas that I've been visiting. Or I've been looking at old records and I want to visit them again, but there's a university building there now.

Aside: Krystle says that she once spent two years trying to get a photo of a particular bee on its niche favorite flower and then, she went back a week or two later only to find that the whole area had been bulldozed. Whyyyy? Why though?

Alie: And when you say fire abatement, what exactly does that mean?

Krystle: They're like, "Oh, there's plants here, these can catch on fire." So, they go at least two inches into the ground and cut all the plants and the roots, so they don't grow back. They did it all over the Santa Monica Mountains and they're supposed to just do it a mile from houses, but this area was more than a mile and it's completely destroyed.

There are so many creatures that not a lot of people are looking at and they're disappearing, and they don't really negatively or positively impact people, but I think just the fact that they're here is good enough reason to protect, preserve, and value them as something that's important. I feel like a lot of times, people value nature as it revolves around people.

Alie: Right. Yeah exactly, what can it do for us? And what about these native bees, I know of orchard bees and mason bees, there's sweat bees!

Krystle: There are sweat bees.

Alie: Can you take me through some of the different types of native bees and if, let's say, you know nothing about native bees?

Krystle: Oh, so the smallest one, the smallest known bee, actually, in North America, it's called a *Perdita minima*, and the very first time I saw it, it was actually on a neighborhood sidewalk in Apple Valley.

Aside: So, that is a desert town about 100 miles east of LA, which is right on the edge of the Mojave Desert and the snow-capped San Bernardino Mountains, is home to some very specific and elusive critters, such as *Perdita minima*, which is a tiny, amber-colored native fairy bee whose name means 'lost one,' on an Apple Valley sidewalk?

Krystle: Yeah, and this bee is very small, it's about 2mm or slightly under that. It's about the size of a letter on a quarter. The largest bee, I think is in Indonesia, it's a *Megachile*, which is a resin bee. That one's about 2-and-a-half inches.

Alie: Woah!

Krystle: Yeah, so it's pretty big. So yeah, they range from those known sizes. But yeah, colors, they come in blues, greens, purples, black, orange, just like, a full rainbow, red colors.

Alie: And bumblebees are in there as well?

Krystle: Bumblebees are in there as well, yeah. So, where we are in Southern California, there's about five or six different species. They actually have pretty big size ranges as well. I think they go up to about 20mm, I think, I'm not really good at converting to inches.

Alie: No Americans are.

Aside: 20mm is about three-quarters of an inch. I gotcha.

Krystle: I absolutely love bumblebees. I think bumblebees are a great native bee to start with, just because they're so large so they're also, kind of, harder to ignore. I feel like that's a great gateway bee.

Aside: Why bumblebees so cute and stripey? I found a 2014 study called, “Defining the color pattern phenotype in bumble bees: a new model for evo devo” and I had to look it up because evo devo means evolutionary developmental biology in cool science talk. And this paper said that black bands are the most commonly occurring on bumblebees because when paired with other colors, especially yellow, you get a sassy bold contrast that scares the bejeebers out of predators. It’s too cute, it’s too stylish, it’s intimidating.

Alie: This is a not-smart question but do native bees tend to have stingers or is that mostly just a colony defense for honeybees?

Krystle: So, all female bees have stingers. Even bees called stingless bees, they actually have stingers too.

Alie: Well, that’s fucked up, what’s up with that?

Krystle: Yeah so, they’re called stingless because I think it’s really hard for them to sting people, so that’s kind of nature-centric around people. But yeah, all female bees have stingers. And bumblebees too, they actually come in more colors.

Alie: They do?!

Krystle: Yeah. So, you’ll see even in Southern California, the endangered one here, *Bombus crotchii*, if you look at the back of their abdomen, they have an orange stripe, and then some of them have white on them as well, and I think there was a variant found in, it was probably Arizona, that was all black, which is really cool.

Alie: And there are carpenter bees. I love carpenter bees.

Krystle: I love carpenter bees too.

Alie: [*whispers*] They’re giant, they’re giant. And the ladies tend to be black, the males tend to be, like, a golden color?

Krystle: One species is golden, that’s the valley carpenter bee and that’s actually my favorite carpenter bee.

Aside: Yes, learn enough about native bees and you too can have a favorite carpenter bee. The genus is *Xylocopa*; *xylo*, like xylophone, and *copa*, like cabana. There are 500 species of carpenter bees in 31 subgenera, and I found that out from a pest control website which did not amuse me.

Krystle: I think the males are just so funny. So, they stake out a spot and they’re like, “This is my spot, I’m going to wait for any females to show up, drive off any males.” And if you stare at them too, they try and, like, kind of follow you around and act really big and tough [*Alie laughs*] but they don’t have any stingers so they can’t do anything. But yeah, I think they’re so cute, and yeah, that’s actually the biggest bee on the West Coast.

Alie: Oh my gosh. I mean, they’re so hard to miss.

Aside: Now, Australians can boast about their native *Amegilla bombiformis*, AKA the golden-haired mortar bee, or teddy bear bee, but the similarly golden and adorable male valley carpenter bees are also called teddy bear bees due to high rates of squishy, fuzziness, and excruciating acts of adorability. And days after this interview, I took my dog goblin for a walk and I stopped in front of a neighbor’s native mallow in their yard and found myself just enraptured and shocked to see a male valley carpenter bee sleeping in a blossom, his whole big hairy butt hanging out. And as I gawked at Krystle’s flashcards later, she showed me more sleeping bees in flowers, or rather, sleeping bees, plural, in flower, singular.

Alie: Look how beautiful these are! Oh my gosh. And now, this one was hanging with a friend?

Krystle: Yeah, so sometimes they sleep together, so these guys are sleeping.

Alie: These are so awesome.

Aside: Also in the deck, a gorgeous shot of a stripey little mason bee, the male of which has, as Krystle calls them, tiny Popeye arms, which they use to gently pull the antennae of their lover, covering her eyes as they do the nasty. You can call them *Megachile fidelis* or...

Alie: A horn-faced leaf-cutter bee!

Krystle: Oh, this is the one I was thinking of when you were talking about colors, because this is the only *Megachile* with yellow on the abdomen, so you can actually ID it from two species by the color.

Alie: Oh wow.

Aside: I just kept shuffling through this beautiful deck, this veritable who's who in indigenous melittology.

Alie: Long-horned bees! Look at this agile long-horned bee! They call it... it's a very long horn for a reason! But it's still the same number of segments, right?

Krystle: So, this one has 13, the females have 12. But yeah, just...

Alie: Just longer ones.

Krystle: Just longer, yeah.

Alie: Oh my gosh. [*admiring to herself*] Ohh! A mini fairy bee.

Krystle: So, that's the smallest known bee in North America. So, this is the one that would be on Sumac or Toyon, so that's the male. Okay, this is the female, and the males, like, follow behind them and flap their wings and try and get their attention.

Alie: And wait, they're really different colors then, right?

Krystle: Yeah, they're really different colors. There's a size difference, so it's 4.5 to 5mm.

Alie: I would have thought at first glance that it was a wasp. A euphorb mini-fairy bee.

Krystle: Yeah, that's the male.

Alie: Are you kidding meee?!

Krystle: Yeah, and these are really temperature specific too so if you go at different temperatures, you'll see the male or the female or both.

Alie: So, they really come out when it's hot.

Krystle: Yeah. And they really harass the females so it's, like, really nice when you just see the females out taking their time.

Alie: Have you ever been stung by a native bee?

Krystle: No.

Alie: No? I never have either.

When it comes to native bees in terms of people going up to them and photographing them, you had one on your finger earlier today, do you ever have to bust any flimflam or try to talk any friends down about, like, "Don't worry, just because it's a bee, you're probably not in a lot of danger."?

Krystle: Yeah, I feel like the first thing everyone asks about bees is: Am I going to get stung?

Alie: Yeah, of course.

Krystle: And then, like, the sleeping male bees, they can't sting you.

Alie: Oh, that's right.

Krystle: Yeah, and they don't bite either.

Alie: Oh okay, that's good to know.

Krystle: Yeah, so I mean, I feel like if you're out on kind of a cool dreary day, or early morning, late evening and you can put your finger out, a lot of times they will just climb on, there's really nothing to worry about.

Alie: You told me earlier that if you see a native bee sleeping in a flower, it's probably a guy just taking a nap, taking a load off. I think it's very surprising to think of bees taking a load off and taking a nap and sleeping in a flower because so often we think of bees having colonies, hives, or nests. So, when it comes to native bees, where are they? Where are they sleeping? Where are they hanging out? Do they have roommates? What's going on?

Krystle: Yeah, you know what's funny? I feel like that's very honeybee-centric again because people are, like, "Oh, they're in a colony. Oh, there's a queen." Most bees, about 90% of them, are solitary so they live by themselves. And about 75% of them are ground nesting, so that's the females, they just create a burrow, or they live in a cavity in the ground. But yeah, male bees, a lot of them you'll find sleeping in flowers that open and close with the sun.

Alie: I think it's so cute to think of, like, female bees digging a burrow and living under there and dudes just being like, "I'm just going to crash here."

Krystle: Yeah! If you have like a sunflower, you'll find like a lot of *Melissodes*, the long-horned bees, the males, hanging out, sleeping together there.

Alie: [softly] Oh, that's so cute.

Krystle: Yeah, it's funny too because, like, during the day they're all competing with each other for female attention, but then at night, they just huddle together. [AI voice: *Cuddle puddle with my boys.*]

Alie: They're in a frat house.

Krystle: Yeah, they are in a frat house.

Alie: What are their life cycles like? How long do they live? Will some that I see here come back next spring or is this it for them?

Krystle: So, it depends on the bee. Carpenter bees of native bees, as far as I'm aware, are the longest-living ones. So, I know the females, some of them can live, like, a year or two. There are a lot of bees that will spend, like, a month above ground as an adult, and the other 11 months, they're underground developing. And then there are some bees that can have two different generations in a year; there are some bees that you'll only see as an adult for, like, a month.

Alie: And do you have any idea why some bees are called mason bees, or carpenter bees, or sweat bees? What are some of the stories behind their names?

Krystle: So, mason bees because they construct things. Carpenter bees because they basically act like carpenters with wood. Sweat bees will land on people, I'm sure other animals as well, and they'll actually lick up the sweat and salt perspiration from people so, yeah, they're kind of named after what they do. [chuckles]

Alie: Oh my gosh, I didn't realize that sweat bees were ever licking me.

Krystle: Yeah, yeah!

Alie: But chances are, we've been licked by sweat bees?

Krystle: Yeah, chances are.

Alie: Wow! [*Lick it up, baby! Lick. It. Up.*]

Aside: Krystle also told me that some ground-dwelling native bees like east coast miner bees AKA chimney bees, sand-dwelling digger bees, and the West Coast globe mallow bee or *Diadasia diminuta*, make little tunnels at the entrances of their burrows and I needed to know why and according to the US Forest Service it's a big ding-dang mystery. So, the Forest Service reports that:

Diadasia bees surround their nest entrance with a turret (chimney), the purpose of which has long been debated. Do turrets 1) help keep rain or soil out of the nest, 2) help females recognize their nest when they return from foraging, or 3) discourage enemies? Investigation of this mystery continues.

Thank you, US Forest Service for lending the appropriate amount of eerie gossip vibes in that science communication. You get it, I love it.

Alie: What about when it comes to ground nesting, if so many native bees are ground nesting, what's going on with garden chemicals and Roundup and all this stuff? How are they doing with that?

Krystle: Yeah, so chemicals, pesticides, herbicides, that's a really big factor with bees in urban areas, decline in the species. And what's really interesting too is a lot of times the way these chemical companies advertise to stop harming bees, it's only directed at honeybees. So, they'll say to spray in the evening because they're like, "Oh, well the bees aren't out." but the bees are in the ground and you're spraying on the ground so it's a really great way to kill native bees. [*Alie whimpers*] Yeah.

So, if you want to create a native habitat in your yard, one of the really positive things is you don't really need pesticides or herbicides. If you have a native habitat, it'll be a healthy biodiverse ecosystem where it'll be self-sustaining, which also means you're going to have a lot of things that you consider pests in your yard like aphids, thrips, mealybugs, things like that, but then you're also going to have creatures that will naturally control the population. So yeah, it helps sustain bees as well by just planting native.

Aside: Just a shoutout to Xerces Society at Xerces.org, which I have been pronouncing [ph.] "Xerck-sees" for five years publicly, until this week when I met a lovely entomologist who works for Xerces named Yara, who David Newsom brought around, and although I was in my backyard looking at bugs with her, I thought maybe I was in heaven. It was the best. So, Xerces.org, they have great maps and lists. Theodore Payne is a foundation that's another great resource for native plant guidance. And you can also follow David Newsom's work at Wild Yards Project because he's great and pulls together and amplifies experts, many of whom have a lot of Indigenous knowledge, just in case you're hungry for more biodiversity in your yard. Oh, speaking of hunger...

Alie: What are the bees eating?

Krystle: Adult bees consume nectar. Developing bees consume pollen.

Alie: And who is feeding them?

Krystle: Typically, it's the female parent bees. But then there's also bees that are kleptoparasites, they're like cuckoo bees. So, they'll go into the burrow of their host bee, they'll lay an egg in there, their egg will hatch, it'll either kill the egg or the larva of the host species and then eat all the pollen.

Aside: I remember these photos of cuckoo bird chicks hatching and just immediately instinctively balancing the host bird's egg on their back and like a wrinkled little testicle with a beak, doing a barbell squat move to just, ploop! Plunk the host bird's egg out the side of the nest and then these

chicks just grow bigger and bigger, they're towering over their unsuspecting host parents who are struggling to feed them. So, do cuckoo bees love that kind of drama?

Krystle: So, there's no real taking care of them. So, it's basically the host bee or most bees that are non-cuckoo bees, they'll actually just lay the egg, they'll provision some pollen, they'll close up the burrow entrance, and then they'll leave and, normally, after they, maybe, constructed a few burrows, they'll actually pass away. So, they're basically taking care of themselves as they're developing.

Alie: So, they leave their egg with, like, a care package, a swag bag, whatever. And they're like, [*sings softly*] "When you wake up, Mama left some food. Byeee." Is it like tandem parking?

Krystle: It is like tandem parking, yes! [*Alie giggles*] Yeah, and what's interesting too is... so, some bees have kind of like, I'd call it like condo living. [*Alie laughs*] So, there's this sweat bee called an *Agapostemon melliventris*, it's a green sweat bee. And multiple females will have a burrow with, like, one entrance but then they'll have their own little apartment in there. So, then they'll have their own little section where the babies are developing.

Alie: Oh my god.

Krystle: It's funny too, I found a burrow one time and I was so happy. There was one female guarding the entrance and she was using a little clump of dirt and she was repositioning it to hide the burrow entrance. And then other females were coming and going, and they were moving it, but it was completely hidden.

Alie: Wow! How do you find burrows?

Krystle: It's completely dumb luck for me. Yeah, sometimes I'll just see them go into there and I'm like, "Oh, there's a burrow." Other times, I've just seen them land and I'm like, "Oh my gosh, you're starting to dig," and I'll just hang out there. I think it was two weeks ago, there was this bee, it was a *Dufourea*, and I'd never seen a *Dufourea* burrow before and I was so excited.

Aside: *Dufourea* is a genus with 160 different species of these small, short-faced, glossy little sweat bees which you might mistake for a fly unless you're Krystle Hickman, or you have her flashcards.

Krystle: She took, like, seven minutes to dig and I was waiting for her to come out, but I think she took a nap.

Alie: Ohhh.

Krystle: She took like a two-hour nap. [*Alie laughs*] So, I was laying at an air force base in the middle of the road, and I was really hoping no one would come by. And I was like, "What is she doing, or did I miss her?" And then she finally came out like two hours later.

Alie: Oh my god.

Krystle: But while I was laying there, it was so cool, there was a wasp that came by, dug a burrow, left, came back with a caterpillar, buried it, and then flew off and started making other burrows. And then I started seeing these other ground-nesting bees, they're called *Calliopsis*. So, they hide their burrow entrance, they basically make kind of a funnel shape and then they cover it with gravel – in this case, gravel or dirt – and they basically just dive through the gravel or the dirt, so you never see the entrance.

Alie: Oh wow!

Krystle: And I started seeing them coming in and out of those and then I got video footage of one coming out, which I was, like, so happy about. I got photos of the *Dufourea* when she was leaving and I was like, [whispers] “Thank god because you took forever.”

Alie: [laughs] Do you ever have to edit your own voice out of your videos, talking to the bees, gasping at the bees?

Krystle: For sure, for sure. [Alie laughs] Also, I have really bad allergies, so I get, like, the sniffles. So, there are some of my videos where I’m just like [sniffles] like that, over and over. I’m like, “God, that’s so annoying,” but yeah, I get sniffles a lot. [“We’re gonna need a box of tissues.”]

Alie: What types of soil do they tend to prefer? Do they prefer drier areas where they can burrow and not get flooded or are there some that want, like, a peaty swampy area?

Krystle: It’s all different kinds of soil, honestly. So, that’s one good way to actually find the bees. So, there’s a bee that I’m looking for, I’m going to find it next weekend, it’s called the *Nomia*, it prefers alkaline soil.

Aside: *Nomia* is another type of sweat bee and they’re kind of chunky with fuzzy stripes and this grayish-white pearlescent coloring; they look like if a silver SUV had a big, round face and hair but was tiny. And there are over 100 species of these all over the world and they’re ground-nesting and also, they’re very good at pollinating alfalfa. Thanks, *Nomia*!

Krystle: So, if you want to find that bee you go to alkaline soil. There’s a micro *Anthophora* that just will nest in everything so you just kind of look for the flowers. There are ones that nest on the side of hills, there are some that nest in, like, the sand in beaches. They’re all over the place.

Alie: And when it comes to the pollen and the nectar, do they have a preference for native flowers versus invasive flowers or are they like, “It’s got a little bit of water and sugar, I’m down”? Do they have certain plants that they can really only thrive with?

Krystle: I’ve found most native bees seem to prefer native plants but that doesn’t mean they’ll exclusively go to them. There are a lot of bees that are generalist pollinators that will visit, like, just about anything. Personally, I think for the last two and a half years, I’ve been looking at a lot of specialists. So, they’ll visit maybe one family of plants, some of them even one species of a plant. So, it can be very, very specific. So, that’s why, a lot of times, if you want to look for a very specific native bee, you look for the plant.

I do, kind of, a cheat. I go on iNaturalist if I’m like, “I’m waiting for this plant to bloom but I don’t want to drive, like, three hours into the desert, so I’m waiting for someone else on iNaturalist to find it, then I’m like, “Oh, it’s out, so then I go there.”

Alie: And do you ever have bee scientists who are working with one specific bee, are they ever doing that to you where they’re like, “Well, you waited until someone saw the plant,” and then they’re waiting until the really good native bee photographer finds it and then they’re like, “Tell us what you found?” [laughs]

Krystle: Yeah! So, I work with a lot of— Well, I don’t know if I’d say, “Work with,” but I’m in communication with a lot of melittologists who work with just one genus of bee, or subgenus. Because I don’t do any collecting, I ID everything through photos. So, some of them, the way they do their science, which I think is still really beneficial, but they want to collect specimens. And like, some of the bees, there’s one bee I got last year, I think most labs don’t have specimens of this, they’d never seen it in person, so she wanted me to actually collect them, and I was like, “I’m not collecting this,” because I saw three of them. But yeah, I feel like a lot of melittologists at universities are just really happy with photos, really happy with observations or even behavioral observations.

Alie: So, the videos must come in handy for that as well, right?

Krystle: Oh yeah, the videos are great. Yeah, I've been doing so many more because I have two cameras now. So, I'll leave one out for video and then I'll go around with the other one for photography.

Alie: It's funny too because if you think about the way that science has been done for so many hundreds of years, we needed the dead specimen and we needed someone with a field journal to describe it. But now, having, obviously they wouldn't have the DNA or something, but just with the way that technology is, you can capture so much more.

Krystle: Yeah, I 100% think we're in a place now where we don't need to collect the same way we were before. I definitely value all the information that we're getting from melittologists who have spent the years and decades out there collecting.

Alie: I feel like the way that you capture insects, you're so good at it, your photography is so amazing and it's such, not only a boon to scientists but also to people who don't yet realize that they're about to fall in love with native bees. Tell me a little bit about the deck that you put together.

Krystle: Oh, I'm so proud of this! So, I've been working on it since 2019 so I'm finally done. [*Alie squeals*] But yeah, people were coming up to me with so many questions and I was just repeating myself over and over again. And I started teaching classes about how to ID bees. And I was like, "I feel like it would be great if someone could just have something in their hand where they could learn this themselves." So, there are also plant relationships in here as well so if you want to start attracting these bees you can actually plant these plants and this bee might show up, and then you can learn to identify it yourself. There are photos of the males, the females, any variants, and the times of year that they'll show up. There's also wing venation because you can ID bees to, like, genus or subgenus, just from the photos of their wings. There's the taxonomy and little facts about them as well.

Alie: And they're in a little box so you can keep them in your backpack, you can keep them in your car. And I love the idea too that you have something that you can, when you're not even out looking, you can just study and share and I think that's such a good idea. Did you have to try to limit, like, "Okay, how many cards am I going to make? How big is this deck going to be?"

Krystle: Yes! Oh my god, that was so hard. [*Alie laughs*] That was so hard too. So, I was originally starting out with, "Oh, let me just do the 40 most common bees." And then also, I realized what people were observing wasn't necessarily the most common, they were just the largest.

Alie: Oh! That makes sense.

Krystle: Yeah, so initially the 40 most common, 20 of them were bumblebees and I was like, "That's a lot of bumblebees." So, I started using a bunch of different references, talking to a lot of different melittologists, and just... that's where I kind of came to the conclusion that it's not that there's actually this many bumblebees, it's that people are seeing them because they're so much larger. So, I ended up going through a bunch of different records and started looking at different genera that people would commonly observe in their gardens, in the desert, on the mountain ranges, plains. Yeah, it was really hard to pick the 42 and I stopped at 42 because 42 bee species equaled the 100 cards and I was like, "I'm done there." So, I call this one Volume 1, and I'm thinking about doing a rare bee one just for California.

Alie: You started working on the project in 2019, when did you launch it on Kickstarter?

Krystle: It was March 1st, I think? It was really successful.

Alie: And it was fully funded like, boom.

Krystle: Yeah, the first day, I can't remember how but it hit, like- I was like, "Oh, this is going to be funded."

Alie: What an exciting day! And to know that there's an audience of people who are like, very stoked about this. [*Alie laughs*]

Krystle: Yes! Yeah. I'm getting a lot of messages, people are very excited because I put out a thing that like, I got the final samples for the flashcards so...

Aside: And yes, her deck is 100 lovely green cards with super detailed, full-color macro photos of the bees and facts aplenty. Again, it's called Native Bees of the Western United States, Volume 1 and you can order yours, there's a link in the show notes, and you can get them now. And they'll be shipping in the next month or so, coming up soon.

Also, for every episode we donate to a cause of the ologist's choosing, and this week Krystle asked that it go to No Canyon Hills, which is a nonprofit in LA attempting to conserve a large swath of the Verdugo Mountains, which is Fernandino, Tataviam, Gabrielino-Tongva land. And an out-of-state developer wants to tear up 300 acres of oaks and native plants and animals to build luxury homes. It's threatening local ecology and it's even crucial habitat for LA's threatened cougar population including, La Tuna Puma, #LaTunaPuma. If you listened to the P-22 episode, you know it's a big deal to have a puma in the area. So, you can support their fight to stop this development at NoCanyonHills.org, you can also sign the petition there, it costs you no dollars to do it, again that is NoCanyonHills.org. That is linked in the show notes and thanks to sponsors of the show for making that donation possible in Krystle's honor.

[*Ad Break*]

Okay, so if you're a patron of this show via Patreon.com/Ologies, for one hot dollar a month, you can submit questions and I may read your beautiful name with my filthy mouth such as this common question asked by Rachael Swenson, Kailee Jones, Kelly Shaver, Nick Mikash, Amy ZM, Great Dane Lady, and Lindsey and...

Alie: Storm and The Aerial Mapper want to know: How can we attract native bees to our yards?

Krystle: Biggest thing: Plant native plants.

Alie: Native plants.

Krystle: Yeah. And also, I really encourage this - I want to start getting into this soon - I encourage people to create native landscaping bridges. So, it's not an actual bridge; it's just encouraging your neighbors to put a small area of native plants as well so these, not just bees, but native creatures have areas to travel between and it helps increase the biodiversity of these creatures as well.

Alie: Ohhh! Oh, that's a great idea, I hadn't thought about that either.

Aside: Again, WildYardsProject.org, great resource. You can follow David's work on social media and all the people he amplifies, as well as US-based Xerces.org. But what if you are not in the United States such as patrons Stephen Moxley and some bee lovers from [*Australian accent*] Down Under, Josie Chase, Renee dyke, Storm, and fellow Aussie...

Alie: Teesha Coot wants to know if you have any native plant ideas for places like Australia or people all over the globe. Obviously, you're not going to be like, "In Melbourne, plant this" because there are people listening to this in so many countries. What's the best way to find out what to plant?

Krystle: Yeah! What I always recommend is going to native gardening stores or locations. A lot of them now have websites where you can actually put in your zip code and find plants that are native to exactly where you are, I'm sure that applies in other countries as well. But yeah, instead of going to these large stores, visit your local garden stores and ask them.

Aside: Again, Xerces.org covers the US in case that's of interest. And this next question was asked by truly hospitable patrons, Andrea Delvin, Gretchen Schroeder, Beauty&Binx, Jenna Congdon, Katie King, BeckytheSassySeagrassScientist, Rachael Swenson, Josie Chase, and Ariel.Vanzandt...

Alie: Bee hotels, are they actually helpful? I have a bee hotel that was a gift in the yard, couple of mason bees went in there, but I don't know that I'm even upkeeping it well so feel free to go off. [*"The floor is yours."*]

Krystle: I'd say they're more helpful to people than they are to bees.

Alie: [*through laughter*] Okay.

Krystle: I compare it to – this isn't a one-to-one comparison – but I would say they're helpful to bees if you clean them out regularly. A lot of bee hotels aren't designed to be cleaned and it's kind of like, again, not a one-to-one comparison, but it's like if you have a doghouse outside, your dog lives in it 24/7 and you've absolutely never cleaned it out, your dog can get sick. The same thing can happen with bees. So, it's always good when you have a bee hotel to make sure that the openings in it, the columns are the appropriate size for the bees in your area, and that you can take them apart and clean them. There's a lot of YouTube videos that actually have instructions on how to clean these out and disinfect them.

Aside: Listen, I know you know how to YouTube bee hotel instructions, but maybe you're operating a forklift, maybe you're feeding a baby donkey, maybe it's not a good time. So, I looked it up for us and I watched a video with aggressively upbeat stock music, and I harvested some steps.

Okay, so in mid-September, remove these used reeds or tubes from your bee hotel, they should be filled with mud plugs and tiny sleeping babies in cocoons. Then you take a razor blade into the front end of the tube, and you twist it and that will split the tube, usually it's like a bamboo reed or a straw. So, now they're split in two and you can see a cross-section so you can remove and sort the cocoons, you take out the pollen and any debris, remove any pests, and you can even wash your mason bee cocoons in a bowl of warm water for a few minutes if you'd like. You dry them off, you put your cocoons in a bee safe, which is like a cardboard box inside a metal box with air holes, keep 'em safe, let 'em breathe. You want to layer some paper towels in between them, and then you place the bee safe in the fridge until about February. And then you can put them in the attic of your bee house or a drawer if it has one. Hopefully, that drawer has a hole or two for some egress. They're going to wake up and they're going to emerge when mother nature beckons them with warm weather and flowers and horniness.

Krystle: Also, that it comes with a drawer, because female bees can actually control whether or not they're laying a male or female egg, so they'll typically lay male eggs closer to the entrance of the burrow and females closer to the back. So, after you're finished cleaning them out, you don't want to put them back in the cavities because you might put them in the wrong order. You want to put them in a drawer that's in the bee house and then they'll just, eclose or exit when they're supposed to. But yeah, if you have a healthy native ecosystem, you don't need a beehouse. The beehouses that I do recommend if you want to get one, @WeeBeeHouse on Instagram; it's designed to be cleaned, it comes with a drawer, I think they're great.

Aside: Also, I was like, why are male bees such mamas' boys? And it turns out that they are laid closest to the exit so that they can come out first and then they can sit outside biding their time for the ladies to emerge, kind of like an awkward prom date with slimy palms waiting at the bottom of your staircase. Also, they may use this time to try to kill each other, giving females fewer options, which is romantic to bees, maybe.

Also, with all this bee hotel talk, I do want to read a question from a patron Ariel.Vanzandt, who said: I managed to finally attract mason bees, I've had a little house for them for years and I never had any takers. This year, I noticed a swarm of them by the house and they filled it up. I got them two more houses and those are all full too! Now what do I do? Do I keep adding houses? Do I need to tend to them?

Okay, Ariel. First thing you should do, according to experts, is throw a fucking party because that rules. Also, get the bee hotels with the removable straws or the reeds, you want to clean it in the fall to make sure that there aren't pollen mites or beetle larvae, or earwigs in there snacking on your baby convention. And overall, I say if the bees like it, and there's a need for it, and you like it, become a real estate baron in bee hospitality.

Alie: And are the things that people worried about with honeybees like mites and colony collapse disorder, are those threats to native population as well?

Krystle: So different mites but yeah, a bee hotel, you can have mite infestations there. So, colony collapse disorder comes from Varroa mites, where a Varroa mite will basically latch onto a developing honeybee. So, that actually can spread to bumblebees. There are some honeybees that are carriers, but they're not physically impacted. So basically, a lot of honeybees are in urban areas so they'll actually visit flowers, and they'll infect the pollen with the deformed wing virus And it's been found that bumblebees will actually visit those same flowers and since they're collecting pollen, it's the developing bees that are eating it. So, we're seeing bumblebees with tiny wings as well. A way to combat that, besides not having honeybees around, is to plant more plant diversity so that it's less likely that these bumblebees will develop these small wings.

Alie: How in general do native bee aficionados and appreciators feel about beekeeping in urban settings like people with hives on top of Brooklyn apartments and stuff? What's the feeling on that?

Krystle: I'll just say, the people that I talk to, it's not super positive. I'll also say, I feel like there are so many honeybees that are getting out into nature. I literally spent time in the middle of nowhere in the middle of the desert and there were just honeybees *everywhere*. Sometimes I'd step out of my car and just hear this hum. And it was like, the only flowering trees around would just have swarms of honeybees and you would see less native bees when the honeybees showed up. I think a great example is if you go to the Channel Islands [*"I've gotta go pack."*] I'll just say Santa Rosa because that's the one I've visited, there's no honeybees.

Alie: How did that happen? They just didn't make it out there?

Krystle: There are no honeybees but there's, like, the diversity of native bees there is just crazy.

Alie: [*softly*] Wow.

Krystle: Yeah.

Alie: What a great place to shoot.

Krystle: Yes. I actually went there looking for a specific species of bee for my book that I'm working on. I found it but also while I was there, I was like, "Oh my gosh, there are so many native bees here."

Alie: Oh my gosh, you're working on a book!

Krystle: Yeah!

Alie: Whaaat?!

Krystle: Yeah, yeah. I'm working on an ABC book and it's like, Bee-ee-ee. So, it's California bees and every single letter in the book is a different species or subspecies of bee and they're in different

environments. There's the *Perdita minima* on the sidewalk, there's one on an island, there's one on top of a mountain. There are also stories about them like what's happening to them after fires, competing with honeybees after fire abatement. I think there are eight bees right now where they're the only photos of living representatives of their species.

Alie: Oh my god, when does that book come out?

Krystle: Well, I'm hoping to get all of the photos this year. I actually got a grant from Nat Geo on that one.

Alie: That's amazing.

Krystle: So, I'm really excited and it's really super validating.

Alie: Does that mean that they publish it?

Krystle: Hopefully?

Aside: Literary agents of the world, reach out to Krystle Hickman. I'm looking at you WME, UTA, CAA. Scoop this lady up.

Alie: That's going to be a *great* book.

Krystle: Yeah, it's going to be a great coffee table book.

Alie: Ahh! I love it.

Krystle: So, I was going to self-publish it and I applied for the Explorers' Grant last year and I was like, "There's no way because there are so many people applying for this." Actually, it was the same day my Kickstarter was funded was the day I found out I became an Explorer, and I was like, "This is amazing."

Alie: [laughs] Were you like, suddenly believed in astrology? Were you like, "Wait a second"?

Krystle: It's so... It's so weird.

Alie: [laughs] ["The stars aligned."] How did you celebrate? What do you even do?

Krystle: I called like three of my melittologist friends and freaked the hell out. It was really validating and it's kind of, like, a bucket list thing because I've wanted to be in *National Geographic* since I was, like, 6.

Alie: It's the dream, it's a dream.

Krystle: It is.

Alie: Can you imagine you in Omaha by the rose bushes knowing like, "Oh PS, you're going to get an electronic message that says, we love the work you're doing." I love that you had to really ask yourself, like, what was missing in your life that you wanted to get back to and that you let yourself go do a bunch of things to see what felt good.

Krystle: Yeah, and I think it's really good to just do things that you might be really bad at just because they pop into your... I feel like everyone has ideas that pop into their head, but they don't, like, follow them through. But I also feel like it is a privilege to be able to follow things through because I was only able to actually do that when I started making more money. I feel like a lot of the time, you can't do your hobbies if you're concentrating on money or paying all of your bills. I do feel very privileged to be able to follow through with my hobbies and then actually turn my hobbies into a career; that's just insane.

Alie: And on top of that, that it helps other people learn and gets them inspired and also helps the frickin' bees. Like, win-win-win!

Krystle: Yeah! It is!

Aside: And yes, while sometimes she might get a sun rash from the desert elements or lay her body down accidentally upon thousands of biting ants, I hope that she always sleeps easy knowing that she's helping save the bees who need her the most. Speaking of sleeping easy.

Alie: On the topic of bee hotels, Kent Durvin wants to know, they say: I have drilled holes in scrap lumber (untreated), and it seems like a lot of sizes get used but when should I redrill or discard them?

Krystle: What I always recommend is instead of just using, like, the bare holes that you drill, I would only drill sizes where you have a paper straw that can fit into them. So, I would always put paper straws into them and when they're closed up, take the paper straws out, unwrap them, clean up the cells, and then if you can get a drawer for a bee hotel, I wouldn't store them inside because it would probably throw off when they would eclose, just put straws in there. But yeah, it's kind of hard to do, some people drill really, really tiny holes. So, I'd maybe just, like, personally, I would just avoid those. Because it really technically isn't beneficial to the bees, it's more so for people.

Oh, this is another thing too and this is a mix-up between honeybees and native bees. People put water out for bees. That's for honeybees.

Alie: [*concerned tone*] Ohhh.

Krystle: Yeah, so if you put water dishes out, you're going to be attracting more honeybees to your yard, not native bees.

Alie: What about fountains and things like that? Same?

Krystle: Yeah. And that's actually in my cards too, and you can go through them but it's like "Basics for bees. You don't have to do this, you don't have to do this." But yeah, native bees get all of their hydration from plants.

Alie: [*softly*] I didn't know that.

Aside: Yes, I checked into this and honeybees drink water on hot days because they need to take it back to the whole colony and they air condition the hive by drinking, spitting at the door, and fanning with their wings acting like a swamp cooler. Native bees do not do this. But butterflies sip on water too, but typically, it's the salt and the minerals that they're after. However, having a water feature like a little burbling, solar-powered fountain, with some kind of moving water can be attractive to all kinds of local wildlife. So, you have to decide if you want an aquascape that brings all the bees to the yard as well as other creatures like birds and frogs, and mammals.

Yesterday, I saw a big ass coyote, broad daylight, in my driveway lapping from a watering can that I use to catch our HVAC condensation. And per wildlife conversation protocol, I hazed it by screaming at it for its own good, and I felt like a real bitch, but keeping them scared of humans saves them from cars so I'm a bitch with a purpose. Now, on that note.

Alie: A lot of folks, KJ, Macnut Cookie, Jakin Yang wanted to know about conservation and KJ said: This might be a stupid question but is the decline of native bees related to the decline of butterflies? I noticed the growing absence of butterflies ever since the bees in my neighborhood disappeared. When it comes to habitat, is it just that they're both victims of the same thing?

Krystle: I would say that's kind of a complicated question to answer but it's also not a stupid question at all. I would say they are connected. Land loss is... up until I think, like, two or three years ago was the biggest factor for the decline in bees. But it's also a huge factor for decline in a lot of creatures as well. Now, climate change is actually number one and these are things that are impacting all of

nature so I wouldn't be surprised. I don't really work with butterflies, but I wouldn't be surprised if the same things were impacting both of them.

Alie: And we did have questions about that. First-time question-asker Lotta Barabasch and Olivier Calas wanted to know: How are the native bees affected by the climate crisis? Is it the extreme weathers, is it the nesting spaces, is it the food sources? Lotta also said: My grandma has *Xylocopa violacea* visit her garden every year and just wanted to say how pretty it is.

Krystle: Oh, okay so that's a carpenter bee, which one was it? Was it the *sonorina*? I think it's *Xylocopa sonorina*, I think that might have been the old name for that bee.

Alie: Oh okay, that's good to know.

Krystle: I think they had a species name change like four years ago.

Alie: A rebrand of sorts.

Krystle: Yeah, a rebrand.

Alie: That seems like a big deal, to rename a species, right?

Krystle: Oh my god, it happens a lot.

Alie: Really?

Krystle: Yeah, it happens a lot.

Alie: How come?

Krystle: So, okay, a lot of reasons. For example, sometimes if it's, like, higher up in the taxonomic table, I guess, sometimes there's a melittologist working in California and there's another one working in Nevada and let's say one of them has ID'd the species this name here but it's the exact same species in another state but it has a different name but it's because these two people weren't working together so it has two different names. Or it could be someone just found a male here and a female here and they didn't know that they're the same species, so they have different names. Or a lot of times now, there's like barcoding being done with DNA testing, specifically with bumblebees, it's happening a lot, where they're like, "These two species look really similar, they could be the same species, or they could not be but there's more genetic testing that needs to be done." I actually have that listed here a lot. It's all over the place.

But yeah, taxonomy is ever evolving and changing and it's just... Yeah, I've started noticing the same things happening with plants. Because of their relation to plants I'm looking at plants a lot and I'm like, "Well, the name keeps changing."

Alie: I didn't even know that they could do that. That's really fascinating.

Krystle: Yeah, yeah and I'm also trying to figure out, like, I still don't understand who decides that it officially is changed and then everyone's like, "Okay."

Alie: Yeah, especially if someone's like, "Oh man, I named that after my professor... okay."

Krystle: Yeah, and I've seen people release papers where they're like, "These are all the same thing now," and then people don't agree with them and they're like... so it doesn't change.

Alie: I guess, I don't know, what else would they do? Do they arm wrestle? Have a dance battle? I don't know. Who wins?

Krystle: I don't know. I just kind of go along with whoever is like, "Oh, it's changed now? Okay."

Aside: So typically, names will get changed when someone realizes that they have some kind of double-up situation or if a species gets oopsie daisied and put into a different genus. And remember, when Linnaeus proposed the genus species naming model, everyone thought that there were just plants and animals. They were like, “What’s a fungi?” There was not a DNA sequencer that you could plug into your electronic laptop for genetic IDs in the middle of a rainforest, so things are still a little wiggly, taxonomically.

And I am so certain that scientists have punched each other like kangaroos over this stuff. I can practically taste the blood on my teeth thinking about it. And that’s gone on for years according to the dusty 1988 publication, “New Insights into the Nature of Science,” by philosophy professor William Bechtel, who put the following ponderings to paper. He wrote:

It is often those most similar to your own that are your most serious competitors and against which you struggle most. This is exemplified by the fights between scientists over names. Naming an entity is one way to mark your idea of that entity. Letting someone else’s name be attached to the same entity may signify that you have lost out to someone else.

Which is a good thing to remember when you hate someone and don’t know why. Are they too much like you? And are they your competition or do you just hate yourself? And are these questions you want to think about when you’re listening to a podcast about bees? Nooo. Let’s move on.

Alie: Well, some folks, The Head Family, Jae Steinbacher, Phylcia Chandler, Maya Roopnarine, and Jani Rounds wanted to know if there are any good field guides or good sources?

Krystle: Yes!

Alie: And yes, there are and *[both laugh]* one of them is called Native Bees of the Western United States, Volume 1, link in the show notes for that.

Krystle: So yeah, my flashcards, definitely. But I would also say too, a lot of times when people start out with native bees, they try to over-ID, as in, try to ID them to species. I would try to figure out the families first. So, there are six families in the US, try to figure out which bee goes into which family, and then after you get the family, try and get to the genus. Because I see so many people just try to ID the species and it’s like... sometimes it’s a fly. *[Alie laughs]* And yeah, it happens. I mean, I do understand that it is kind of difficult when you’re first starting out.

So, I would recommend, besides my flashcards, iNaturalist is great. There’s a book *called The Bees In Your Backyard*, that’s the book that I started with. That really helped me get to families. There’s also *Bees of the World* by Charles Michener, it has a honeybee on the cover for some reason but it’s about... like, it’ll really help you with native bees, I think it’s advertising. iNaturalist, which is obviously free. There’s also Bug Guide, which is another website. DiscoverLife.org is another great website. I would use Discover Life if you’re much more familiar with species and also different body parts of bees, so it’ll help you ID things to species.

Alie: Well, that, in Maya’s words...

Aside: Also asked by Jae Steinbacher and Phylcia Chandler, Jani Rounds, and Maya Roopnarine...

Alie: Maya wanted to know: How can bee-ginners learn to tell the different bees apart? What key features should they look for? I think for me I’m like, “What color is its butt?”

Krystle: I mean, that can actually help you with some species. Yeah, I would say start off figuring out how to tell males and females apart. Also, telling bees from wasps and flies is a really good place to start

because people keep sending me fly and wasp pictures. If it has short antennae, eyes that take up pretty much the whole head, and only two wings, that's a fly.

If you see longer antennae and four wings, smaller eyes, it could be a wasp or a bee. If it's collecting pollen on the back legs or underside of the abdomen, that is going to be a bee. If you want to get more specific, you can look at the venation of the wings, which can be really specific. Also, a lot of wasps have an ocular sinus in their eyes, it's like a little concave sort of niche. Some bees have that but it's not as extreme. Also, a lot of times, the way bees are sleeping, you can distinguish them. Most wasps purge most sleeping bees clamp by their mandibles, but you do see some bees perching as well. A lot of times, people say, "Oh, it's the amount of hair on the body," but that doesn't really apply. There are so many exceptions that I wouldn't say that one. But yeah, just how they carry pollen. Actually, how they carry pollen can actually help you distinguish between families of bees.

Alie: Really? Like, some have different saddle baggies?

Krystle: Yeah, so some like honeybees and bumblebees, also some *Perdita*, they'll have, like, balls of pollen on their back legs. Also, if they carry it on their abdomen, that will help distinguish families. Antennae, you can tell based just on antennae if you're looking at a male or a female bee. Males typically have longer antennae; they also have 13 antennae segments, females have 12. So, if you're able to count, that count helps. If the bee doesn't have any pollen-carrying structures, it could be a male, but it could also be a kleptoparasitic bee. Also, behaviors are a really good way to tell males and females apart. If you see a bee that's never landing, it's just kind of fluttering around a bush a lot, that's a male probably looking for a female.

Alie: Ahh! Or if they're asleep in a flower?

Krystle: If they're asleep in a flower, yes.

Alie: Why are these bees sleeping so much? I know that they're very busy but, especially during the day, that's one of those things where it doesn't even occur to me that bees are sleeping or need to take naps. My dog has been passed out for the last, you know, 20 minutes, every creature needs to sleep but do they sleep, like, an hour here, one off one on, or...?

Krystle: They could. Most bees sleep at night, so just, kind of like, the same hours as people. But they're cold-blooded so they need... Like, if it's cloudy or cold, you're less likely to see bees out because they need the sun to warm themselves up, so they'll be sleeping longer.

Alie: It worked out in our favor though that it was overcast today.

Krystle: Yeah, that really helps.

Alie: Because I didn't expect to see... I thought, "Oh man, it's overcast, we might not see any." But little did we know that it was just nap town.

Krystle: Overcast days are great because it could still be warm but the sun's not out, so you'll also see- Like, we saw some female bees as well but they were slower so they were easier to photograph.

Alie: And this actually brings me to some questions from listeners about sleepy bees, ConnieConnieBoBonnie, Carolyn Myers, first-time question-askers Storm and Julia Cape wanted to know, well Carolyn Myers said: Speaking of bee butts- because ConnieConnieBoBonnie...

Krystle: I love that name.

Alie: Such a good name, talked about sleeping inside of flowers. But Carolyn Myers wants to know: Speaking of bee butts, do bees really fall asleep in flowers with their cute butts sticking out? Is

there a reason why bee butts are so easy to see? Do they sleep with their butts out usually or is that only when they've been digging in there for pollen and nectar?

Krystle: I think there's this meme of a bumblebee butt sticking out of a flower, and I don't know the context of that photo, but I think it was a female so I'm pretty sure she was nectaring in the flower, and not actually sleeping.

Alie: Oh! She was just under the hood.

Krystle: Yeah, I think that's what she was doing but it looked, just... her butt was sticking out. Oh my gosh, wait, what was the question? Do bee butts stick out?

Alie: Yeah, do they sleep with their butts out usually or probably not?

Krystle: They usually don't. I can't remember what the center of the flower is called, is it the stamen?

Alie: I think so, but I'll check it out.

Aside: Okay, stop yelling at us, the circle of stalks inside a flower that are all covered in pollen, those are stamens and the rod in the middle connected to a flower's ovary is called a stigma. And I was like, "Stigma? That's not the right word. Stigma like stigma?" And both the shame 'stigma' and the flower 'stigma' come from the same root word for a pointed stick because sometimes, imprisoned people were marked with pointed sticks like a brand. Also, there's the word stigmata, all comes from the same thing.

And no, I didn't know all of this because we haven't done a flowers episode yet which would be... Anthology? Is that right? No. Anthology is a collection, what? Wait. Okay, *both* anthology the study of flowers and collection come from the same word meaning to collect. So yes, I can do an anthology of anthological facts about the stigma of not knowing what a stigma is. That is the part we were talking about.

Krystle: Yeah so, normally bees sleep wrapped around the center of the flower, flowers that open and close, a lot of times you'll just see them, like, tucked in. Sometimes you'll see them face up so when the flower opens, you'll see their face first. But yeah, normally, do I see a lot of bee butts when they're sleeping? I don't think so.

Alie: You do get to see a lot of bee butts though, right?

Krystle: I see a lot of bee butts. I get more bee butt photos than face photos, yeah. It's funny because bees have a lot of, like, they have five eyes, so I try to hide from their eyes. If I'm sneaking up on a bee, even though I'm, like, super huge, I'll have a piece of grass or a stem in between us so I kind of sneak up behind the stem and it works oddly well.

Alie: So, all it takes is that little block of them.

Krystle: That little thing. And I don't know how it works so well but I do it and it works *so* well. And then I just, kind of, move around it and then they don't fly away as much. But yeah, I sneak up behind the thinnest things.

Alie: [*softly*] Oh my god, that's so cute. Nat Schaefer says: Every spring, mason bees find their way through a wall vent and into my preschool daughter's bedroom. These ones never seem to live long. We try rescuing them by taking them outside (Or if it's still very cold by getting them fresh flowers and water). Any idea why this happens? Are they disoriented? Seeking shelter? Drunk? Have you heard of native bees that nest inside sometimes? Any idea what to do?

Krystle: I have not heard of native bees nesting inside, I would double check to see if they actually are mason bees first. So, they do nest in cavities, I would look for the cavity, I don't know how they're getting inside, that's interesting.

Alie: Maybe block up an entrance of some sort. It sounds like a very specific problem too.

Krystle: Yeah, it does.

Aside: But we loved it. And yes, mason bees tend to be solitary but if there's a nesting hole that exists, that's pretty tight, many might build their own little nest within it. And Nat, I've got some news for you, it might not be that every spring, they find their way in, they're probably here year-round, just hibernating through the chilly winter just, drinking egg nog, binging *Skins*, hoping for a make-out scene. And then when things warm up outside, they're like, "What's up roomie?" But typically, the females don't sting unless they're absolutely pissed, like, because you squeezed them, or you added them to a too-active text thread that they feel bad leaving.

But for the patrons who asked about bee swarms, I'm looking at you Gabrielle Mlagenovich and Julia Cape, you're probably seeing swarms of European honeybees which break off into groups when the older queen gets ousted from the nest. They're like, "You're dead to us," and she's like, "I'm fucking out of here," and half of her subjects are like, "We're with her." They leave out of loyalty, or love, or fear, whatever, and then that swarm is looking for a new castle and to heal their hearts, being like, "We gotta find a new place to live man, this sucks." That's what you're probably seeing.

But what if you have builder bees, carpenter bees? Patrons Sunni Brimsy, Valerie Bertha, Michelle Husko, and Mary of the Grapefruit asked about seeing them, booping them, ignoring them. Others are not fans of the carpenter bee and for that, I offer my condolences because I cannot comprehend you. They're so cute I want to hold tiny hands with them.

Alie: A lot of people though, don't have an individual problem Cate Muenker, Jen, Ashley Konon, and Julia Bingham wanted to know a little bit about carpenter bees and any way to lure them away from a swing set, or a house, or like...

Krystle: So, carpenter bees, I don't know if I would classify them technically as eusocial, but they basically kind of have a family structure inside the colonies that they create in wood. What I would maybe recommend doing is just providing other resources for them to nest in because they really like wood that's not treated. They love yucca, they love fenceposts, fallen logs, and things like that. But yeah, a lot of times, because they sort of have a community, sort of, they'll come back.

Alie: Ahh!

Krystle: But also, they don't do any structural damage, they just do unsightly damage.

Alie: Okay! So, your swing set or your deck is not going to fall apart because of carpenter bees?

Krystle: It's not, no.

Alie: Oh! Well then that's great! You just got yourself a dual-purpose bee hotel.

Krystle: Yeah, basically a self-made bee hotel.

Aside: I looked it up and, okay, people are divided on carpenter bee destruction, okay? And carpenter bees do have to chew wood with their faces, so naturally, they prefer the softer stuff, your pines, your cedar, your redwood. But if you have a hardwood like oak, they may chew into it if it's decomposing a little or untreated. And yeah, we have a whole episode called Xylology about lumber.

But carpenter bees, they have made foot-long baby tunnels into wood, and according to a Texas A&M pamphlet that I just read, succeeding generations of carpenter bees can keep inheriting and expanding old tunnels, extending them several meters like a nepo-baby bee mansion. But is that likely? Nnhh, not that likely. Also, a carpenter bee can sting you if she's a lady and if you've really maddened her. And unlike a honeybee, her stinger isn't barbed so she can just keep doing it again and again, kind of like a bottomless slot machine. It hurts about the same as a bumblebee sting, which hurts way less than a bikini wax. So, let 'em live!

Alie: Last question I'll ask, from patrons Helen, first-time question-asker, wants to know, I think I already know what they are: Your thoughts on the *Bee Movie* starring a male honeybee.

[clip from Bee Movie trailer]

Narrator: Barry B Benson...

Barry: So, you see soda spilled on a sidewalk and you don't drink it?

Narrator: Is a little bee.

Vanessa: He's not bothering anybody, get outta here, you creep!"

Krystle: Yeah, it's soooo annoying. You know what though? It's not just like *Ants*, *A Bug's Life*, all these movies, for some reason it's always centered around male characters they're always doing something that they never do.

Alie: Right?

Krystle: Yeah, I feel like once you get to know any subject, whenever a movie comes out about it, you just get really frustrated. But yeah, I was like, "Oh yeah, can you like also maybe just female-centric, doesn't live in a hive, not a honeybee, maybe somewhat accurate to something they would normally do?" I mean, yeah.

Alie: Just like, open the Wiki page before final draft.

Krystle: Just something, just talk to someone else. Oh, have you seen *My Garden of a Thousand Bees*?

Alie: No!

Krystle: Oh my god. So, this guy during the pandemic was a documentary filmmaker and couldn't go anywhere because it was obviously a pandemic. He had a native yard like yours so he's like, "Let me just make a documentary about the native bees in my yard," and it's amazing, absolutely amazing. I recommend it to, like, everybody.

[clip from My Garden of a Thousand Bees trailer]

Roll tape.

In the spring of 2020, as the country goes into lockdown, outside the garden is coming alive. As a wildlife filmmaker, I knew there were revelations here that could be just as amazing as anything I'd ever filmed.

These bees just go, "Zzzzow, zzzzow."

Alie: Suzanna Green, first-time question-asker, also in terms of... we always like to ask, what's the best representation in pop culture but wants to know how you feel about the "Bringing Home a Baby Bumblebee" song? Are you familiar with it?

Krystle: I am very familiar with that song, and I haven't thought about it since, I think, elementary school. I don't have strong opinions about it. It's a cute song. *[laughs]*

Aside: I have one child and she is a dog, so I did not remember the song, but I looked it up and it goes, "I'm bringing home a baby bumblebee, Won't my mommy be so proud of me, I'm bringing home a baby bumblebee, Ouch, it stung me!" And then the stanzas go, "I'm squishing up my baby bumblebee, I'm licking up my baby bumblebee, I'm throwing up my baby bumblebee, I'm wiping up my baby bumblebee, I'm wringing out my baby bumblebee." In terms of native bee representation, what could be more memorable than a child, wild-eyed and innocent, smashing a bee with its bare hands, eating its guts, and barfing them at you? So yeah, Krystle, when it comes to the PR of native indigenous bees, we're all counting on you, we need you.

Krystle: I'm working on an animated short about a bee.

Alie: YESSS!

Krystle: Yeah! And I just hired a character designer, she's halfway done with the main character.

Alie: Are you serious?

Krystle: And I'm so excited for it, I'm hoping to have the main three characters designed and then I'm going to start pitching it to people because I finished the script. It's super short.

Alie: That's great!

Aside: Agents, holler upon her. But life can't all be nectar and flowers, right?

Alie: What sucks about bees? there's got to be something that sucks about photographing them. I can already tell it's got to be either allergies, a sun rash, or getting stung on the abdomen from something. *[laughs]*

Krystle: Also okay, so this is for the cards too. Oh my gosh, so like, I was taking really beautiful – I thought beautiful – photos of bees but then I was like, "You know, I realize not all of these photos are great for ID." So, like, sometimes I need a complete side view of the bee but I need them to turn their head just slightly so I can get a good face shot as well. It would be really great if bees spoke English *[Alie laughs]* so I could just kind of say, "Hey, don't fly away, I just need one picture of you." Because I've stood by bushes before. Lately I've been standing by them longer, for like 15 hours, and I need them to kind of pose slightly differently or, like, realize I'm not trying to eat them.

Alie: I'm sure people have called you a bee whisperer so much and you're like, "I *wish* I could whisper to the bees, and be like, 'Over here to the left. Head, chin down.'"

Krystle: Oh my gosh, yeah. And then also too, sometimes when I do get that pose, their antennae are slightly down so it covers up the facial feature that I'm interested in. And also too, I've noticed that when I get that perfectly and the antenna is pointed right at the camera, people are like, "Why does it only have one antenna?" I'm like, "Augh, geez!" But yeah, I wish I could communicate with them better.

Alie: To be a director, like *America's Next Top Model* but for bees.

Krystle: Exactly, yes! [*"Do you know that all of America is rooting for you? Do you know that?"*]

Alie: If only you could direct.

Krystle: I would love that. Or if I could speak bee, whichever way.

Alie: If you could speak bees, one of those.

Krystle: One of those, yeah.

Alie: What about the best thing?

Krystle: The best thing? I think that would be really personal depending on who you're talking to. But I would say, for me, the best thing about bees is that they got me back into nature and they got me into places where, I think I said this before, where nothing is humancentric. You really don't matter there and it's kind of nice when things don't revolve around you or any other people that you know, you're just sitting there in the moment enjoying yourself.

Alie: And we just don't ever do that.

Krystle: We don't, yeah. But yeah, that's why I really try to go out every single day and just sit somewhere and enjoy the quiet.

Alie: Well, it's inspiring me even just to take my iPhone and go out there.

Krystle: You don't even need attachments for your phones anymore. But yeah, just go out in your yard, you can experience the exact same thing, just lay on the ground.

Alie: Do you get a lot of DMs from people asking about bees or showing you bees?

Krystle: Oh yeah. I get a lot of photos where people are like, "Can you ID this? Or tell me more about this?" But I really enjoy it.

Aside: I mean, how contagious is she? Y'all, even after we were done with the main interview, we sat and chatted for hours. I just loved hanging out. Do we love her? We love her.

Alie: And Volume 1, congratulations on Volume 1!

Krystle: Volume 1, yes!

Alie: I'm excited, I have four sets coming.

Krystle: Do you?

Alie: Yeah, I bought four. Because I'm like, I know I want one, but then I also know so many people that I'm going to want to give them to. Especially if I have friends who have just moved to LA. When people move to your city it's so fun to get them a book about local flora or fauna to make them more excited. I mostly do it so that my friends don't hate LA and move away. I'm like, "I swear we've got great bugs; we've got great everything."

Krystle: Oh, we do, we do.

Alie: I have several copies of the *Wild LA* book for that reason.

Krystle: Oh my gosh, I love that book.

Alie: [laughs] It's a great book!

Aside: We have an episode about this book, and it's called Field Trip: How to Change Your Life via the Natural History Museum of Los Angeles, and it includes excerpts read by the authors including entomology guest, Lila Higgins. So, *Wild LA*, excellent book, get it for everyone you know who lives near LA.

Krystle: I keep that in my car with me.

Alie: Oh, it's so good. I'm on my second batch of them because I give them to neighbors or when people move to LA.

Krystle: That's a really good idea.

Alie: And I feel like your deck will be like that.

Krystle: I really hope so. I put so much thought into it, so I really hope everyone really enjoys it and learns things from it.

Alie: Oh! Well, congratulations. Thank you so much for doing this. This has been a joy.

Krystle: Yeah!

Alie: Well, anytime you want to photograph bees, you know we got them. Come right on over.

Krystle: Yeah, you do! You have a great native yard in your backyard, you did a really great job.

Alie: Thanks to David too for that. Any time you want to come by, it's open for you.

Krystle: I would love that, thank you so much.

So, ask enthusiastic experts basic bee questions, and then turn off your phone and go stare at a plant for a bit. Again, you can find Krystle Hickman @BeeSip on Instagram and her website and other socials are linked in the show notes alongside a very easy link to get a deck of her flashcards. And definitely have a look at her photography, tell her you love her work.

We are @Ologies on Instagram and Twitter, I'm @AlieWard on both. We have kid-friendly, classroom-safe episodes called *Smologies* that are available in this feed or for free at AlieWard.com/Smologies. Thank you, Zeke Rodrigues Thomas and Mercedes Maitland for working on those. Emily White of The Wordary makes our professional transcripts. Erin Talbert admins the *Ologies* Podcast Facebook group with assists from Boni Dutch and Shannon Feltus. Kelly R. Dwyer works on our website. Noel Dilworth does our scheduling, Susan Hale does so, so much including handles all of our merch, again, available at OlogiesMerch.com. Mark David Christenson assistant edits and Laurel McColl assisted on research for this episode a bit. Jarrett Sleeper of Mindjam Media is a friend to the bees and to mees. And lead editor, who we know, and love is Mercedes Maitland of Maitland Audio. Nick Thorburn wrote the theme music.

And if you stick around until the end of the episode, I tell you a secret. This week, oh, it's that I'll be in Philly for the week if anyone is going to the ISTE conference, it's an education conference. I'm doing a talk next Tuesday morning. Also, this week I made a TikTok about being a landlord and having to evict a single mother, but it was actually a video about a spider that I had to put outside who had made a web in our bedroom. And I was like, "I gotta put her outside," but I think some people didn't see the whole thing and actually thought that I was a landlord, and I was evicting someone, which was not true, it was just a video about a spider relocation. But I worried about it and then I deleted the video just in case. But anyway, I hope the spider is thriving, as are you. Okay, go look at bees. Berbye.

Transcribed by Aveline Malek at TheWordary.com

Links to things we discussed:

Buy Krystle Hickman's gorgeous native bee flashcards, [Native Bees of the Western United States, Volume 1](#)

[Links to Krystle's work](#)

Follow Krystle Hickman on [Instagram](#) and [Twitter](#)

A donation went to [No Canyon Hills](#)

[Sign the petition for No Canyon Hills](#)

[Krystle's Artwork](#)

[T'Challa portrait](#)

[Time lapse of the making of it](#)

[Skins \(British TV series\)](#)

[Central Coast Curious: How did mustard 'invade' our coast?](#)

[Junipero Serra Statue Beheaded At Old Mission](#)

[Into the West : the story of its people](#)

[Male Megachile fidelis \(Horn-faced Leafcutter Bees\)](#)

[Genus Dufourea - Short-faced Bees](#)

[Xerces.org pollinator map](#)

[Nomia bee, that looks like a small furry hairy silver SUV](#)

[Defining the colour pattern phenotype in bumble bees \(Bombus\): a new model for evo devo](#)

[Scientists uncover the genetic pathway that colors bumble bee stripes](#)

[Genus Perdita - Fairy Bees](#)

[Perdita minima—"World's Smallest Bee"](#)

[Bee Movie trailer](#)

[My Garden of a Thousand Bees](#)

[Be My Little Baby Bumblebee](#)

[Miner bees aka Chimney bees \(not West coast\). Anthophora abrupta](#)

[Globe Mallow Bee, Diadasia diminuta. Nests are commonly found in partially compacted soil along the margins of dirt roads in the western United States](#)

[Digger bees, \(Anthophora bomboides stanfordiana\). The fuzzy digger bees dig tunnels to nest in sand or along coastal bluffs](#)

[Texas A&M slandering carpenter bees](#)

[How To Clean Your Bee House with Reeds](#)

[WeeBee House](#)

[New Insights into the Nature of Science: What Does Hull's Evolutionary Epistemology Teach Us?' by William Bechtel](#)

[Now Is A Good Time To Clean Your Mason Bee Cocoons](#)

[Everything You Need to Know About Mason Bees](#)

[Common Bee Groups Of California](#)

[Wild LA Book](#)

[State insects](#)

[Mustard flowers](#)

[Bumble bee patterns](#)

Other episodes you may enjoy:

[Kinetic Salticidology \(DANCING SPIDERS\)](#)

[Entomology \(INSECTS\)](#)

[Aperiology \(MACRO PHOTOGRAPHY\)](#)

[Melittology \(BEES\)](#)

[FIELD TRIP: How to Change Your Life via the Natural History Museum of Los Angeles](#)

[Delphinology \(DOLPHINS\)](#)

[Xylology \(LUMBER\)](#)

[P-22: The Life & Death of an L.A. Cougar](#)

[Chickenology \(HENS & ROOSTERS\)](#)

[Acaropathology \(TICKS & LYME DISEASE\)](#)

[Diplopodology \(MILLIPEDES & CENTIPEDES\)](#)

[Dipterology \(FLIES\)](#)

[Myrmecology \(ANTS\) Encore](#)

[Sparklebuttology \(FIREFLIES\)](#)

[Forest Entomology \(CREEPY CRAWLIES\)](#)

[Scorpiology \(SCORPIONS\)](#)

[Lepidopterology \(BUTTERFLIES\)](#)

Ologies info:

[Sponsors of Ologies](#)

[Transcripts and bleeped episodes](#)

[Smologies \(short, classroom-safe\) episodes](#)

[Become a patron of Ologies](#) for as little as a buck a month

[OlogiesMerch.com](#) has hats, shirts, masks, totes!

Follow @Ologies on [Twitter](#) and [Instagram](#)

Follow @AlieWard on [Twitter](#) and [Instagram](#)

Editing by Mercedes Maitland of [Maitland Audio Productions](#), [Jarrett Sleeper](#) of [MindJam Media](#) and Mark David Christenson

Transcripts by Emily White of [The Wordary](#)

Website by [Kelly R. Dwyer](#)

Theme song by Nick Thorburn