

Smologies #4: BEES with Amanda Shaw

Ologies Podcast

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Oh hey, it's that sweater that lives in the backseat, Alie Ward. I'm here with Episode #4 of *Smologies*. *Smologies* – if you're like, "What's that?" – they are bite-sized, classroom-friendly edits of our original *Ologies* classics. So, if you haven't heard the original Melittology bees episode, and you don't mind swearing and juicy, sometimes filthy details, stop what you're doing and listen to that version at the link in the show notes. But if you need a shorter, G-rated director's cut, you're in the right place.

This episode still has me buzzing around the room with excitement because it's all about bees! Melittology, by the way, comes from the Greek for 'bee.' So everyone you know named Melissa, their name means bee! Go tell Melissa that fun fact.

I met today's ologist in Portland, where she is a melittologist and President of the Urban Beekeepers Association there. And after we recorded in 2018, she decided to start her own amazing podcast called *Beekeeper Confidential*. And if that wasn't enough, she also is the founder of Bella Beek, a company that creates made-to-order bee veils. So get ready to find out all about bee bread, what colors make you most attractive to bees, who has stingers and why, why agricultural honey bee populations are threatened, but why native bees are of greater concern, how you can help them, hives versus nests, carpenter bees, blue bees, and how honey bees have a call-and-response song of their very own, with bee expert and melittologist, Amanda 'Mandy' Shaw.

Alie: What's going on with these bees?

Mandy: So, what we're seeing is bees are being put into nest boxes that aren't ideal. If you look at the industrial beekeeping complex, bees are being forced to pollinate and work outside of their normal cycle. They're being pushed to these limits and it's weakening their immune systems. And when there's monoculture and pesticide use involved, it causes them to collapse. I think that generally the wild honey bee population is doing okay. It's the managed hives, it's the ones that are used in agricultural practices that we're seeing the big issues with the colony collapse. Generally, native bees are solitary and they don't make honey. But they do gather pollen to feed their young.

Alie: What is their normal life cycle? Do they only work in certain months and we're like, "Yo, we got stuff to pollinate!"?

Mandy: Right. "It's February! We got almond trees to pollinate! Get up! Let's go!"

Aside: So, Portland is relatively temperate and Amanda says that the bees do survive over winter and then they're up and at 'em in late March, early April. And then by November, they start shutting down for winter again, living off the honey, and they have smaller colony numbers. But the summer bees are the most extra. They're out there. The summer bees only last about six weeks because they literally work themselves to death.

Alie: [*shocked*] Aaaaaaargh!

Mandy: Yeah!

Alie: And most of them are women anyway, right?!

Mandy: Yes! They need to take a break, right?!

Alie: It is... like, because most of the workers are all women.

Mandy: The workers are all women, yeah.

Alie: And so, they work themselves to death.

Mandy: To death, yes.

Alie: Good god. In the scale of zero to ten, what can the average person do?

Mandy: I always tell people you don't have to be a beekeeper to help the cause. The biggest thing that bees need right now, honey bees and native bees, is food that's safe. Plant seeds that haven't been pre-treated with pesticides. Check the labels because a lot of them *are* pre-treated.

Alie: Oh, I didn't know that.

Mandy: Yeah. And planting plants that haven't been pre-treated with systemic pesticides. That's one of the big issues.

Aside: I didn't know what a systemic pesticide was because I live in L.A. and my garden is a parking lot. But they are the kind of pesticides that live in the tissues of the plant instead of just being misted over the leaves.

Mandy: Another thing that native pollinators are struggling with is habitat. So, if you can have a corner of your yard where you can have that compost pile on the ground for bumble bees to nest in. Or there's lots of other ground nesting bees. So, having that awareness, you can make your yard its own little nature site and the bees will come.

Alie: Can you tell me a little bit about the difference between honey bees and native bees? And should we be using honey bees in this environment?

Mandy: [*deep breath*] With native bees, they're actually more effective pollinators than honey bees are, but honey bees, sort of, get all the attention. They can be used in the agricultural industry. They can be used as livestock to pollinate large crops. But native bees are more effective pollinators. And we have over 4,000 species of native bees in America!

Alie: What?!

Mandy: So, there's a lot of them out there but they don't get the attention that they need because the honey bees are the star of the show. And the cry for help is for the honey bees but really it's the native bees that need the habitat. They need variety in their diet. So, when you have these giant fields of almonds, or cotton, or corn, or soybeans, that's not good for the native bee population because they need variety.

Aside: You heard how shocked I was that there were over 4,000 species of native bees in America. And *Apis mellifera*, the European honey bee you're so familiar with, is not one of them! That's right, they were brought over by settlers for wax, and honey, and pollination. And the native bees get edges out of territories and are more threatened. And the native ones are the species who need saving! I had to know more about these supporting-but-important native players in the bee show which, let me remind you, is an ensemble piece.

Have you ever seen those huge black bees buzzing around in the summer? They're probably carpenter bees, and they drill out these perfect little tunnels in wood to raise their young. And the females are black and glossy, and they rarely sting. And the males are this great golden blond color. They don't even have stingers, of course, because they're dudes, and a stinger is a modified egg-laying part so only females have them.

Now, these facts are helpful conversational distractions if you ever see a carpenter bee and everyone around you is shrieking. Just say, “Hey, this is a native bee and this is our friend.” Another native bee friend which you can keep and rear in your yard: Mason bees. What’s a mason bee?

Mandy: Mason bees are solitary bees. They are known as the gentle pollinator. They’re native. They’re also called blue orchard mason bees. And they nest in these little tubes. And they’re super easy. It’s like beekeeping for *anybody*. Anybody could keep mason bees. They’re just fuzzy, and shiny, and blue, and cute. When they’re coming back to their nest, you can see little packs of pollen on their bellies, and they’re bringing it back. They’re really cute!

Alie: [*overcome with cuteness*] Aww!

Aside: So, a non-yellow, non-striped bee? Yes! They exist! There are a lot of them. So, mason bees are this really beautiful kind of gunmetal blue color. And in a lot of the one million photos I just scrolled through, while turning into a living, breathing heart-eyed emoji, mason bees appear to be covered in pollen a lot. I guess sloppy gatherers make really good pollinators. They’re just like, rwar! Confetti pollen everywhere.

Alie: And now, what do you keep?

Mandy: I plant a lot of oregano, mint, lavender, the stuff that’s really easy to grow, that blooms long season. Borage is a really great bee food and it’s super easy to take care of.

Aside: So maybe plant yourself a little garden, or even a pot or two of flowers in a window box or a stoop. Those can be a wonderland for native bees or honey bees. Now, if you like, if that’s just not enough bees, if you’re like, “I need 30,000 bees,” maybe think about beekeeping like Amanda does. But before you go ordering a whole setup, which can set you back a few hundred bucks, you may want to check with a local beekeeper’s association first because they can sometimes rent or lend equipment, which is handy. Or they can tell you which hive boxes or cool face nets attached to a hat are bunk and not to buy. Personally, I say, buy Amanda’s. Link in the show notes.

But this brings us to stings. Why do they hurt? So, bee venom contains a compound called melittin, which makes red blood cells burst. Which hurts. And there are other proteins that destroy cell membranes, cause pain, destroy nerve tissue. There’s also histamine in bee venom, which makes your capillaries leak and causes itchy welts. So, when bees sting, they release a pheromone that says, “I’m in trubs!” It’s a last-ditch defense. Bees don’t wanna sting you! They don’t wanna die! They would really rather very much not.

Alie: So, you prevent getting stung by just being really, really cautious about where they are at all times. Like just kinda watching your back?

Mandy: Yes.

Alie: Okay. And now, when they’re swarming, tell me what is happening.

Mandy: So, a swarm is like a birth of a new colony, and it happens in the springtime when bees are coming out of winter. The queen starts laying eggs, the colony starts brooding up. They start ramping up their population production. So, they’ll make new queens to prepare for the swarm. When the new queens emerge, the old queen leaves the hive with about half of the bees and they go off to find a new place to live.

Alie: Oh! That’s fascinating because I always thought it was a new queen that was like, “Byyyeee.”

Mandy: No...

Alie: But really it’s the old one that like...

Mandy: It's the old one, yeah.

Aside: Side note, fun fact. When a bee colony is naturally occurring, it's called a nest! But when it's in a human-made container, then it's a hive. Isn't that fun? So, where do these old queens go after they bounce from their former colony? Apparently, hollows in trees are just ideal new digs. Amanda says hollows in trees are insulated, it's an alive ecosystem, it has a microbiome that's beneficial to them. So, a great place to rear tens of thousands of babies. But how do they do that? What are they eating?

Mandy: The bee goes out and gathers some nectar, they use their tongue, their proboscis. It's like a straw. They suck that up and the nectar goes into their honey stomach. So, it's a secondary stomach that they have.

Alie: Oh! Okay!

Mandy: And they carry it in that. When they bring it back to the hive, they do this thing called trophallaxis. They're regurgitating the nectar into another bee's mouth.

Alie: Oh!!!!

Mandy: And they pass it back and forth, and each time they do this they're adding enzymes to it. It reduces the moisture content of the nectar a little bit, because the nectar is very high in moisture. So, before it can become true honey, they have to bring that moisture content down quite a bit. After they pass it back and forth, they'll put it into a little honeycomb cell. And they fill that up and they use their wings to flap and get the air moving and reduce the moisture content. Ideally, for harvested honey, 17% is the most moisture that you'd want to have for it. And then they cover it with wax. It stays fresh forever, really.

Alie: Now what are they using the honey for? How do they use that honey to feed a brood?

Mandy: They feed their brood pollen, actually.

Alie: Okay!

Mandy: So, when they're collecting pollen, they're bringing that back to the hive and they're adding enzymes to it to sort of ferment it. And it's called 'bee bread.'

Alie: Oh! I didn't know that!

Mandy: [laughing] Yes, bee bread.

Alie: [high pitched] That's cuuuute!

Mandy: So, they'll feed that to their babies. It's a protein source.

Alie: Got it. So, then what's the honey used for? For the adults?

Mandy: They eat it, yeah. It gives them energy. It's a carbohydrate. It sustains them through the winter.

Alie: Oh, so are they collecting it more in the spring and summer and then living off of it in the winter?

Mandy: Yes. Yeah. And before a swarming event, they fill up on it. Everybody fills up before they leave the hive because they need that energy for when they get to their new home location to build a comb, because they won't have any comb where they're going unless they're moving into an old beehive. So, they have to start from scratch.

Aside: So now that I have heard the *buzz* about how honey bees eat, I needed to ask about their colonies' social setup. Who's overworked and bitter? Who's popular? Who's good with kids? It

turns out, every honey bee colony has roles that different bees inhabit, including Her Highness, Queen Bee.

Alie: And there is a queen, there are the female workers, and then there are the drones, right?

Mandy: Yes.

Alie: And so how do they determine who is the queen?

Mandy: The queen is made a queen when she's still an egg. A 3-days-old egg. The change happens when they start feeding her. She's only fed royal jelly. She doesn't get any bee bread.

Alie: [*gasp!*]

Mandy: She's deprived of protein during her development, and that is what makes her a queen.

Alie: Because she's deprived of protein?

Mandy: She's given a totally different diet, so that somehow changes her. She grows differently than the worker bee.

Alie: And what's royal jelly, exactly?

Mandy: Royal jelly is this enzyme that the bees... they have these glands that excrete it.

Alie: So that comes from a bee face and not from...

Mandy: It's from a bee face. [*laughing*]

Alie: And so do a lot of different workers contribute to that? Or is it, like, one nurse?

Mandy: Yeah, so what happens is if a bee lives out its full life cycle, it will achieve all the different jobs within a colony.

Alie: Oh!!!!

Mandy: They start out as nurse bees. So, when they first are born they come out and start tending the young and the larvae. And then there's food processor bees, there's cleaning bees because they like to keep their hive really clean. And the last stage is the foraging bees. Those are the most experienced bees and they go out and are the ones we see in the gardens. Let's say they make five queens and they all emerge around the same time. They will call each other out. They do this thing called piping. It sounds like a kazoo. They'll call to each other and then they'll fight.

Aside: Sidenote. So the first queen out starts roaming around making this noise in G-sharp. It's called Piping or Tooting. It's like *meeeeeee meeeep meeeep*. Now, a few of her sisters who have also been raised to be queens but are still sleeping in their little cells – they just snoozed a little longer – they respond with a noise called, Quacking. It sounds like a duck honk. [*faint kazoo-like buzz/beep repeating at irregular intervals*] It's kinda like Marco Polo but with newborns. Now, here's the thing. When the sleepy queens quack back at the first one, the first one is like, "Oh, there you are!" And then goes and kills them.

Alie: And does she have a stinger? Cause I know a stinger is an ovipositor, right?

Mandy: She does have a stinger but it's not barbed like a worker stinger. So she can use it in battle, but it's not like the worker's stinger with the venom sack.

Aside: Also fun fact, unlike honey bee workers who would sting and die to defend their colony, most native solitary bees are not quick to sting. So embrace your native bees! But not literally. They don't need hugs. But they do need flowers to romp around and to shower themselves in pollen.

Alie: Why are workers and drones fuzzy?

Mandy: It's my understanding that the workers have fuzz because it helps them to gather the pollen. It will stick to them. They get a little bit staticky and sticky, and it will stick to their fuzz and then they can clean it off and sort of push it into their little pollen packets.

Aside: So imagine if your breakfast cereal just stuck to your clothes and then you just kind of swiped it into a couple of cargo pants pockets. See? You're a bee.

Now, on to honey bee keeping. I'm a little hazy on how smoke can calm down honey bees. Can Mandy clear the air for me?

Alie: And now, the smoke. You're essentially the smoke monster. They fall asleep? They get drowsy?

Mandy: So, it confuses them. It masks their pheromones. So, if they're really feisty, you can put a little smoke on them and it subdues their sense of smell, but it also tricks them into thinking the hive's on fire. "We've got to load up on honey and get out of Dodge."

Alie: Oh wow!

Aside: How do they know where their new home is? Do they have GPS? No. But they do get directions from their sisters via, yes, interpretive dance. That's not what you thought I was going to say, right? I know, shocking. It's not some dance you do at weddings, or on cruise ships, or on TikTok. It's actually a form of physical communication called a waggle dance. I am not making this up!

Mandy: So with the waggle dance, they're communicating locations of food, water, or even a new place to live. And the orientation of the direction that they're doing the dance in correlates with where the sun is at.

Alie: Whoa...

Mandy: So they're following the sun and they're using their waggle dance to tell you which direction. Like if the sun is, you know, due east, they'll do their dance due east and the intensity of the waggle tells you how good of a source it is.

Aside: I just want to say, I have been known to do a little dance at the first bite of a great sandwich, so I get it. It happens to the best of us. Now, really quick, speaking of the best of us, each week a cause gets a donation, and this week we are splitting it between the Xerces Society and the Pollinator Partnership. There will be links to those in the show notes, and also Mandy is about to tell you a little bit about them. And those donations are made possible by sponsors of the show.

[Ad Break]

Okay, on to your questions. Lightning round. This one is about native bees.

Alie: Eric Blanc wants to know: I want to help bees in my area. What's a good resource to find out the proper wildflowers to plant for them?

Mandy: I would go to the local extension department at the university. Xerces Society has a lot of resources. Pollinator Partnership also has a lot of resources so you can find what's growing in your area.

Alie: And John Worster and Jesse Peel both had the same question: Will eating honey that's been harvested locally help if you have seasonal allergies?

Mandy: Word on the street is that it does.

Alie: So it gets your body used to, maybe, those pollens?

Mandy: Exactly. I'm not an allergist, but yes, it's like you're inoculating yourself with the irritant and your immune system adjusts to that rather than taking an antihistamine to just suppress any kind of response.

Alie: Katie Grant wants to know: Are bees actually more attracted to bright yellow clothing? I wear a safety vest for work and was told that an orange vest won't attract bees like a yellow one does. Is this true??

Mandy: In my own personal experience when I wear my bright yellow coat, I do have bees land on me.

Alie: Wow!

Mandy: Maybe it's because you look like pollen, I don't know.

Aside: Okay, so we have learned a lot about honey bees and their homes, but what can they do if suddenly an intruder enters the nest? Well, this is bananas.

Alie: I've read that bee species will gather in a ball and increase the local temperature in order to cook wasps and other invaders like Japanese hornets. So what is that mechanism and how do they not cook themselves in the process?

Mandy: It's called balling.

Alie: Boom!

Mandy: Yeah! *[laughs]*

Alie: Appropriate!

Mandy: So, they will use their body heat to cook the predator. [*"That's hot."*]

Alie: What is your favorite thing about bees?

Mandy: I love this thing that they do called festooning.

Alie: Whut??? What is it??

Mandy: Festooning is when they're building new comb. So they have to work together to do this, and what they do is they join hands and they make this lovely little chain, and then bees gather together in the chain and they excrete the wax from their abdomen, and they pass it up to the bees up top. So, they are working together while in contact with each other to make this comb, and they make the chain so that it's plumb to the earth, so it's straight. And the comb, when it's brand new, is beautiful. It's very translucent. It's so delicate and perfect.

Alie: Oh wow...

Mandy: They make it perfect.

So wow. Okay, we learned that honey bees are not native to North America. Native bees are amazing too and need our help. Pollinator plants are the best and queens don't get to eat bee bread. Augh! Now, to learn more about Mandy Shaw, you can follow her on Instagram and Twitter. She is @BeeingMandy on both platforms. To learn more about her, you can go to Bellabeek.com. She sells very stylish netted beekeeper bonnets that she makes. And for all the sweet *beehind* the scenes on beekeeping, you can listen to her podcast. It's called *Beekeeper Confidential*. Those will all be linked in the show notes, as well as the credits for all the great humans who work on the podcast. The saucier, non-Smologies version of *Melittology* is also linked in the show notes in case you do not have any kiddos around.

You can find more Smologies episodes at AlieWard.com/Smologies. Those are all cut-down, condensed versions that are G-rated for kids and cleaned up. You can follow the podcast on Twitter and Instagram @Ologies. I'm @AlieWard on Twitter and Instagram.

If you listen until the end of the episode, you know I share some advice, like a cool uncle. This week it is that, if mornings ever feel too hectic – I totally understand – try to do as much as possible to get ready the night before. Like pick out an outfit for school, maybe help make your lunch before you go to bed. Pack your bookbag all up. And then getting out the door will be much easier when you don't have to make a bunch of decisions and gather your stuff when you still feel too sleepy. So, I hope that helps. It helps me sometimes.

Until next time, Smologites. Berbye.

Transcribed by Emily White at TheWordary.com

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