



Encyclopedia of Life

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## Branch-tip Spiders Podcast and Scientist Interview

### *Dictyna*

The hills near Missoula, Montana, are changing, native grasses and other plants increasingly squeezed out by nonnative plants. Knapweed, cinquefoil, and other weeds aren't only changing the look of this ecosystem but its very structure. As ecologist Dean Pearson's research has shown, however, some species are benefitting from the changed habitat in unexpected ways. You just have to look closely to see them.

### Transcript

**Ari:** For the Encyclopedia of Life, I'm Ari Daniel Shapiro. And this is: One Species at a Time.

**Pearson:** We can just go and look at some of these webs.

**Ari:** It's early morning in the hills of Missoula, Montana. And Dean Pearson – an ecologist with the US Forest Service – is on a mission – he's looking for *Dictyna* spiders in the plants out here.

**Pearson:** *Dictyna* spiders are really quite small. If you're afraid of spiders, these are probably not ones that are gonna be too frightening to you – they're maybe half of your fingernail. And that's the females, which are larger.

**Ari:** The *Dictyna major* and *Dictyna coloradensis* spiders are light gray with a dark stripe down their backs.

**Pearson:** Um, I see a few spiders that are adding a little bit to their webs. And uh, this one's just hunkered down at the base of the web, waiting for the action to come, I guess – waiting for a capture. I have a, a male and female in this web that are...making new spiders. We'll leave them alone.

**Ari:** At this early hour, the webs are lit by the sun from behind.

**Pearson:** They're quite beautiful webs, sort of shaped like an upside down pyramid often.

**Ari:** It all seems so picturesque – these backlit webs, spiders making love in the morning light. But when Pearson looks out across the hills, something's wrong.

**Pearson:** ...if you squat down on your knee, it puts you about at vegetation height. You just see webs everywhere.

**Ari:** In the last 10, 15 years, these rolling hills have been transformed, and that transformation's ideal for building all these webs.

**Pearson:** We're standing here in the middle of what was once a beautiful, beautiful grassland. We've got things like blue lupins in flower. But mostly what we're seeing here is a stand of yellow-green leafy spurge that's gotten pretty heavy – scientific name is *Euphorbia esula*. There's *Potentilla* – sulfur cinquefoil, it's called, which is also a nasty weed. Spotted knapweed, and that one is *Centaurea stoebe*. So what we're looking at is a lot of exotic, broad-leaf plants that have come in and really started taking over this system and they're, they're changing the architecture of the grassland.

**Ari:** And the little spiders?

**Pearson:** They really love this transformation that's gone on, this invasion of these exotic plants.

**Ari:** The invasive plants don't die back at the end of the growing season like the native plant species. So the spiders have many more places to build their webs. And not just that – because the plants are taller and wider too, the spiders can make even bigger webs – four times larger than before. In other words, these exotic plants that have taken root and flourished here – like the sulfur cinquefoil and the spotted knapweed – they've catapulted the indigenous *Dictyna* spiders to the top of the heap.

**Pearson:** The webs are passive prey capture devices – the bigger your web, the more prey you catch. We can look at this one right here in front of me – so this one's on *Potentilla*, and there are probably about 5 or 6 prey items caught in this web. And another one over here, and we can see a couple of flies in this web. And a pretty good size wasp. Despite their small size, they're pretty vicious spiders in terms of prey capture ability. Some of the wasps that they catch are probably almost 20 times larger than the spiders.

**Ari:** Oh, my goodness, how the heck do they incapacitate something like that?

**Pearson:** Well, the web helps a lot. But being a spider and being venomous, they can go up and subdue 'em by making a quick bite and wrapping them up.

**Ari:** The more the spiders eat, the quicker they mature. Twice as many spiders are reproducing here compared to the native grassland. And more of them are then surviving

on the invasive plants. So the *Dictyna* spiders are kind of reigning supreme at the moment.

**Pearson:** And that's pretty much the perspective for a fly or a wasp that's buzzing through here, trying to visit these plants. You're running through this gauntlet of web after web after web out there.

**Ari:** It's not just the webs decorating all the plants here – there's a more metaphorical web at work. The native spiders are thriving because of the new exotic plants. They can eat more insects, and these insects can then no longer keep the growth of certain plants in check. And on and on. You alter one piece of the ecosystem, and the whole web changes.

**Pearson:** I don't think we've fully understood to what extent these changes are cascading up and down through the system in all sorts of crazy ways.

**Ari:** The changes have made their mark on Pearson as well. He grew up here, in the hills of Montana, and he misses the way things were when he was a boy.

**Pearson:** As somebody who's fallen in love with native grasslands, it's, it's pretty sad to watch these things unfold and I've just tried to hold back the tide.

**Ari:** Try as he might, though, Pearson thinks this ecosystem will ultimately fall into a new balance. But it might take a thousand years. And in the meantime, at least for now, the *Dictyna* spiders have it made.

**Ari:** Visit our website to see photos from Montana of the *Dictyna* webs, and to send in your own photos of spiders and their webs.

Our series, One Species at a Time, is produced by Atlantic Public Media in Woods Hole, Massachusetts. I'm Ari Daniel Shapiro.

## Meet the Scientist

Meet Dr. Dean Pearson, the scientist you heard featured in the Branch-tip Spider podcast:



### **Where do you work?**

Rocky Mountain Research Station, United States Department of Agriculture Forest Service in Missoula, Montana.

### **What do you study?**

I study community ecology which is about understanding how organisms interact to form the communities we see in nature.

### **What are three titles you would give yourself?**

Community ecologist, back-country elk hunter, wanderer.

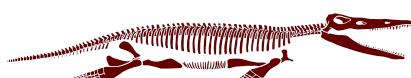
### **What do you like to do when you are not working?**

When I am not in my lab, I am chasing elk, birding, naturalizing, wandering through the desert, hanging out with my wonderful daughters or growing plants in and around my home.

### **What do you like most about science?**

For me, nature is the keeper of the answers to life's great questions. I love the fact that my work allows me to explore those questions on a daily basis.

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