But Why: A Podcast for Curious Kids

Why Do Ladybugs Have Spots? Do Dragonflies Bite?

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[Jane] This is But Why: A Podcast for Curious Kids from Vermont Public Radio. I'm Jane Lindholm. On this podcast, we take questions from curious kids just like you and we find answers. We love to hear about the things that you are thinking and wondering about. And that's the fun of this show.

We all get to learn new things together. This week, we're getting out our bug nets to look at something considerably smaller than us. We're talking about dragonflies and ladybugs. And we're going to be joined by someone we've talked to before on an episode we did about moths.

[Kent] I'm Kent McFarland with the Vermont Center for Ecostudies. I'm a research biologist and I like to study insects and all kinds of other flying things.

[Jane] Why in the world do you like to study insects of all the creatures you could study?

[Kent] Well, you know, I've studied birds and I've studied mammals, but insects, in my world, are like everything you can think of that's in the movies, insects do it. They do strange things that we would never imagine possible and it just excites me to go out there and find out what they're doing.

[Jane] Strange things like what? Lift something that would be like us lifting a car or leap tall buildings, that kind of thing?

[Kent] Yeah, they're like the superman of the animal world. They can do all kinds of things that we couldn't dream of: fall out of the sky for hundreds of feet, you know, fly long distances, long distances like 3000 miles, sometimes longer than we'd ever imagine, swim underwater for long periods of time. I mean, you name it, they do it.

[Jane] Walk on the ceilings?

[Kent] Walk on the ceilings, yeah. So it's just crazy things they do.

[Jane] There are so many kinds of insects. Estimates range between 2 million and 30 million different types of insects. If you count up the total number of these animals themselves, scientists think there are 10 quintillion individual insects on our planet, but we can't do an episode about all of them. Just think how long that would be. We're going to focus on two cool types of insects you have sent us questions about: dragonflies and ladybugs. But even those are categories of insects with lots of different species within them, as we'll find out more about later. But first, let's dive into some of your questions.

[Owen] My name is Owen. I am 4 years old. I live in Seattle, Washington. And my question is, why do ladybugs have spots?

[Claire] My name is Claire. I am 6 years old. I live in Brentwood, Missouri. And my question is, how do ladybugs get their spots?

[Arya] I am Arya. I am 5 years old. I live in Greensboro, North Carolina. And my question is how do ladybugs have spots?

[Kent] Well, here's the interesting thing about ladybugs. There's a lot of different kind of ladybugs. And the ones that we usually think of are the ones that are red with black spots or sometimes little white spots on them. And that represents maybe, you know, a quarter of the species of ladybugs. There's a whole bunch of other ladybugs that are black, brown, red, white, even some kind of other colors mixed in like yellows. And so the traditional thing we think of of these ladybugs are the ones that are black and red. But there's all kinds of others that have all kinds of other patterns and colors associated with them. How they get their spots? I'm not really sure how they exactly get their spots. But one of the things is that the spots, the patterns are probably on them so that is a warning to other insects or even birds that they might not want to eat them because they might taste poorly. And so it's a way to defend themselves against being eaten by birds or other insects.

[Jane] Do some types of ladybugs have a certain number of spots and others have a different number or could, you know, the same kind of ladybug, if you lined up 10 different individual bugs you'd get 10 different spot patterns?

[Kent] The answer is yes. It happens both. So there are ladybugs that have certain number of spots. And in fact, they're even named after that. So there is a native ladybug in North America called the nine spotted ladybug. And it has nine spots, actually. And there is the seven spotted ladybug. And it usually has seven spots. There's a 20 spotted ladybug. And you get the picture. There's different kinds of ladybugs that have different amount of spots. But sometimes within those groups, they can have a variety of spots. So there's one kind of ladybug that comes from Asia called the Asian ladybug that's been introduced, has been brought here and now lives in North America. And sometimes it can have almost no spots and sometimes it can have maybe a dozen or more spots on it. So it's really variable compared to, say, the nine spotted ladybug, which almost always has nine spots.

[Jane] And we have listeners in I think every continent except Antarctica. We haven't gotten a question from Antarctica. And do ladybugs also live on every continent, maybe, except Antarctica?

[Kent] I'm pretty sure they are on every continent except Antarctica, yes.

[Jane] And that brings us to this question.

[Hallelujah] Hello. My name is Hallelujah. I live in Rwanda, Kigali. My question is how many different types of ladybugs are there?

[Jane] There are over 5,000 different species or types of ladybugs in the world.

And as Kent said, it's not just the spots that vary. Their colors can vary, too. But those colors are basically always there to warn predators that the ladybug will taste terrible. Now, some of you are probably wondering why they're called ladybugs anyway, or maybe you aren't even sure what insect we're actually talking about. Not everyone calls them ladybugs. For example, if you live in the United Kingdom, you might call them ladybirds or ladybird beetles. And Kent says he actually doesn't like the name ladybug.

[Kent] Because they're actually beetles, not bugs.

[Jane] That's right. And they're not all ladies.

[Kent] And they're not all ladies, yes.

[Jane] As for the lady part of the name, it comes from a religious story, specifically from Christianity, and it refers to Mary, the mother of Jesus. But these insects have also been referred to by different names over time, including ladycow and cowlady beetles. Scientists refer to them as members of the coccinellidae family. Now, here's a question from Ingrid.

[Ingrid] I am 5 years old and I live in Neptune Beach, Florida. And my question is how do ladybugs crawl on the ceiling without falling down?

[Kent] It's really the same thing for lady beetles, ladybugs or flies, all those kind of things, if you look at them closely. If you had a chance to look at them with, say, a microscope or even a magnifying glass, if you looked at their legs, you'd see that most of them have really strong little tiny claws on the end of their feet. And we don't recognize them, but even on our glass windows, there's little places for them to grab hold of things on those. They're not perfectly flat if you look at it microscopically. So they're able to sort of, it looks like they're sticking to them almost like Velcro, but they're really gripping with their claws on little flaws on the surface of the ceiling so they can, you know, almost defy gravity by hanging upside down.

[Jane] So it's kind of like if you were rock climbing as a person and you could get a grip, you might be able to hang upside down. But the flies and ladybugs and other insects look like they're doing it effortlessly, whereas for us, maybe our muscles are just designed differently.

[Kent] Yeah, we don't have that grip that they do. We're heavier. Even at the scale they are at it is a lot different because they are so light. And, you know, our fingers are really good at grabbing a hold of things, but when it comes to grabbing tiny little spots on a rock, we have to be expert climbers to be able to do that and hold our weight because we don't really have claws like that. We have tiny little fingernails compared to, say, a ladybug. If you look at a ladybug’s feet, it literally has claws. It almost looks like if you had a cat, it looks like a cat's claws, really sharp, really long and able to just grip on the tiniest little crevice or crack on the ceiling and hold onto it without really any effort.

[Jane] Boy, now I really want to look microscopically at ladybug feet. I never knew they had claws.

[Kent] Getting a microscope out if you're at school or something or even a little magnifying glass you have and looking at things you find on your windowsill, like often you’ll find a ladybug on your windowsill, sometimes in the fall or the winter, is a real eye opener. It's amazing to look at these things to their scale. Between the spots on their backs, which look really cool under a microscope to their claws on their feet, it's a whole new world when you start to look at the minute details.

[Claire] Hello But Why. My name's Claire and I'm from Durham, New Hampshire. And my question is where do flies and ladybugs sleep?

[Kent] There are some flies when they sleep that they actually will sleep inside of flowers, especially early in springtime in the northern part of places where spring flowers are out. Some of the flies are attracted to these spring flowers, and they will actually sleep inside

the flowers at night and then come out in the daytime. Ladybugs, where they might sleep? I really don't know. I mean, that's a really fascinating place to go out sometime with a flashlight and see if you can discover some in your garden at night.

[Jane] And do they sleep at night? I mean, how would you know if a ladybug is asleep or not?

[Kent] That's true. I wouldn't. It's not like they close their eyes. I would imagine they're not very active at night because what they like to eat are aphids. And aphids are these usually these green little bugs that suck on sap, on plants in your garden and elsewhere. And ladybugs like to go around and find aphids and eat aphids. And so I have a feeling that ladybugs really are kind of relaxing at nighttime and hunting for aphids during the daytime.

[Jane] Ladybugs can eat as many as 60 aphids a day. So farmers and gardeners love to have them around because they eat the aphids, which are trying to eat the vegetables the farmers and gardeners are growing. While most ladybugs eat aphids and other small insects, there are some species that eat plants. Ladybugs do have an inactive period at night, and typically they'll find a warm place to relax in and take a rest. What about winters? Well, if you live in a place that has cold winters, ladybugs don't migrate to a warmer climate. They just overwinter in their adult form by tucking into a warm place, like maybe a fence post or the wall of your house. They gather in groups to stay warm and wait out the cold weather. Coming up, we're going to learn about dragonflies.

This is But Why: A Podcast for Curious Kids. I'm Jane Lindholm. Today, we're answering your questions about two kinds of insects. We've been learning about ladybugs with Kent McFarland from the Vermont Center for Ecostudies. Now he's going to answer your questions about dragonflies. We'll start with a question from Ruby.

[Ruby] I’m 5 years old. I live in Charleston, South Carolina. And my question is why are dragonflies called dragonflies?

[Jane] We couldn't find a confirmed reason they're called dragonflies, although there are some ideas that there's another religious story related to the named dragonfly, again, from Christianity. But the best Kent could offer is a guess.

[Kent] I can only guess that they look like dragons in some way with their long tail and their head. But I really have no idea where that comes from.

[Jane] Well, I was going to ask you, you know, you're talking about how ladybugs and other insects and creatures look really interesting under a microscope. Dragonflies are often bigger. You feel like you can see them pretty clearly with your own eyes. But what do they look like under a microscope?

[Kent] Well, the big thing I noticed when I look at him closely with a magnifying glass is their eyes, because dragonflies are super predators. They like to fly around and find mosquitoes and other flying insects and they literally catch them out of the air and will actually eat them while they're still flying. To catch them out of the air, they have to have super vision. So if you look at a dragonfly, the first thing you see on them is these huge eyes on their head. It makes up most of their head. And if you look at it using magnification, you can see that their eyes are made up of hundreds and hundreds of little cells. So when they see, they can see in all directions practically, even behind them sometimes. And that is for their hunting abilities, for them to be able to fly really fast and

catch stuff right out of the air. So if you ever have a magnifying glass and you can have the chance to do this, look at their eyes. It's unbelievable because they have so many little facets in their eyes.

[Jane] Some dragonflies are so beautiful. They have these iridescent blues and greens and reds and different colors. Are there reasons why some of them have different colors or how you think about their coloration?

[Kent] Well, some of them are usually it's the male that has a lot of color because he's trying to attract a female sometimes, and so they'll dance in front of the female. They also use that just like birds, to protect a territory from other males. So they flash their colors to say, like, hey, this is my territory. I'm shiny and bright. You probably shouldn't come in here. So it's sort of a badge of honor to be really bright and shiny in a way to attract females. The females tend to be a little bit more dull colored because they don't want to get eaten by, say, a bird or another predator. So they like to be able to be camouflaged a little bit and hide from things.

[Jane] When you see two dragonflies that are flying stuck together, are they mating?

[Kent] They are mating. Yup. It's a mating wheel. Often the male will carry the female for a while and they'll fly around sometimes that way. Or you'll see them perched on something next to a lake. They'll be perched on a limb or a plant and they'll be in that wheel pattern. And sometimes it looks really cool because they're even in the shape of a heart, which I always think is sweet.

[Jane] What's the difference between a dragonfly and a damsel fly, which often looks similar but aren't the same?

[Kent] Yeah, they're actually really closely related, they're close cousins, they're in the same family. Dragonflies and damsel flies are called odonata, which is a family of insects. So they're in the same family, but they're slightly different lineage and different genera. And they're so closely related it would be like the difference between a moth and a butterfly, which actually isn't much either. They're both really close cousins. Damsel flies and dragonflies both have four wings. Most of the damsel flies when they land, they will have their wings closed above their body and the dragonflies are usually bigger and they have them spread out usually.

[Jane] Damsel flies tend to have long skinny bodies. Dragonflies are bigger bodied and their front wings and back wings are a different shape. They're also very strong fliers. There are 5000 species of dragonflies and damsel flies in the world. Now, the most amazing thing you might not know about dragonflies is that they actually spend most of their lives as aquatic nymphs. That means they're an insect without wings that lives in the water. After hatching from their eggs, they spend a few months, up to five years, in the water. Then they climb onto shore, shed their skin and out come their wings. Then they can fly around and move to a land stage of their lives, which can last for a few days or a few months.

[Brady] Hi, my name is Brady and I am 5 years old and I live in Laurel, Maryland. And my question is do all dragonflies not sting or bite?

[Jane] Are there any dragonflies that sting or bite?

[Kent] There are no dragonflies that sting for sure. It's an old tale that it looks like they sting because they have that long appendage at the end of them and it looks like if they land on you, maybe they'll sting you and they don't sting at all. Some of the big dragonflies, they have huge jaws that they use for chewing up insects when they catch them. And so if you caught a huge dragonfly, if he grabbed you a certain way, they might be able to pinch you with their jaws a little bit. So they might be able to bite you. But I've never had one bite me so I can even really feel it beyond like, huh, he's trying to bite me because we're so much bigger than them. But they will sometimes try to gnaw on you just to try to get you to drop them and let them fly away. But stinging is definitely not a thing for dragonflies and they won't sting you.

[Jane] You talked about catching them. Can you teach us how to catch them or should we not be touching them because we keep hearing on this program and elsewhere, you know, you really shouldn't be touching wild animals. But what about dragonflies?

[Kent] Well, with dragonflies, some of us catch them because we have to in order to identify them when we're studying them when we're doing science. And so we use an insect net and we catch the dragonfly. And if you learn how to catch them, put your hand in there and remove them carefully, it doesn't really hurt them. And you can look at them, take a quick picture, identify them, and then we can let them go. So really, we only catch them when we really have to catch them and we need to do so when we're studying them. Does it hurt them to catch them? I mean, anytime you're catching insects, there is a chance that you can hurt them. And so unless you have a good reason to catch them, I tend to just watch them get close enough to look at them with my binoculars or just creep up to him really carefully and look at them closely until they fly away. So I don't like to catch them unless I really have to.

[Jane] What else do you want to tell us before we let you go, Kent, that is super cool about dragonflies?

[Kent] One of the things that people don't realize about dragonflies is just like birds in the spring and fall, they migrate and they migrate thousands of miles. There's one dragonfly that we have here near us called the common green darner. And it migrates from here in Vermont the whole way down to the Gulf Coast in, say, Mexico or Texas. And then after it spends the winter there, its young migrate the whole way back to the north in the next summer to spend the summer here. So it goes back and forth generation by generation, just like monarch butterflies do. And people don't realize that these things migrate. There's another species that's over in India and it migrates from India the whole way to Africa and then back again. And it takes two or three generations. So one generation in India flies the whole way to Africa. And then they have young there. They have a family there. Then that family lives there for a little while and then its young migrate the whole way from Africa, the whole way back to India. And it keeps doing this year in, year out. So these dragonflies can migrate thousands and thousands of miles just like birds, even though they're much smaller than birds. And no one usually recognizes these things as they are doing so.

[Jane] That was Kent McFarland, a biologist who works at the Vermont Center for Ecostudies. He's also the co-host of another great VPR podcast you might like. It's called Outdoor Radio. You can look it up if you like to learn about outdoor creatures in the northeastern U.S.. That's it for today.

Now, if you have a question about anything, have an adult record it. It's easy to do using a smart phone voice recording app. Then you can email the file to

questions@butwhykids.org. If you're very shy or talking is difficult for you, you don't have to send us an audio version. We're happy to take your questions by email, too. We can't take all of your questions and turn them into episodes, but we do listen to them all. And we love to hear what's on your minds.

But Why is produced by Melody Bodette and me, Jane Lindholm at Vermont Public Radio. Our theme music is by Luke Reynolds. We'll be back in two weeks with an all new episode. Until then, stay curious.