

But Why: A Podcast For Curious Kids

[How do squirrels climb trees?](#)

November 5th, 2021

Jane 00:20

This is But Why: A Podcast For Curious Kids, from Vermont Public Radio. I'm Jane Lindholm. I host the show. On But Why, we take questions from kids all over the world. And it's our job to connect you to interesting people who can help you learn more about what you're wondering. Today we're going to talk about a kind of animal I'm guessing most of you could recognize. I say that because these animals live in cities and in the countryside, they live in cold climates and warm climates, and they live on every continent except Antarctica. Even Australia, although they're not native to that island continent. I'm talking about squirrels! There are about 300 different kinds of squirrels. So you probably aren't all picturing exactly the same animal. But I'm guessing you have some kind of squirrel living not too far from you right now.

Squirrel Sound effect 01:16

Squirrel chattering.

Jane 01:18

That's an eastern gray squirrel, one of the squirrels we see most often here in Vermont, where our show is based. We see a lot of eastern gray squirrels and American red squirrels, sometimes fox squirrels, and we have some flying squirrels too, although those are nocturnal, so you usually have to shine a flashlight in the trees at night to see them. Do you know what kinds of squirrels you have where you live? Ask your adults to help you do some research to know what species live nearby. You've sent us a whole bunch of interesting questions about squirrels. So we called up a guy named Ben Dantzer. He researches squirrels for his job at the University of Michigan.

Ben Dantzer 01:57

There was never necessarily a point in my childhood where I thought, "I'm going to study squirrels when I get older." For me, it was more recognizing how hard it is to work with most wild animals, where they're here for a little bit of the year, and then they disappear. And usually you don't have any understanding of what happens at those other places. There's also the fact, like, where babies will disperse, or leave their home, and only the males or the females will return to where they were born. And what I recognized was that squirrels live in one specific place, and they almost never go anywhere. You know, they have a little neighborhood they have a home just like we do. And that makes it easy to follow them roughly from birth until death. And there are lots of squirrels. They live in lots of different places.

Jane 02:55

And sometimes he even lives with them. Not in his house. He travels to a place in Canada, where there are lots and lots of red squirrels so he can study them.

Ben Dantzer 03:05

I do! And so some of the time I spend with squirrels is locally where I round where I live. And we might study squirrels and the differences between squirrels in cities versus more rural areas. But the other part of studying squirrels is going to the Yukon in Canada, where we have this study population of red squirrels that we've studied for about 32 years. The great thing about them is that there are lots of them. Maybe even more important: around where I live, and in most parts of North America, there's lots of different things squirrels can eat. There's acorns, there's beech seed, there's maple seed, there's black walnut seeds, there's pinecones there's spruce seed, there's all these different sources of food throughout the winter time. But when we study squirrels in the Yukon, they really only have one type of food that they consume. And that's the seeds that are from white spruce trees, and they cache that seed, the spruce cones, underground, and they survive on that throughout the winter time and when they're producing babies.

Jane 04:16

And when you say cache, that just means stores, kind of buries them and puts them all in one place. So they have a cache or a group, like a big pile of them for later.

Ben Dantzer 04:26

Yeah, so the cache is exactly that, where they gather all of these cones, usually from about mid-August until mid-September, in the Yukon. They store all of it underground, and it's kind of like they have a little refrigerator or a big deep freezer, on their territory, and they pull out those cones whenever they want throughout the winter time to consume them. And in the Yukon, what we can do is we can not only figure out how much food for squirrels is in the trees, but also how much they've collected and stored underground.

Jane 05:01

While you're talking about food, let's bring in one of the questions that we got about squirrels. And this is from Selma in Iowa

Selma 05:08

My question is: how do squirrels eat acorns?

Jane 05:12

How do squirrels eat acorns. Now, for a lot of us who live where there are acorns, we kind of associate squirrels and acorns. So do they really like acorns? And how do they get in and eat that meat?

Ben Dantzer 05:24

Yeah, that's a good question. Squirrels like to eat a lot of things they eat fruits, nuts, seeds. Squirrels in cities, of course, can eat human garbage or human foods, if they come across it. It's not necessarily a strong preference for acorns, because acorns themselves are heavily defended by chemicals called

tannins, that can make animals sick. So for example, acorns are a traditional food source for Indigenous peoples in North America. And in order for us to consume them as humans, we would need to boil them for long periods of time to remove those toxins. So squirrels might like acorns because they can store them underground. It comes in its own little container that stores the seed, they can put it under some leaves or deeper underground, and then they can come back to it. What I think is pretty cool about squirrels consuming acorns, is there's been a lot of research of the things that squirrels do that kind of prevents those tannins or those chemical toxins inside of the acorns from making them sick. What the squirrel does is they hold acorn in their two forepaws and they consume it. But what they also seem to do is they eat most of the bottom of the acorn, and not the top part, because the bottom seems to have lower levels of those tannins. So they can avoid the parts of those acorns that might make them ill. So they also will store them underground, as I said, and that might make them an attractive food source. But interestingly, some acorns can vary in whether they're going to be spoiled really quickly, or much later. And what squirrels seem to do is consume the acorns that would be spoiled really quickly, and then they cache or store the other ones that have a longer shelf life. Squirrels that live in an area where there are both red oaks and white oaks seem to have preference for certain types of red oak acorns rather than white oak acorns. Because the shelf life of red oak acorns is longer.

Jane 07:42

Where I live in Vermont, sometimes when I'm out in the woods, I see pinecones that look kind of like what an ear of corn looks like after you've eaten it. Like, if you eat all of the kernels of corn, you just have that sort of stick of hard material. And sometimes I find pinecones that are like that, and they've been chewed all up, and that's probably a squirrel, right? That's how they eat some pinecones.

Ben Dantzer 08:08

Exactly, they eat it just like we would eat corn of cob. There's the spine, or like the cob, of a cone left. But then the other thing that you would see evidence of a squirrel consuming pinecones or spruce cones, is the little flakes that come off of it called brax. And the brax are these little covers that hide the seeds. The seeds in, say, a spruce tree are extremely small. They're larger in some of the bigger pinecones that we might find. But you can find, if you see evidence of a squirrel consuming these things, you'll find those spines or cobs, but you'll also see the flakes, the brax that are around. And sometimes those piles of brax can be several feet high even. And what a squirrel will do is they'll have a specific spot on their territory, a little branch, for example, they like to sit there and they just eat a bunch of cones over and over and over. Those brax, those little covers over the seeds fall off, and the spines fall to the ground when they're done.

Erica 09:16

My name is Erica, I'm six years old. I live in Ontario, Canada. And my question is: do squirrels like nuts better than berries?

Jane 09:29

Do they like nuts better than berries?

Ben Dantzer 09:32

I think it's going to depend upon the time of the year. Berry picking is much more popular in the summer months, right, than in the winter months because berries are not really growing in most species in the winter months. The other thing is that berries, like raspberries or strawberries that we buy, you know often when we buy them, one of them is already covered in mold by the time we get them back to our house. Those fruits are going to spoil really quickly. So it's probably going to be a seasonal explanation where nuts or acorns or pinecones can be stored over the winter months when the squirrel needs to use them, whereas those berries need to be consumed quite quickly. The other thing is that, you know, if you tried an acorn or a pinecone or spruce seed or whatever, it's not going to taste very good. But it might have high levels of fats, just like peanut butter might have high levels of fats and proteins that we need, whereas those berries are going to be high in sugar. So it's probably going to be seasonal. And it's probably going to be because those acorns and seeds are these dense or rich sources of foods with lots of nutrients or calories.

Jane 10:41

Erica also wants to know: do squirrels get sick?

Ben Dantzer 10:44

Yeah, so squirrels can get sick for a couple of possibilities. So one of the maybe more serious ones is this thing called squirrelpox. And it's a virus that can cause a deadly disease in them. It's probably been best studied in the Eurasian red squirrel that lives all across Europe and into Asia. What's happened in some parts of their range in Europe and England in particular, is the North American gray squirrel was introduced to England and it brought along with it, this virus called squirrelpox. And the gray squirrels that are here, they don't seem to be that heavily impacted. But those Eurasian red squirrels, especially England, have almost gone locally extinct, because they're heavily impacted by the squirrelpox virus. And if they get this they can get tired and die. But luckily, again, a lot of the squirrels in North America have some level of immunity to this. Unfortunately for those Eurasian red squirrels, they don't, and they often die. The other thing that I'll mention about diseases is that many wild animals can get what's called mange. And this is where the animals lose their hair, except for example, its tail. And usually what that's caused by is this mange, which is a parasitic mite. And those mites embed themselves in the hair follicles or into the skin, and then the animal experiences this intense itching. They get skin damage from biting, they lose their hair, they bite and itch their skin all over and this can cause that entire fur loss. So that's another type of disease they might get.

Cadence 12:32

My name is Cora. I live in Goffstown, New Hampshire. I'm seven years old. And my question is: why do squirrels have big bushy tails?

Jane 12:43

You were talking earlier about mange and you know that it could remove all of the hair on a squirrel except for its tail. Cora wonders why do squirrels have big bushy tails?

Ben Dantzer 12:54

This was a great question because it's a difficult one to answer. One explanation is they use them as a type of like scarf or blanket. So when a squirrel goes inside of its nest, what they usually do is, like a

dog on a cold night--or a cat--they curl up into a ball. And then what they might use their tail, their big bushy tails, for is to cover up their nose or their face or their head, because their nest also have a hole for them to go in and out of. They might also use their tail to block the wind. Another possibility is that that big bushy tail can serve as a parasol, or an umbrella against the hot sun or from rain. Usually the tail on ground squirrels is much shorter than on tree squirrels. And so tree squirrels might have those longer tails, just like a domestic cat would have a long tail, to help balance themselves when they're running along branches when they're in a tree, or when they're jumping from trees to trees. But one of the things that I think is interesting is how squirrels might use their big bushy tails to communicate to either predators or to other members of their same species, other squirrels. So for example, a lot of times when I see squirrels and they're waving their tail up and down, they're sort of what I would call flagging the tail. They're often doing that when they're in these open areas where there might be a hawk or a raptor that might be able to fly over and kill them. And in some other species, like lizards or salamanders, they have these removable body parts, where if you grab a salamander or a certain lizard by its tail, it will drop off that tail and their tail will wiggle back and forth after becomes detached in a way that might attract the attention of the predator away from their head. So in the case of the squirrel, those big bushy tails might serve as a distraction technique, where they flag them up and down as a distraction device, and there's a hawk overhead, for example, they strike at that tail, rather than at the head. Then the final way that it might be able to do it is another communication way where it might communicate with others nearby squirrels that there's a predator around.

Runa 15:30

Hi, my name is Runa. I'm seven and a half years old. And my question is, how fast does squirrels and chipmunks run.

Jane 15:41

Runa wants to know how fast can squirrels and chipmunks run?

Ben Dantzer 15:44

Yeah, I like this question because I I didn't know the answer. And the way I thought about this was, just like us, if I consider myself a runner, I'm very rarely running as fast as I possibly could. And I think that squirrels usually do the same; they are very rarely running as fast as they can unless they need to. So unless for example, a predator like a dog or cat is chasing them, or when maybe another squirrel is trying to steal food from it, they might run as fast as they can. But people have done some studies to look at how fast squirrels can run. And some of the estimates are something like up to 22 miles per hour in some species of squirrels. Some other studies like chipmunks would say only about two or three miles per hour. So I would say it varies, maybe an average of 11 miles per hour is how fast squirrels can run. And if we're to put this in comparison to humans, fastest recorded human was Hussein Bolt in the 2008 Summer Olympics, where at one point Bolt was running at 27 and a half miles per hour. If I'm to think of myself as a average runner, I might run five or six miles per hour. I might jog 10 or 15 miles per hour if I'm a peak athlete. So squirrels might run, on average, the same as a peak athlete, but remember, they're not necessarily going to be able to do that for as long distances as we can.

Jane 17:22

While we're talking about how squirrels move. Here's what Rachel wants to know:

Rachel 17:26

I'm five years old. I live in Tuscaloosa, Alabama. I want to know how squirrels climb up trees.

Jane 17:32

How do squirrels climb up trees?

Ben Dantzer 17:35

Squirrels have these long nails on their paws. They all have five digits just like us. And this is one way they can be these expert climbers. The thing to remember, again, is that there are some tree or arboreal squirrels that are really well adapted to climb up trees, whereas ground squirrels also have these nails or claws, but they seem to be primarily used for digging and not for climbing. So one of the things with those tree squirrels, they have these long nails or claws. But they have this especially long middle digit that seems to help them climb up and down trees.

Jane 18:14

And when you say digit that's like a finger...

Ben Dantzer 18:16

Yeah, so they have five digits or five fingers and toes just like us. But one of the bigger things, the most helpful things that they can do is when they climb down a tree, they can turn their feet around when they're coming down a tree head first. This means they can essentially turn their rear feet entirely around. So they can use those claws to hang down from the tree and just walk down easily. So this would be like us taking our feet, turning them to the side, but then keep on turning them so they're entirely turned around our toes facing behind us.

Jane 18:56

What?! Did you know that? That some tree squirrels can turn their feet all the way around, so their feet are actually backwards when the squirrel is climbing down a tree? I did not know that. And now I'm on a mission to go find a squirrel and watch it climb down. Coming up: we'll give you another thing you might want to see if you can discover about the squirrels in your neighborhood. You might be able to tell whether a squirrel is left handed or right handed. This is *But Why* a podcast for curious kids. I'm Jane Lindholm and today we're talking with University of Michigan squirrel biologist, Ben Dantzer. He's been answering all kinds of really interesting questions you sent us about these rodents. Do you know what a group of squirrels together is called? A scurry, a scurry of squirrels! Here's another thing you might not know: marmots, which include groundhogs, chipmunks, and prairie dogs are all types of ground squirrels. But let's talk a little bit more about arboreal squirrels. Arboreal means living in trees. So the squirrels you might see running along a branch of a tree high up in the air or leaping from one tree to another, are probably arboreal squirrels. And they kind of look like acrobats sometimes, don't they?

Ben Dantzer 20:17

Absolutely. So I always have fascinated with how they are able to gauge how far to jump. They seem to never fall, unlike human acrobats. And there's actually some people that are studying how they're able

to adjust how they move on branches in order to jump effectively. And I don't have many insights to add there other than saying I'm also in awe and inspired by their ability to jump from tree to tree.

Jane 20:47

And some squirrels have additional adaptations or additional things on their body to help, right? Like here where we live, we have flying squirrels. It's like they have a cape kind of attached to their body.

Cadence 20:59

Hi, my name is Cadence, live in Salina, Texas. I have a question. Do flying squirrels actually fly, or do they glide?

Ben Dantzer 21:09

When you see them actually jumping, they do actually seem to be able to fly. But they're not flapping their wings. They don't have wings. They're not flapping like a bat would. They have this flap of skin that allows them to glide. They're more just using the wind underneath their skin flaps on their armpits, so to speak, to glide from one tree to another.

Jane 21:33

Now if like me, you live in eastern North America, and you're saying "Wait, we have flying squirrels?!" because you've never seen one, that might be because those squirrels at least come out mostly at night. And Brooke, who's in California, wants to know:

Brooke 21:48

Are squirrels nocturnal?

Ben Dantzer 21:50

There's only two species in North America that are known to be nocturnal. And those are the the flying squirrels, the southern and the northern flying squirrels. And across the world, there are of course other nocturnal species. But most of the squirrels that we see are diurnal, they're active during the day. And that could be because it allows them to avoid encountering predators that might be out at night. But I would also say that while squirrels are active during the day--they are diurnal--it can also depend upon the temperature or the season. So woodchucks are a type of squirrel that hibernates. There are other ground squirrels that hibernate as well. But one of the species that I study, the North American red squirrel, the smallest of the tree squirrels in North America, it doesn't hibernate. But what squirrels seem to do is they just use their behavior to try to minimize how exposed they are to very cold temperatures. So they build these really densely insulated grass nests, and then they stay inside of those grass nests in the winter time, essentially until it's the warmest part of the day. It's like us not wanting to get out of bed, if you're camping in a cold environment, or in the wintertime, when you're sleeping in your bed, you don't want to get yourself out from under your covers. Squirrels will stay in those heavily insulated nests until the warmest part of the day. That's when they'll come out. They'll eat some food and they'll go back in. So they try to minimize how exposed they are to those cold temperatures using behavior. And then similarly, in the in the summertime, they might be more likely to be inside of the nest or just hanging out outside of the nest somewhere, being inactive, during the hottest parts of the day during the summertime.

Nicholas 23:41

Nicholas, and I'm four years old. I live in Washington DC, and I have a question: how do squirrels sleep?

Jane 23:53

Nicholas wanted to know how to squirrels sleep.

Ben Dantzer 23:55

I would say that understanding how squirrels sleep is probably one of the more interesting questions. Because when I think about, you know why I'm a scientist, it's because we get to do research exploring the unknown, right? The last frontier of exploration is not even space anymore. It's more just scientific discovery allows you to explore and discover new phenomenon. And one of the things about this question about how squirrels sleep is that we don't know, we have no idea how squirrels sleep. And so what we're doing in my research group, along with another scientist that I work with, Matt Gaidica, is we're trying to discover how squirrels actually sleep. And what we think so far is that squirrels sleep a lot like we do, as in humans. So when the sun goes down, they get into their nest, which could be a big pile of leaves or a big fluff of grass high up in a tree, sometimes underground or sometimes in a dead tree like in a cavity. Or, sometimes, unfortunately, in people's houses. So they go up into those nests, they curl up into a ball, they might put their tail over their eyes. And then during the nighttime, they might wake up a little bit to get more comfortable, kind of move around, you know, if you're a side sleeper move from one side to the other. But they really don't come out of their nest until sunrise. Unless, again, it's the wintertime, it's the coldest part of the day, they might not come out. So they're, there're not really distractions for squirrels out there, right. They don't have iPads, they don't have video games to play. They don't have work to do. So usually they have very little distractions, they can get this really solid sleep. And a lot of times they're waking up when the sun rises, and then they're going to bed when the sun sets.

Jane 25:47

Before I let you go, are there any things that you could tell us that we could do to help us observe squirrels, because as you mentioned, squirrels live all over the place. And there are lots of squirrels in cities. So if there are kids listening who live in cities, they might still have squirrels in a park nearby. Or if they have a yard, they might see squirrels. And if you live in the countryside, you might be able to see squirrels in your yard or in the trees around you. So how can we start to observe squirrel behavior? And what should we look out for that's cool?

Ben Dantzer 26:17

Kids are interested in doing science projects, and some of the easiest science projects you can do is just by watching squirrels. What are they eating? All you need is a pair of binoculars to understand about what squirrels are eating. And other simple science projects that that folks can do is related to the anti-predator behavior of squirrels. So for example, if you see a squirrel, and you slowly walk up to it, you can measure the distance, how close you can get to the squirrel before runs away from you. You can do that in a city. And you can do that in a more rural area with lots of trees or forest around. And

you can see the differences. Those are simple projects that students can do that show us how animals are coping with human activities or urban environments.

Jane 27:10

You can report your observations, if you want, to a website called iNaturalist. Ben says that helps scientists know about where squirrels are living and how many of them there are in all kinds of different places. Ben also says feeding squirrels isn't a great idea. Human food, in particular, isn't good for them, and they're better off foraging or looking for food they can find in the wild. And there's one more thing you might want to be on the lookout for as you observe the squirrels around you: some squirrels are left-handed and some squirrels are right-handed!

Ben D 27:44

When squirrels are eating pinecones or spruce cones, squirrels can be right or left-handed in how they consume those. When a spruce cone, the spine is on the left side of my face, it's a right-handed squirrel. What it's doing is it's sort of twisting the cone around in this hand. Other squirrels might be left-handed, and they're using their other hand to consume those those cones. And interestingly, left-handed squirrels seem to be very rare, and ambidextrous squirrels don't seem to exist.

Jane 28:19

Who knew? Just like people! So are you going to try to see if you can watch a squirrel eat a pinecone and figure out if it's left or right-handed? I know I am. We better leave it there so you can get outside and start observing. Many thanks to Ben Dantzer of the University of Michigan for helping us understand some of the fascinating things that are known and others still to be discovered about squirrels. If you have a question about anything, send it to us. Having an adult help you record yourself. Using a smartphone is an easy way to do it. Tell us your first name, where you live and how old you are, and what you want us to investigate. Then have your adult send the file to questions@butwhykids.org. But Why is produced by Melody Bodette and me, Jane Lindholm, at Vermont Public Radio and we're distributed by PRX. Our theme music is by Luke Reynolds. We'll be back in two weeks with an all new episode. Until then, stay curious!