

# Bufology with Priya Nanjappa

## Ologies Podcast

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Oh hey, it's your sister's new boyfriend, who you're quietly judging because of his cracked phone screen and bad shoes, Alie Ward, back with another episode of *Ologies*. If this is your very first episode, just a few things. We swear a whole bunch in this; we swear in a lot of 'em, most of 'em. If you wish we didn't, don't freak out, there are bleeped episodes of the podcast available at [AlieWard.com](http://AlieWard.com). I'll put a link in the show notes. Moving the danged heck on.

Okay so frickin' toads. What are they? And are they the best or are they the worst? Are toads the unsung underdogs? Are they warty friends yet to be made? Or are they bastards? Do they belong in a heap of canceled beasts who don't deserve our admiration? You'll find out.

But first, business, in which I thank everyone on [Patreon.com/Ologies](https://www.patreon.com/Ologies) for their questions, for their patronhood, for making the show feasible and possible and just a joy to make. Also, thank you to everyone sporting *Ologies* merch from [OlogiesMerch.com](https://www.OlogiesMerch.com) and everyone who just gets it and knows that making sure that you're subscribed and rating the show helps us get seen by pre-ologites, people who don't know about the show yet.

Also, thanks to the kind folks who are leaving reviews, because you know that I read them when I'm in a hotel, eating gas station food, and they make my day. So I read you a new one each week as a thank you, and this week Justine D. said:

*My grandma passed away recently and the only thing I could do to keep myself from crying was listening to Ologies. Alie, you helped me laugh when I felt like crying; that's huge. Keep it up, my friend.*

Justine, I'm so sorry about your grandma. I'm sending you a hug. Everyone, text your grandma—does your grandma text? If you have a grandma, text her and say, “Hey, thanks for pushing out a baby that pushed out a baby,” or you can word it however you want to word it.

Okay. Bufology. Let's go down a toad hole. Let's get the hell into it. So bufology is a word that I did not make up although it's seldom cited, to be fair. A 2011 *Reptile Magazine* article titled “Ode to a Toad” uses the term ‘Bufology 101’, so I'm going with it. There's also herpetology, which is reptiles and amphibians, there's batrachology, which is the subfield that is just amphibians and which I may have pronounced wrong, but I tried to pronounce it so many times.

But what if I want to do a frog episode down the line? Or one on newts? So, I'm going with Bufology, because it exists, people use it sometimes, also its root is *bufo*, the Latin for ‘toad’, which may come from a word meaning slimy plant, or it may also come from *bufare*, meaning to puff up, and buffoonery is a related word. It's debatable, like toads, for some people.

So where are you with toads? You know what? It doesn't matter, because in an hour and change you'll be padding out to the backyard on little bare feet with your coffee mug every morning, just hoping for a toad encounter. Mark my words!

This Ologist is wonderful. We tried to meet up so many times in the past year or so but our travel plans kept hitting snags, and then this past week we both happened to be thousands of miles away from our respective homes; we were in Minneapolis on the same night. She was on a road trip-toad trip and I was on this *Ologies* Midwestern interview bonanza. So I used your *Patreon* money to get her a nice room in the same hotel and, with butterflies, I went down to it, kind of like a nervous

Tinder date. She's a gorgeous soul. She's so funny, and candid, and enthusiastic about toads and I love her and I hope we are always friends.

So, if this is your first episode of Ologies, boy howdy, buckle up. Get ready to hear a scientist passionately describe a love of toads. She's so human. I cherish her. She was once the program manager for the Association of Fish and Wildlife Agencies where she also served as a national coordinator for Partners in Amphibian and Reptile Conservation. She worked as a biological science technician for the US geological survey in the Amphibian Research and Monitoring Initiative, and now works in the non-profit ecology sector at Conservation Science Partners. But is still in the field a bit, out toading and salamandering and frogging and newting, but today she is in a Minnesota hotel, about to get super bufological with me, so hop on in to a conversation with amphibian enthusiast and Bufologist, Priya Nanjappa.

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**Alie Ward:** [*whispering to herself walking through the hotel*] On my way to see Priya... eight-oh-six here we go, gonna meet Priya, gonna talk toads... eight-oh-six... Oh my gosh. Here we go. This is like a blind date. I'm so excited. [*door opens*] Toads! Toads! Toads!

[*now seated with Priya*] You are a lover of toads.

**Priya Nanjappa:** Yes!

**Alie:** What is it about toads specifically that you love? Why don't I open with a question that we could do a whole series on? [*laughs*]

**Priya:** Oh yeah! There're so many things to love! So, I was thinking about this because I knew you were gonna ask me this and there's so many different ways I could go with this question, but I think just in general I tend to be somebody who likes the underdog, you know what I mean? The thing that people don't want to love, you know? And that kind of plays into my romantic life as well too but *anyway*, that's a whole other story. They're just so fucking *cute*! They're fat, and they're grumpy-faced, and you just know that they're really not grumpy, or you want them to really not be grumpy, but they wanna act grumpy. They wanna act tough, they puff up.

**Aside:** Priya studied Wildlife Biology with a minor in Environmental Studies at Iowa State University and then she went on to get a Master's in Conservation Biology at Ball University. Her work involved developing the first national database of amphibian distributions and maps. Kind of like a census taker, just going off to tiny toad houses, sayin', "Hey, knock-knock, howdy-hoo, pardon. How many of you livin' in that log? I'd like to observe you eating bugs and doing the nasty." But what got her into it?

**Priya:** I remember my first toad sighting, which was in my mom's garden, in Iowa. It just would hop along the tomato plants and eat things, and eventually we figured out we could build a little toad hut, out of a pot, and put that in there and it would just go and hang out. I was so sad on the days when I didn't see it, like I'm sure it was all seasonal but I don't remember the specifics of it. But I do remember other people's houses where there'd be one sitting under the gutter, eating the flies and stuff like that. And I liked other critters too, but there was something about the toads that I just kept coming back to, that I just kept... I don't know. I just love them. They just have that face, you know? It's just that face.

**Alie:** I love that you had a toad friend! Like, that toad was your friend.

**Priya:** [*laughs*] It kind of was my friend.

**Aside:** Her warty buddy got a toad abode and in return it ate all the bugs that wanted to eat their lettuces. It was a mutually beneficial relationship. Kind of like when you dog sit, and then also while you're there you eat all their snacks.

**Priya:** And then somehow we figured out or looked it up – there was no internet back in those days – but we figured out that there it was gonna be a helpful thing. So that toad lived there, and I want to think that the same toad came back year after year, but I know we definitely saw *a* toad in the garden at least a couple of years.

**Alie:** Maybe the great grandson of the original toad!

**Priya:** Oh my god, that would be just so delightful if that was true!

**Alie:** How long do they live?

**Priya:** There's a variety of age ranges, just depending on the species. I think probably ten years, five to ten years is on average in the wild, but there's some in captivity that can live really long.

**Alie:** They look *ancient*. They look like they're in their 80s. All of them look like Wilford Brimley but hairless and green!

**Priya:** [*laughs*] They totally do! [*clip: "I'm Wilford Brimley and I'd like to talk to you for a few minutes about diabeetus."*]

**Aside:** PS, Wilford Brimley was a TV star who was also known for his Quaker Oats commercials, and for changing the American pronunciation of *diabetes* to *diabeetus*. [*Wilford Brimley: "Diabeetus."*]

Also, I just looked up some facts about Wilford Brimley and one of the most stunning is he's very much alive! He's only 84 years old, which means that he was just 60 when he was playing like deep, deep grandpa genre roles. I respect him for just leaning into that. So, toads. Tiny grumpy grandpas. They are *grump*-pas. Okay but what makes a toad a toad?

**Alie:** Straightaway, what is the difference between a frog and a toad?

**Priya:** So, generally speaking, most frogs have smooth skin, they tend to need a closer association with water or aquatic environments. Then the toads that we traditionally know, with the big fat stout bodies and the warts and everything, they typically can be away from water longer, and they don't need as much of that, sort of, direct moisture the way that frogs do. And then they also secrete these toxins from their skin. That's the biggest thing. There are some frogs that do that as well. But pretty much all toads have some sort of gland and they secrete some sort of bufotoxin.

**Alie:** Bufotoxin! Sounds like such a good punk band. "*Bufotoxin!*"

**Priya:** Right? Yeah.

**Alie:** Is their skin thicker? And what exactly are the warts? Are they air-quotes warts?

**Priya:** That's a good question. These warts on toads are associated with mucous glands and granular glands. But the granular glands are the ones that are responsible for the toxic secretions, and it's for anti-predator defense so that when anything grabs it, it just tastes bad, and they spit it out, or sometimes they'll get sick. Some of the toads produce some pretty strong toxins. So, all toads are frogs, but not all frogs are toads.

**Alie:** Oh, I love those. It's the old "All cactus are succulents, not all succulents are cacti."

**Priya:** Yes, exactly. Or like in the amphibian world, there's newts, all newts are salamanders but not all salamanders are newts. Newts are to salamanders like toads are to frogs. Early lineages of toads, they look more froglike, and over time, those different features, the more stout bodies, and the bigger warts and glands, appear later in evolutionary history. They came after frogs, so somewhere in that Cretaceous-Cenozoic period. They've been around.

**Alie:** Oh jeez, they're Wilford Brimleys.

**Aside:** So, side note. Wonderfully British vertebrate paleontologist Darren Naish has written extensively on toad evolution and its many gnarled branches. And also, he has a pet cane toad named Milo, which looks like it can kick my ass.

Anyway, more on cane toads in a minute but cane toads, like frogs, have teeth. Sort of. They have little peg-like nubbins. But other toads do not have teeth. To recap: toads are frogs, and toads have no teeth, yes for warts, they've got a poison gland behind their eye called a parotid gland, thought to have been an adrenal gland just gone bonkers. Oh, and another souped-up special feature not available on the standard frog model:

**Priya:** And the other really weird thing is that toads have this thing called the Bidder's organ, which sits kind of between the kidneys and the gonads. And I think both males and females have them, but they're thought to be like a primitive ovary.

**Alie:** What!? [*slowed down: "Whaaat?"*]

**Priya:** Kind of like a spare set of follicles, but the males have it too. So in experiments in the lab, they've removed the testes, just castrated them, and all of a sudden this Bidder's organ is like, "Oh! Okay! Time for me to come into play!" and it starts forming eggs.

**Alie:** No way!

**Priya:** Initially when I had learned about it, I thought maybe it would create sperm or something in the males and eggs in the females but no, it always produces eggs. It has follicles. Then the same thing with the females, if one of the ovaries doesn't work, then it will start to come into play.

But the other interesting thing with the males is that in some situations where there's estrogen-mimic chemicals or other chemical things that will chemically castrate, all of a sudden that organ starts taking off. It's named after the dude who discovered it, but it always relates to eggs and oocytes, and that means that the ability to possess ovaries is probably, like, the original evolutionary condition. That's my story and I'm sticking to it. [*laughs*]

**Alie:** I love it! Publish it! I just peer-reviewed it. No paywalls. And then what about their big crazy weird ear drum?

**Priya:** So, they do have that tympanum, and that's how they can hear each other sing their lovely songs. But those ones in those areas where they don't call, they have lost their ear drums. So they just do the waving thing, or whatever, and they don't even need them anymore, so they don't have them. It's just that tympanic membrane, and most frogs have them, and it's just a little drumhead, basically, and they sense vibrations from the calls of others. They can tell the difference between their own species, obviously, and others.

**Alie:** What about their eyes? Is their eyesight good? Eyesight bad? I've never seen them in glasses.

**Priya:** I don't think they're supposed to have very good- I've never seen them in glasses either. They would look so good in glasses, though, wouldn't they? They would look so good. Just like some little hipster, sort of thick-framed glasses, or those ones without the rims.

I don't think they're thought to have great eyesight, but I don't think it's bad. They can discern color though, because some toads are sexually dimorphic more than just the size, there's actually color differences, kind of like in birds. So, they must have some color vision.

**Alie:** Are the males bigger than the females?

**Priya:** The females are bigger than the males.

**Alie:** By a lot?

**Priya:** Yeah, by a lot. Usually by quite a bit. If you see them mating, it's like this tiny male on top of this big ol' female and it always looks a little funny.

**Aside:** Oh, and both have tympanums to hear sound, such as for example, the romantic screamy love ballads man-toads make by inflating an air sac like a big extra chin, kind of like having a subwoofer on your face. *Heyyyy!*

**Priya:** So, another thing that's really cool about toads is they have a lot more bony material in their skull. Their skulls are highly ossified, and those crests and the shape of those crests are what you can use to distinguish species when they are in the same area and you have a lot of similar looking little brown toads with warts. Other than the warts-per-spot. In the dark brown spot, there'll be two or three warts if it's an American toad, and then if it's a Fowler's toad or a Woodhouse's toad it'll have more in each dark spot.

And then there's the shape of the parotid glands, which are the things behind their eyes that produce more of the toxic secretion, and then those little crests and bosses and ridges and everything. That's how they differentiate themselves. So yeah, they have these really cool skulls. Frogs don't have that. You think of them as the cave men. They're actually the ones that came later.

**Alie:** Gonna get, like, a full toad back tattoo. [*laughs*] It's gonna happen! There are toads on all continents?

**Priya:** Everywhere except Australia, which right now is being overrun by the invasive cane toad.

**Alie:** Oh really? Australia got a little bit ripped off on the toad card and then they got payback.

**Priya:** Yeah, and they didn't used to be on Madagascar either but now there's a different toad that is found on Madagascar that's also super invasive and wreaking havoc. Unfortunately, the toads that are finding their way to places where they never were are the ones you just don't want to be there.

**Aside:** Okay let's loop around back real quick and talk about cane toads, shall we? Okay, great. So, these are these huge-ass toads, they're also called marine toads, even though they're terrestrial (Linnaeus made, like, an oopsie daisy in the 1700s about their habitat). But the largest recorded one measured over 9 inches long.

They look like holding a big leathery pretzel roll but with legs. And they are college-stoner-level hungry. They eat everything from live bats, sometimes plants, to bugs, to dead animals, to just straight up garbage. Sometimes just literal, actual garbage. Most scientists report they seem to give few, if any, fucks, enabling them to get both large and in charge.

They also have successful and very prolific mating strategies. So, in summation, cane toads, they're like the Romans. They like to eat, they like to make love, and they're native to the Americas and even south Texas, but they now live all over the damned place because in the 1930s someone was like, [*old timey accent*] "Hey, I got an idea, see?"

**Priya:** So, it was like where they were growing sugar cane they had brought them there to control the bugs that were eating the sugar cane. And then of course, any time you bring a thing to control the thing that you don't want then that thing goes crazy. So, they are these big, beefy marine toads, so they can tolerate saltwater environments, but they also apparently can live all over the place, on land. So they're in vast swathes of Australia and all over Hawaii, they're in Florida now.

**Alie:** How do you control a cane toad population?

**Priya:** It's proving to be really difficult. They have had some luck with, I want to say, caffeine. Where they're dropping caffeine, or spraying caffeine. That has been effective in some places in knocking down the population, and just generally they try to go and collect them up and then euthanize them.

**Alie:** Throw them in a volcano or something?

**Priya:** Yeah, pretty much.

**Aside:** So yes. Some parts of the world have a *real* cane toad problem. Also, the beetles that they were supposed to eat? They like to climb to the top of the sugar cane and the toads are like, [*whiny*] "Ugh, that's too high, no reachy. I'll just eat this bird instead."

So now Australia has this bunch of poisonous toads, and sometimes people's dogs eat them and trip absolute balls or just die. But caffeine? Really? As an agent for toad assassinations? So, what happens is, concentrated caffeine, when sprayed around by professional eco-barista, if you will, causes amphibians to have heart attacks, and they... well, they croak. DadWard really *toad the line* with that one, kiddos. Please don't stop listening.

Okay. So, concentrated caffeine gives them pretty much lethal panic attacks. But one can spread coffee grounds in the garden, and they might just get real buzzy and uncomfortable enough to just avoid the area. Kind of like how I didn't go into a Starbucks for a while after a venti-induced anxiety meltdown. But this could just be wicked mean to slugs and such, because caffeine is a plant's natural defense against getting munched on by a lot of critters. Also, this sent me down a weird hole learning that a plant can poison itself with its own caffeine, so the leaves drop, the caffeine leaches into the soil, the plant is like, "Oh nuts. I brought this on myself."

Now, okay, if killing animals makes you squeamish, you could always just exploit them for profit and become a drug dealer. So, Country Farm Lifestyles website offered up the advice of painting chloroform on the belly of a cane toad until they start oozing milky poison, and then, just like a pimple full of money, you can gently express their parotid gland right behind their eyes. But watch your eyes; wear some cool steampunk goggles or something, so you don't get splat into on the eyeball and then wind up really crying over spilled milky white poison.

Also, quick aside within this aside – a sideception, if you will – does Priya have a favorite toad? Yes. She has a soft spot. She has a soft, warty spot for American toads because they were the first she saw in the Midwest, but she did clarify that they no longer belong to the *Bufo* genus. North American toads are now classified *Anaxyrus*, which sounds like a very cool rebrand, if you ask me. *Bufo* versus *Anaxyrus*? Reminds me of the time my goth friend Ben wanted us to call him Sebastiane, with an e on the end. But unlike *Anaxyrus*, it didn't stick. I'm sorry Sebastiane. Sebast-*cheen*?

**Priya:** They're a little bit fatter and their eyes are just a little bit more, like, bulbous. So, I really kind of fell in love with them, but there's some really pretty toads, too. In the Southwestern US there are these green toads, and then these red-spotted toads. They can be really pretty, especially in South America. I haven't really seen all the bufonid species that are down there, it would take millions of years, there's so many species of toads all over the world. They are really diverse and interesting.

**Aside:** PS, how many species of toad are out there, hoppin' around and frowning? It's over 600! And some look like dead leaves with a face, and some are beautiful rainbow colors, some we haven't even discovered yet, right now, just kickin' it in a hollow, I think.

**Alie:** Is that where toads live? Do they live in toad hollows? Do they live in little carved-out spots in trees and stuff?

**Priya:** Pretty much in burrows of different sorts; some of them can do a little bit of digging but a lot of times they'll live in other mammal burrows and things like that.

**Aside:** For more on being roommates with a Gopher tortoise, see the Testudinology episode with Amanda Hipps. Also, I just tried to google 'toads + friends + interspecies' and I'll be honest, not much popped up. I guess it's lonely being horny and toxic.

Oh, and if you've already heard the Thermophysiology episode with Dr. Shane Campbell-Staton you might know a little bit about wood frog antifreeze, but how do toads get hygge – aka higggy – with it? That Scandinavian word for cozy-in-the-winter? Do they knit chunky turtlenecks and sip hot table wine out of a crock pot? Do they all peace out to condos in Florida when it gets chilly? What happens?

**Priya:** They don't freeze like some frog species can totally freeze in the winter, they produce this antifreeze, but toads don't do that. They just go underground below the frostline, where it's just warm enough that they can survive through the winter and they hibernate, but they don't freeze. They just live underground.

**Alie:** I need you to settle something that's been plaguing me for a long time. You love toads. You've studied toads. True or false: Toads have arms?

**Priya:** [*gasps in delight*] Yes, they do! [*laughs*]

**Alie:** Thank you! I don't feel like toads have four legs. I feel like they have two legs and two arms.

**Priya:** They do!

**Alie:** Toads have arms!

**Priya:** They do have arms! I mean, they're like little Popeye arms, right? Couldn't you just see a little tattoo on those little forearms? They're sooo fat. And the males have fatter forearms on purpose, to clutch on the ladies. Yeah, they have arms.

**Alie:** Okay *thank* you!

**Priya:** You will see it in different places and references, about their arms.

**Alie:** Really? So, is that official?

**Priya:** [*pauses*] I'm going to say it is. [*DJ airhorn*]

**Alie:** Because I just cannot accept that those are legs! That's not how legs work.

**Priya:** No, they're not even really forelegs. They really look like little wrestler arms. Totally.

**Alie:** And they have little hands, like little baby hands!

**Priya:** They do have. Yeah.

**Alie:** Okay that makes me feel better.

**Aside:** Okay, I looked this up and they *are* called arms! They're called arms! I went into this thinking this was a battle I had to fight. I was willing to die and leave my corpse on this hill that toads have arms, and instead, no one wanted to fight me! It's just a known thing; they have a humerus, they have a fused radius and ulna bones, and four fingers, just like us! The only thing they can't do is give me a knowing, appreciative thumbs up, because technically their thumbs aren't opposable.

Anyway. Moving on. Priya has done a lot of work with a lot of amphibians, namely salamanders, but her fieldwork helping collect toad data made her love them even more.

**Priya:** Just a little ways into the season, the toads would come in and they could just be *everywhere*, and they were just so fun to watch and they'd have these big orgies. [*slowed down*: "Heeyyyyy"]

And the eggs were everywhere. Then the tadpoles would be everywhere. There's probably at least a couple of sites where there was probably close to a hundred toads, hopping across roads... Whenever we would see them we'd measure them, and determine the sex, and look for overall health of the animals. We were doing that in general for the other critters too because we were finding, in some cases, some different malformations with some of the frog species. But we didn't really find that with the toads, which is interesting. We definitely saw a lot of them, just out and about, and just hoppin' along.

You could really find them when they're breeding, when they come to the ponds to breed. You'll find them just hopping around in the woods but just very randomly. Once they come in and they do that, they get out. You don't really know where they are or what they're doing. I just imagine them underground in their burrows having little socials, little underground bars, just chilling out, all winter.

**Alie:** Are they solitary, or do they burrow with friends, do you think? I wonder if they have girlfriends, boyfriends...?

**Priya:** I think there are some records of them sharing burrows with other toads. We actually found a multiple species hibernaculum. But I do think that there are toads that will share the same types of burrows, and then there's some places where the soil is really sandy and they can just shimmy down under the sand, especially in the hotter environments. In a lot of places in the southern US, both east and west, they're active pretty much year round, they don't really have much of a hibernation. But in the northern areas they do.

**Alie:** Do they sleep?

**Priya:** They do sleep. I've never seen a sleeping toad. Yeah, I haven't seen a sleeping toad.

**Alie:** Are they nocturnal or are they out in the day?

**Priya:** When they first come out, it's usually during the day and they will just be singing their little hearts out, like all during the day. And then they kind of shift to just calling at night, so you don't really hear them during the day, but you'll see them out there sometimes. We definitely... when we go out in the field to our sites during the daytime, we would see the toads, just everywhere, and they weren't always calling by that point. But then if you came to the same pond that night they would just be singing like crazy. So that was cool.



**Aside:** Ugh, listen to these beautiful sounds! [*high trilling toad noise*] That is nature's way of singing "Ah'm pretty hoorrnnny! Ah'm over heeere! I'm ready to be a daaadddd to thousands of kids I'll never meet! Once again: Ah'm very horrrnnny!" [*clip from Old Yeller: "Well now, that's a fine horny toad, and I want him bad!"*]

PS, where does the word 'horny' come from? I thought maybe I'd wander down a lush forest of bufological etymology. It turns out, horny toads aren't even toads! They're just another name for the horned lizard. They just call these spiky-necked Southwestern lizards toads because they have kind of a stout body. So, good morning world; we've been lied to for generations! Let's get back to our real friends, the toads, and their robust sexuality.

**Alie:** Talk to me about toad romance. You mentioned the word orgy. Let's revisit that.

**Priya:** [*laughs*] It's true. Let's do that.

**Alie:** What is happening when toads all get together to make more toads?

**Priya:** When toads start wanting to get their freak on, they are so indiscriminate sometimes. I've seen a toad amplexing a rock. One time I was taking temperature of the water and there were some toads nearby and this little toad hopped up and grabbed onto my fingers. They are so funny. They get all territorial and if they think... In that case obviously he thought, "I gotta get on that thing! That thing looks like I should mate that!"

But sometimes they're just defending their territory and they do that thing, they puff up. And as I picked it up, they do this little release call, the American toads make this little [*brief, high-pitched chirp*].

**Alie:** Like their version of a car alarm?

**Aside:** Let's hear that, shall we? [*toad release-trill, a super tiny little chirp*] Priya says that release call essentially translates to, "Oops, nope, I'm a boy toad; please don't mount me bro. Thanks buddy."

**Priya:** Just this little trill, as I was holding it. And yeah, I fell in love a little bit more that day.

**Alie:** I don't blame you.

**Priya:** But they are just on everything. And because the males are also really competitive to get the females, there's usually 3 or 4 on the females and we definitely would find sometimes, like, half-drowned females – and this happens with other frog species too – but where there's so many males that they basically are weighing her down and her head is staying underwater. And they breathe air, so she's getting drowned by all these aggressive fuckers.

**Alie:** These eager dudes! Like, come on! Take a number!

**Priya:** And she's just like, "Look, yeah, I got one."

**Alie:** And she's gonna squirt out some eggs, and then they're just going to go by and "season" them, sort of?

**Priya:** Well, yeah and they do have external fertilization. That's part of the strategy. They're just hanging out, and there'll be ones that'll be sitting there waiting for the one to hop off so that the next one can hop on.

**Alie:** Okay. Tell me if I'm hallucinating. Is there a type of toad where the baby toads are birthed from holes in the back or was that on *American Horror Story*?

**Priya:** No, no, those are a different family, so they're not bufonids, they're not true toads. They're called the Suriname toad, and that's the craziest reproductive strategy. They'll lay the eggs, and they'll be fertilized, and then they scoop them up with their legs onto their back. And then the chemistry of the skin changes, and it basically absorbs the eggs into their back, and then the skin grows back over the top of it. [*Alie groans*] It's like some serious sci-fi shit. And then when they get ready to hatch, they hatch out as little live... it's not even tadpoles, it's little live baby toads, and they start cracking out of the mom's back. It's so crazy.

**Alie:** That is such a horror show.

**Priya:** Yeah.

**Alie:** I mean it works for *them* and good for them.

**Priya:** It works, right. But I mean, it's really cool, actually. We use that a lot in outreach with kids as an example of cool adaptations that they have. And they're always like, "Eww!! Let's see it again!" But yeah, that one's a really freaky one. But those are not true toads. Those are in the *Pipidae* family, not the *Bufo* family.

**Aside:** So I looked this up, and as a person who has relaxed to dozens and dozens of videos of blackhead extractions, and bot fly maggots under human skin – shout out to Lepidopterologist Phil Torres for fostering one in his back recently – and my personal favorite, mango worm extraction, I found this Suriname toad thing *revoollllting*.

First off, it just looks like a frog who's been flattened by a mallet but came back as a muddy, angry ghost. The Suriname toad scientifically known as *Pipa*. *Pipa* means kite, because it's flat and pointy. It looks like an angular, roast chicken breast, with webbed feet, and like a mesh tank top of skin is its back. It's riddled with holes, out of which, flailing, squirming, mini-toads emerge in a fury like a jailbreak. It's a nightmare you cannot imagine, and if you have that fear of holes? Whatever that's called? Get a restraining order against this species. I have met my match. This is disgusting.

Also, not even really a toad. It's an aquatic frog. Get outta here! Let's get back to toads. God this was gross. I mean, beautiful, but *very* upsetting.

**Alie:** Let's talk toad lickin'. Who's doing it and why?

**Priya:** Yeah, there's a lot of people that are doing it, and they probably shouldn't be doing it. So, there's only one toad in the US that produces that particular type of bufotoxin. You can't just, like, lick the toad. You will not be very comfortable if you just lick the toad. [*giggles*]

**Aside:** [*as if over a loudspeaker:*] Again: Do. Not. Lick. The. Toad.

Why? Consider this story a PSA against toad-basing:

**Priya:** We were driving down this little golf course where another colleague of mine had these rattlesnakes telemetered, tagged so we could track them, and I just saw this thing hopping along and I was like, "What? Is that a bunny?" And he was like, "Those are the Sonoran Desert Toads" and I was like, "What?! Those are those toads, the ones you can lick?" And he was like, "Oh yeah, those are those ones." And then we had to stop and went and checked them out, and he was like, "Now you've got to really wash your hands. Here's some Purell."

Later on, I think I rubbed my nose or did something like that and it was really burning, from that little bit that was probably still on my hands. Thankfully, I didn't touch my eyes because that can be a real problem. I think the Indigenous people had learned how to basically

harvest it, and then I think you have to dry it and process it a little bit before you can actually use it in those ways, to have the true hallucinogenic experience.

**Alie:** So, you have to kind of milk them by stressing them out a little bit?

**Priya:** Pretty much. But they do have a fair bit just on them. They're pretty gnarly. But I don't think it takes much to stress them out. Certain toads you can actually see the secretion, it's this milky stuff coming out.

**Alie:** You just have to shit-talk their moms, they're like "Urrhh!" It comes flowing out.

**Priya:** [laughs] Exactly. There are these stories, though, that people will do it in such a way that they can still get a high, and just keep the toad so that they can harvest it. And I'm sure people have studied all of these different ways of how you can make it happen, but I have not experienced the toad high.

**Alie:** I wonder if people on YouTube are like, "Listen. Here's what you do." I'll be looking.

**Priya:** Oh, I'm sure you will. And I'm looking forward to learning more about that.

**Aside:** Oh, you *know* I will. Okay, so the Colorado River toad or the Sonoran Desert toad, same thing, they're native to what's now northern Mexico and the Southwestern United States. So, these produce a poison that has a form of the psychedelic substance DMT, which is produced in humans naturally, but during a dream state and maybe when you die. [clip from *The Simpsons: Homer moans in his sleep. Marge calls, "Homer? Hooooomer"*]

Do not go milking it and licking it; that's not gonna work. For thousands of years, Indigenous cultures have perfected the harvesting, and the drying, and the smoking of this angry toad-juice. And what is said to result is everything from, like, a powerful love and oneness with nature, to feeling like dying and a rebirth, to seeing geometric aliens chirping welcomes into another dimension. Did I mention, Don't Lick a Toad? Don't try this on your own. This is not a Pinterest DIY hack to diddle with on the weekend. Respect the culture. Respect the history. Respect the toad.

**Alie:** What about toads in popular culture? How do you feel about the children's book series *Frog and Toad*? [clip from *Frog and Toad: Frog, cheerfully, "Toad! Toad! The sun is shining! The snow is melting! Wake up!" Toad, grumpy, "Ohhh... I am not here."*]

**Priya:** Oh my god, one of my favorite books, for real. Even before I really became a toad lover, it was just one of my favorite books. I just loved the little relationship that they had and how toad was always so grumpy. I had *Frog and Toad Are Friends*, and that became the book that I gave all my friends when they started having kids.

There's a lot of vilifying of toads in pop culture. The whole thing about getting warts from toads, which of course you can't.

**Alie:** You can't! They're not viral! It's just part of their back!

**Priya:** Yeah. They're just trying to protect themselves; they're just trying to make sure that nobody eats them, that's all.

**Alie:** And also, stop licking them if you don't want to get any diseases!

**Priya** [laughs] There are a lot worse things you can get from licking a toad, like salmonella among other things.

**Aside:** Among the other things is a strain of chlamydia, and a bunch of bacterial infections I can't pronounce. So, *don't lick toads!* No one wants to get Toad Chlamydia. You wanna tell

people you got Toad Chlamydia? Also, what is the state of the toad these days? How are toads? Do they need us? Do they hate us?

**Alie:** I know that cane toads are having a heyday, it is the Era of the Cane Toad, but how in general are toads faring these days?

**Priya:** It depends. So, some of the species of toads have been hit pretty hard by the chytrid fungus, the amphibian chytrid fungus *Batrachochytrium dendrobatidis*, [“That’s quite a mouthful.”] or BD for short. In Central America especially, there’s a couple of the *Atelopus* genus species that are thought to be extinct. There’s a golden toad that’s in the *Incilius* genus from Costa Rica that was their iconic toad species, and they think that that’s extinct. [slowed down, sad, “Oh nooooo.”] I think they’ve found maybe a couple of individuals here and there of all these different species, but they’ve gone extinct and it’s because of this fungal pathogen.

So, have you heard of white-nose in bats? This actually came before and the people in the white-nose world learned from that, but it took the BD world, the amphibian world, a really long time to figure out that it was this fungal pathogen. It was described as a new species once they figured out that that’s what it was. It’s been responsible for... well, it’s questionable. But there’s a recent paper that says there’s like 500 species that have declined throughout the world because of BD. But there’s some question about that. Most people say around 200 or so species have declined or gone extinct specifically because of the impacts of BD.

And in the US in particular, some of our toad species have been the ones that have been most impacted. The boreal toads, like the Western toads, and there’s a Wyoming toad that’s related as well. It just has a very small distribution in Wyoming and it’s also been impacted. And there’s all these recovery programs going on for these two toad species. They were raising them in captivity and having good success with that but then when they put them back out in the habitat, they would die because this fungal pathogen remains in the habitat. So once it’s out there, it’s really hard to figure out how you can get them back out there. So they’re trying a bunch of different things to see how they can help them to persist with it.

So, disease issues are something that has impacted our toads. There’re multiple strains that are being documented now. There was an out-of-Asia and an out-of-Africa hypothesis that were competing for a while. I believe they have determined that it came out of Asia, but because of trade is why this thing is moving around. And with BD, they would use those African clawed frogs. They’re fully aquatic, with claws. You’ll see them in Asian markets. They’re established in Los Angeles or somewhere down around there, in the wild, there’s a population down there and in a few other places in the US.

Anyway, they were used as pregnancy tests. [“Wait. What?”] So, these are not toads, but these frogs were used as pregnancy tests, and what they would do is they would have them in a doctor’s office and a woman who thought she was pregnant, they would take her urine sample and inject it into the frog, and if it laid eggs [Alie gasps] then she was pregnant. And so of course after they were done with these frogs, they would just chuck them outside.

**Alie:** Oh dear. Oh no.

**Priya:** Yeah, and many of these... those obviously came from Africa, but they were carrying this fungal pathogen, and apparently they’re resistant, or they can persist with it, and so they were then spreading it to all the native species.

**Aside:** So, this was an awful practice, but at the time it seemed favorable to the older way, which was injecting a live rabbit with prego-pee, waiting a couple of days, killing it, and then

examining its ovaries. Or you could pee on wheat and see how long it takes to germinate. So, if you're ever in a position to pee on a drug store stick, I guess just be glad you're not waiting for seeds to sprout. Or, like, actively murdering a bunny.

**Alie:** Other than fungus and old timey pregnant ladies [*Priya laughs*] and like, really desperate Phish fans, what are the predators of toads?

**Priya:** Oh, there are various birds and snakes that will eat toads. Hognose snakes are kind of toad specialists. The toxin doesn't seem to bother them, so they're able to manage with them. But crows, which are super smart as you know, will eviscerate toads and then just eat their gooey insides.

**Alie:** That's what I do with airport sandwiches. I just eat the middle.

**Priya:** Right!! Exactly! [*laughs*] That's what I do too, because I've been trying to not eat as much bread anymore, so I just eat like the cheese and the veggies.

**Alie:** Sometimes I'm like, "I'm gonna fall asleep if I eat this whole pretzel roll. I'm just going to eat the inside." Oh my god.

**Priya:** So you eviscerate your sandwiches. It's the same thing.

**Alie:** So, they just unzip them in the belly and gobble them up?

**Priya:** Pretty much. They just go for the soft part right there, and they just poke 'em open. Sometimes you can see, it's like a little shirt that's been removed. I've seen some toads where they've pulled off the skin in such a way that it looks like they're just stuck with their shirt up over their head. [*laughs*] And raccoons will do that a little bit sometimes, they'll bite off the head or the legs and then spit them out and then claw out or suck out the insides. So we'll see these half-eaten toads and stuff in the breeding season especially because they're like, "Who! Smorgasbord here!"

**Alie:** Oh my god, it's like a shrimp buffet on a cruise ship. "Goin' for it!"

**Priya:** Exactly.

**Alie:** Now, toads in pop culture. Are there any toads in movies?

**Priya:** Oh, there's this whole cane toad movie. Do you not know about this toad movie?

**Alie:** No! What is it?

**Priya:** It's like, *Attack of the Killer Toads* or something. If you look it up you'll find it, but it's all about these cane toads and it's hilarious. It's such a great classic B-movie.

[*clip from Cane Toads: An Unnatural History. Australian male voice: "When I'm driving the car I have no hesitation in running over them whatsoever." Australian female voice: "I couldn't do that. They're friends." ominous organ music.*]

**Aside:** So, she's talking, I think, about the very cheesy 1988 documentary *Cane Toads: An Unnatural History*, which I would very, very much like to just kick back and watch. These cane toads, man. Who! I had no idea.

**Priya:** Cane toads are the biggest toads, and I think the record is 3 pounds or something like that.

**Alie:** [*laughing*] It's an absolute unit of toad!

**Priya:** Yeah. Completely.

**Alie:** Would you ever keep a toad as a pet?

**Priya:** No, you know everybody asks me that and I never have.

**Aside:** So, no. No pet toads for Priya. She prefers to see them hopping about and just enjoying the wild, having their orgies, one of which was recently captured as 10 cane toads at once were riding a python bareback in Australia. It looked like toads on the subway, home from work, but what was really happening was not commuting. The python just didn't have that release call chirp, if you know what I'm saying.

But let's say you'd like to have more outdoor pals, and you're not a python. How can you make your backyard a haven for toads?

**Alie:** So, you turned over a pot in the garden and then did you carve out a little toad door?

**Priya:** No, they have this stuff at the nature centers, like these little guidance type things, but you can bury a pot halfway so that it becomes a little tunnel. You can find these little designs that are out there for these little toad homes and they even make actual terracotta toad homes.

**Aside:** So, do yourself one favor today, and look up the hashtag #ToadAbodes. Oh, what a sight. What a sight for sad hearts. Just all kinds of pottery in the shape of mushroom houses, toad roadhouses, little ceramic cottages for warty locals. Several times a day since seeing that, I just stare off and I think of all the toads in aaalll the little houses all over the world, taking a snooze.

All right, let's pepper Priya with some questions.

**Alie:** Are you ready for Patreon questions?

**Priya:** I think so.

**Aside:** But before I ask the questions that you submitted, patrons, a few quick messages about sponsors of the show who make it possible for us to make a donation each week to a cause of the Ologist's choosing. This week Priya requested a donation be made to the Amphibian and Reptile Conservancy to support inclusivity and diversity initiatives in amphibian and reptile conservations. So thank you, Priya.

Also, if you like *Ologies*, I think you would dig a podcast called *Gastropod*. I don't know if you have heard about it, but it's about the science and history of food and it's hosted by two lovely women and I just want to give them a shout. They go on these deep dives into the most curious topics. They visit the world's most advance model gut at dinner time, they take you on a quest to figure out where microbes in sourdough come from. They figure out whether science can speed up the very magical process of aging whiskey. So in short, they're just obsessed with finding surprising science behind the food we eat every day. You can find *Gastropod* and subscribe to it on Apple Podcasts, Stitcher, or wherever you get your podcasts. We just thought that you guys might like each other. Okay, sponsors.

[Ad Break]

Your questions:

**Alie:** Patreon questions. We got a ton.

**Priya:** Really!?

**Alie:** Yes!

**Priya:** That quickly?

**Alie:** Patrons are the best! Jack Kelleher asks: Life cycle of a toad; same as, similar to a frog? Or do they live longer or shorter than a frog, do you think?

**Priya:** Well, I think it depends on the species. Some frogs live pretty long, some toads live pretty long, but on average sort of 5ish, 7ish, 10ish range of years. But life cycle, fairly similar to a frog, because you know, they are frogs.

**Alie:** They are a frog.

**Priya:** So, they will mostly be on land until it's breeding season, or they'll be hibernating or whatever, and then they'll come to the ponds for that breeding season, and they'll call, attract their mate. There are some toads that don't call and... Oh! There are some toads that will do that leg waving thing? Have you ever seen that?

**Alie:** What?!

**Priya:** In these stream environments where it's so loud because of all the stream noise, they have evolved this... They literally take their back leg and they just go like this.

**Aside:** Priya, by the way, is laying on the hotel room bed, doing a move that looks like part synchronized swimming but also part shipwreck victim.

**Priya:** And I think in some of them it's their front leg too, or their arm? And they're like, "Hey! I'm over here!" *[laughs]*

**Alie:** Oh my god. Like hailing a cab!

**Priya:** Yes! And then some, chick toad is like walking by and she's like, "Oh. OH! I see you."

**Alie:** *[laughs]* I never knew that they did that!

**Priya:** Anyway, I digressed there. So, generally speaking they attract their mate, the female comes over and they, you know, do the deed, and they have mostly external fertilization, there's a couple of exceptions. And then they lay their eggs and most of the species lay a lot of eggs. Maybe you'll have a pretty decent amount of the eggs that'll hatch into tadpoles but then the tadpoles are food for all sorts of stuff. *["Mmmm. Delicious!"]* Have you ever *seen* all the little toadlets popping out of...

**Alie:** Are they really called toadlets?

**Priya:** Yes! Toadlets!

**Alie:** Oh god!

**Priya:** And they're soooo tiny, but they're just the cutest frickin' things.

**Alie:** Frédéric Roy wants to know: Are there any studies on the possible medical applications of toad toxins?

**Priya:** Yes. I don't know the details of them, but I know there's some study on how it affects heart rates. There's kind of a steroidal element to it, and I think in the cocktail there's also epinephrine components. In animals, and other things that have experienced the toxin coming into contact with the toads, they have these extended periods of fast heart rate, or sometimes they have a really slowed heart rate, and so they're studying maybe there's a way to hone that in. There's some cool stuff going on with that.

**Aside:** PS, I gave a quick google just to make sure and yup, sure thing; plenty of research going on about toad toxins and inflammatory agents, cardiac activity regulators and anti-cancer agents, so the future is toads.

**Alie:** I'd love to see a prescription pad that just said, "Toad."

**Priya:** "Toad. Lick toad. Two licks a day."

**Alie:** Heather Albrecht says: What are toad communities like? I always see toads on the ground, blazing their own trails, but then there's always another little guy not too far away. Do they reconvene at the end of the day in communal housing if they survive my lawnmower? Or do they battle it out for prime resources? Do they have friends, do you think?

**Priya:** They all come together for the breeding season, but they're not really, like, friendly. They're all competing during that time. And it is true that you do tend to see them together, and I think that is probably because they must hang out together wherever they're overwintering or hanging out during the hot months or something.

**Alie:** Maybe they're in the same hibernaculum which is my new favorite word ever. I'm like... literally, I'm going to get a sign for the bedroom, just call it The Hibernaculum.

**Priya:** Yes! It's the perfect name for the bedroom.

**Alie:** Jana May Purington wants to know: Why does everyone think toads are so much grosser than frogs?

**Priya:** I don't know. That is such a good question. I think it's because of the warts. People just think, "Oh gross, it's all warty," and they don't want to touch it. But if you just actually look at a toad face, I mean, they're just so cute!

**Alie:** So expressive.

**Priya:** So expressive, and you kind of know where they stand and I love that.

**Alie:** Toads do not suffer fools.

**Priya:** They do not suffer fools, yeah.

**Alie:** Ira Gray wants to know: Why do toads pee on me when I pick them up?

**Priya:** Oh, yeah. It happens all the time. I've gotten so much toad pee on me. It's just a defense mechanism. They're like, "Hey maybe if I pee on you, you'll let me go."

**Aside:** I mean, who hasn't tried that in a meeting you wanted to leave?

**Priya:** Just from sitting in a little puddle of water or something, they can absorb up enough water. Unless it's been really dry, you don't have to worry too much about it. But if you're finding a toad out in the middle of the woods, and you pick it up, and then it pees on you, then you might have made its life a little bit harder for a little while.

**Alie:** Give it a little capful of water and let it just sit.

**Priya:** Yeah just pour a little bit of your water into a little bowl and just plop it in there, let it just [slurps] reabsorb some water. [laughs]

**Alie:** I love that they do that! Sarah Terry wants to know: What do you think is the most poisonous one ever?

**Priya:** That's a good question because there's different toxin cocktails in these bufotoxins. I think the cane toad is pretty toxic. I don't know if it's the most toxic, though. That's a good question. But I know that that genus, that *Rhinella* genus, I think a lot of those have pretty strong toxins. I think the *Incilius* maybe does too, and that's the genus of the Sonoran Desert toad, the one that is the hallucinogenic one.



**Aside:** Shoot, I don't think I've said this yet, but: Don't Lick Toads.

**Alie:** Sarah Peck would like to know if you know any toad related magic spells? [*laughs*] I'm sure you know so many!

**Priya:** So, in *Macbeth*, that saying double toil and trouble poem? At the beginning of it, it talks about a toad and like 'put that in the pot first'. [*clip: A witch from Macbeth reciting, "Toad, that under cold stone. Days and nights has thirty-one."*] They're basically trying to get the toad toxin into their little witch's brew. But I'm sure there are other toad poems. I don't know other toad poems.

**Alie:** I'm gonna look up some toad witch spells. I'm sure there's a ton.

**Aside:** So, I just did a little tippy-tapping, and according to some very helpful occult websites, during medieval times toads were seen as satanic creatures. Folks thought that witches could, like, magically cosplay as toads, and then go poison people, and just cause general toad-related mayhem.

Although now that I'm thinking about it, that Disney frog prince fairy tale of a woman kissing a frog and then turning it into some well-groomed and presumably fiscally stable man, was maybe just a parable about a hallucination. Who knows? Moving on.

**Alie:** Alpecapaca wants to know: Is there a humane way to get rid of cane toads, or nah?

**Priya:** [*sighs*] Yeah, probably the most humane way is if you could just collect them all up and freeze them or something. Like, slowly turn the temperature down until they freeze. I don't know.

**Alie:** They'd just go to sleep-sleep, right?

**Priya:** Just go to sleep. There's this thing that we used to use, when we were getting ready to preserve critters for pickle jars, it's this stuff called MS-222, which I think is regulated differently now. But it's kind of a cocaine relative, and you would sprinkle a little bit in a jar of water and you'd put the toad or frog or whatever in and after a little while, [*relaxed sigh*]. So if you put in *more*, then it'll feel that way just before it dies, and so then it's kind of a peaceful death. But you probably couldn't do that very easily with... especially the cane toads, as big as they are, you'd have to get like big vats.

**Alie:** You'd have to literally get like...

**Priya:** ... piles and piles, kilos of MS-222.

**Alie:** You'd need a dealer. Laura Kinney wants to know: Do toads travel far from their burrow, or whatever a toad home is called, to forage or find a mate? How's their commute? What's a toad commute like?

**Priya:** You now, generally speaking, it's thought they don't move that far. But there was recently... one of my colleagues in Utah was tracking these Western toads, and found that they moved like 5 or 6 miles, which, for a toad that hops? That's a long-ass way! Between where their breeding site was and where they were hanging out in the winter... because they'll go back to the same ponds where they emerged to go breed.

And so, when those habitats got fewer and farther between, if they went back and their pond that they know was not there, they'll usually go just a little bit further until they find the next thing. So probably over time, these animals have developed the ability to go that far. And especially the ones in these montane habitats, there are a lot fewer areas, and a lot more ground to traverse between ponds.

That was one that I remember was pretty striking. I just learned that a couple of years ago, that those particular ones were able to do that. I'm pretty sure that there's nothing in the literature that suggests that they go that far.

**Alie:** Do they have a homing device? How are they finding the same ponds?

**Priya:** I think they believe it's a little bit both astrological as well as chemo-sensory, and they're able to smell their home ponds, basically, and go back. That's true of a lot of amphibians in general, they tend to go back to the same sites, and actually a lot of reptiles as well. They have site-fidelity.

**Alie:** Oh, I didn't know that's what it was called! Megan Luschen asks: In your opinion what type of toad has the most beautiful mating call?

**Priya:** Oh man.

**Alie:** And says: Some of the best sleep I've ever had took place in a little cabin in northern Wisconsin and I specifically remember the toad songs being extremely calming.

**Priya:** I do really love the American toad call. It's just that long trill, it's so pretty. Have you heard it?

**Alie:** No!

**Aside:** Priya offered to do a toad trill, and I said, "Yes please."

**Priya:** [*imitates toad trill, like an extended old-fashioned telephone ring, but not annoying. Priya laughs and Alie applauds*]

That one is a very soothing one. There's another relative, the Woodhouse's toad, or the Fowler's toad, they sound like a woman or a child being murdered, seriously. I have been out in the woods with other herpetologists and we were like, "Oh my god! There's a woman in trouble!" [*A woman's - er, a Woodhouse toad's - high-pitched scream*] And we're like, "Oh no, shit. That's just a Fowler's toad."

**Alie:** Oh my god! Just horror toads!

**Priya:** So those are the *not* soothing ones.

**Alie:** In all of this praise of toads, something's gotta suck. They've gotta be a dick to someone. What is wrong with a toad? There's got to be something you dislike about toads or about, just in general, toading? [*Priya laughs*] Toad trippin'.

**Priya:** I think the worst quality of a toad is that they just... they try to be so tough. Like, just admit it. You're just a soft little sweet thing. Just admit it! [*Alie laughs*] This is, again, like where my romantic life comes into play. [*laughs*] But like, I know you're trying to be all tough and badass, , but you're not, you're not all that tough and badass! Just be soft! It's okay that you're soft! I see your soft belly; it's all good. [*"All right, Mr. Tough Guy."*]

**Alie:** What about the fact that you got sexually assaulted by a toad!?

**Priya:** Oh yeah, they're pretty aggressive.

**Alie:** I love that that's so forgivable. It's like, okay.

**Priya:** [*laughs*] No, that's pretty bad. You're right. What else, though?

**Alie:** Well the toxins, but what about when you're out toad hunting? Are you out there in the middle of the night? Are you sloppin' around in boots?

**Priya:** Oh yeah. In boots, at night, headlamp, trying to take the females' heads out of the water so that they don't die.

**Alie:** When you're out froggin' and toadin' at night, and you're in hip waders and boots, do you bring along a thermos of hot tea or anything? What are the creature comforts out there?

**Priya:** You know, once it gets to be around toad season, the nights are relatively warm, or at least they were out in Maryland. So, it's kind of nice being out at night, those warmish nights.

There were definitely some days... one of my friends and I, in grad school we wouldn't even wear boots. There were these mucky ponds that we would just take off the waders because they would get stuck in the muck, and we would go barefoot and in shorts, and just become one with the toads. They would be all around you, and other frogs and stuff too, and you'd see things swimming in the water, like turtles.

**Alie:** And now, did we say a favorite thing about a toad? So hard to pick. Do you have a favorite thing? The one thing about a toad that you love the most? Or about your job as a herper?

**Priya:** Oh, what is my favorite thing about a toad? I don't know? I just love their little bodies, that little classic toad shape, and the little hop, and the face, just that little classic toad face. You're gonna get all these comments afterwards, like, "Oh my god! I can't believe she didn't say anything about *this* shitty that a toad does."

Oh my god! But speaking of that though, they do pee, but you have to look up a toad pooping.  
[]

**Alie:** What's the deal?

**Priya:** They have the biggest shit. They poop out these logs that are seriously, like, a third to a half of their body length. I'm telling you; it is the craziest thing. I've only seen it once, in the wild, but videos, yeah. You have to google that. [*Alie can't stop laughing*]

**Aside:** Oh, of course I looked this up.

**Priya:** I think that they just eat a lot in one sitting, and then they hop around, and then all of a sudden, the one that I saw, it just started doing this weird crunching thing, kind of like a dog that's ready to poop? And then all of a sudden it was like, "Oh my god! It's pooping!" and then this thing kept fucking coming out and it was this huge-ass shit. Yeah, you have to see. [*Alie is still laughing and Priya laughs*]

**Aside:** Ohboyohboyohboy! Okay, I guess if you take nothing else away from this episode, it's just that toads make turds. I of course sought out video proof, and was instantly furnished with some YouTube gems, such as one titled, "Toad Pooping a Giant Turd."

[*clip from "Toad Pooping a Giant Turd": three voices exclaiming and laughing*]

*"Look at the size of that load, man!"*

*"It's a big turd!"*

*"My god, dude!"*

*"He's having trouble"*

*"It's like he's laborin' it out! It's almost like he's giving birth or something!"*

And yet another small film, called "Toad Taking a Massive Shit." [*female voice, in disbelief: "How can one toad poop so much?"*]

It's an impossible seeming volume. In a human scale, you would easily need a second toilet. Let's move on. []

**Alie:** You are my favorite bufologist. [*Priya laughs*] You're my favorite toad-lover on the planet.

**Priya:** [*laughs*] I'm the only one you know, aren't I?

**Alie:** That is true. But you're also my favorite.

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So ask smart people stupid questions, and follow Priya Nanjappa on Twitter [@ToadallyPriya](#), and also you're going to want to follow her on Instagram [@WildBeautifulWorld](#), because she mentioned she might get a toad tattoo *on her toe* and that then she would be *tat-toed*. Follow her and love her.

Okay, links to those accounts will be in the show notes and they'll be up at my website at [AlieWard.com/Ologies](#). I'm @Ologies on [Twitter](#) and [Instagram](#). I'm [@AlieWard](#) on [both](#). And if you're looking for less adult-science content, I'm also on the Netflix show *Brainchild*, which is a science show. I host the CW science show *Did I Mention Invention?* I'm also on *Innovation Nation* with Mo Rocca on CBS every Saturday morning.

Thank you also to Erin Talbert and Hanna Lipow for adminning the Ologies Podcast [Facebook group](#). Thank you, Shannon Feltus and Boni Dutch, for all of your super hard work making the [Ologies merch](#) site run. You can get merch and tag it #OlogiesMerch so I can repost you on Instagram on Mondays, if you like.

Thank you to assistant editor Jarrett Sleeper of Mindjam Media, who also helped with a bunch of research this week. And of course, thank you to Steven Ray Morris, host of the kitty podcast *The Purrrcast* and the dino podcast, *See Jurassic Right*, for his *cane do* attitude. The theme song was written by Nick Thorburn of the band *Islands*.

And if you stick around to the end of the episode you know I tell you a secret, and this one is, I still feel bad for shit-talking that non-toad with the skin that erupts in babies, but I'm just telling you, I can watch mango worms all day long. I could watch hours of mango worms, but that got me. That got me, fam.

Okay, toodleoo for now. Also, guess what next week is? Mycology, kiddos. Mushrooms. Mark your calendars! Okay, berbye. Don't lick toads.

*Transcribed by Agnieszka Stachura, who once camped by a toad pond and was kept awake all night by their singing and loved it*

*Final touches by Kaydee Coast who has to look up the fear of holes term. It's Trypophobia. Is there a Phobias podcast? There should be. Kthxbi*

### **Some links which you might find of use:**

A donation was made to [The Amphibian & Reptile Conservancy](#)

First use of "bufology"

<http://www.reptilesmagazine.com/Reptile-Blog/Kristin-Van-Alstine/Ode-To-The-Toad/>

MacBeth toiling and trouble

<https://yarn.co/yarn-clip/2b9234f4-d485-451d-a5a8-2f861055b7fd>

Frog & Toad clip

<https://www.youtube.com/watch?v=OWIwUGAJs2U>

Facial subwoofer

<https://animals.mom.me/bubble-under-frogs-neck-8571.html>

Fowlers toads

[https://www.youtube.com/watch?v=rZHn\\_SrZfN0](https://www.youtube.com/watch?v=rZHn_SrZfN0)

Toad evolution

<https://blogs.scientificamerican.com/tetrapod-zoology/the-toads-series-comes-to-siam-because-africa-has-toads-too/>

Holy toad barf

<https://www.youtube.com/watch?v=ezHAMcbA7z8>

Cane toad 101

[https://en.wikipedia.org/wiki/Cane\\_toad](https://en.wikipedia.org/wiki/Cane_toad)

Toad hallucination, much?

<https://trancentral.tv/2016/09/psychoactive-toads/>

Cane Toads: an Unnatural History

<https://www.youtube.com/watch?v=6SBLf1tsoaw>

Dogs are out there toad tripping

<https://www.sbs.com.au/news/thefeed/story/dogs-licking-cane-toads-how-dogs-are-using-cane-toads-get-hallucinogenic-high>

Hell toad with babies crawling out of skin

[https://en.wikipedia.org/wiki/Common\\_Surinam\\_toad](https://en.wikipedia.org/wiki/Common_Surinam_toad)

Toads riding a python

<https://www.youtube.com/watch?v=XE73Fm0arRU>

Toad pooping a giant turd Quality 4K Amazing

<https://www.youtube.com/watch?v=6x6CZzKo5PM>

*For comments and inquiries on this or other transcripts, please contact [OlogiteEmily@gmail.com](mailto:OlogiteEmily@gmail.com)*