

## **The Best Biome Episode 5 - Tumbleweeds**

Rachel - Hello from your favorite Grasslands PR team. This week, we're back with another reason why these overlooked and underappreciated ecosystems are objectively the best biome. I'm Rachel.

Nicole - I'm Nicole. And today, we're talking about a plant.

Rachel - Finally.

Nicole - It's our first plant. I'm really excited. We're talking about tumbleweeds.

Rachel - Okay, excellent. I'm ready. We have another review from Sandra. Thank you so much. We love seeing your comments every week. She says, another awesome, entertaining, super educational podcast. Keep them coming. I love it with a heart on your megafauna episode, Nicole. So thank you, Sandra, for that note. I'm ready to jump right into tumbleweed stuff. So please, Nicole, how are we gonna start this?

Nicole - Okay, so I wanna talk a little bit about their natural history, where they're found, cool adaptations. And then we'll jump into the not so great part of tumbleweeds. But first we're gonna talk about how awesome they are.

Rachel - Okay, I didn't think that there were not great parts about tumbleweeds. I didn't, huh?

Nicole - Oh, just wait.

Rachel - I guess I don't live in a place with tumbleweeds, so that's a blind spot.

Nicole - So, you know, these plants are very iconic. You see them all the time like old Westerns. And you know, if it's like, oh, nothing happens here, they show a pan of some tumbleweeds. Like, first of all, very insulting. Don't appreciate that, because these guys are super cool. And a lot of the places that people make fun of when they do that are places that are near and dear to my heart, and they tend

to be grasslands, which is just rude. But I didn't know a lot about tumbleweeds. And, you know, I felt inspired to research more about them and to share it with everyone. So I hope that everyone is as excited as I am. And to get this out of the way, the term tumbleweed is an extremely broad term, which includes plants from the sunflower, amaranth, cabbage, forget me not, carnation, beans, sage, and grass families, as well as a couple others that like are just scientific names and don't have good common names. There's a lot of tumbleweeds out there. Like a lot.

Rachel- Yeah, that's interesting. I know I've seen people here in Kansas call things like windmill grass tumbleweeds when the seed heads kind of come off and blow around, but I mean, that's not an actual tumbleweed.

Nicole - And I mean, it kind of is.

Rachel - Wait, is it? No.

Nicole - Yeah, any time a plant has a part of it that is designed to break off and tumble in order to spread those seeds, that is a tumbleweed.

Rachel - Interesting.

Nicole - Okay. So, the kind of iconic tumbleweed that we think of is, this plant that has a small stem growing up from the ground and they actually have, when they flower, they have hundreds, if not thousands of flowers, just all along those branches. And they just look like a little shrub. And the flowers are actually kind of beautiful. And there are some tumbleweeds that are used in gardens that just look like little shrubs and they are like these beautiful little fiery red, orange, yellow shrubs that then will just pop off and tumble away.

Rachel - Oh my gosh, out of their landscaping?

Nicole - So I don't know that I would necessarily recommend using them in landscaping for a few different reasons. One, it's going to tumble away and you're not going to have it anymore. And those seeds are just going to destroy your landscaping, just saying, but they are really popular in some places. But those seeds, you know, sometimes the plant won't tumble away and those seeds are

just kind of pushed out of the plant and dispersed by the wind. But usually, you know, that stem is, I don't want to say programmed, but the plant will purposefully break off its own stem and create that iconic tumbleweed, which bounces across the land. And those branches of the plant are very stiff when it's in this tumbleweed mode and will actually almost act like a spring because they have just enough flexibility in the branches to help the plant kind of literally bounce. Like it's not just because of the shape of the plant, but it's also just like the physical nature of the plant that helps it bounce, which I thought was really, really cool.

Rachel - I need you to back up though.

Nicole - Yeah.

Rachel - Because I feel like I heard "you say that the plant breaks off its own stem and I just need to know how.

Nicole - I didn't look into it super scientifically, but yeah, it literally, it's a bunch of different... So a giant truck is rumbling past my house right now.

Rachel - Oh, is that what that was? I thought it was a dog.

Nicole - No, I don't know if that was weird. Okay, I didn't look into it super, super closely, but there's literally biological processes that are going on that this plant is like, hey, it is time to throw these seeds all over the place and it will purposefully break off the entire tumbleweed part of the plant. So yeah.

Rachel - Wow. Yeah. Isn't it weird that I'm thinking of it as being analogous to a skink contracting its muscles and purposefully dropping its tail?

Nicole - I mean, it's not horribly far off. Like, I mean, obviously it's a different process, but hey, super cool.

Rachel - Yeah.

Nicole - Ultimately, this is just another way for this plant to spread its seeds and grow its range. And it's really, really effective at doing this. I found one research

article that was looking at a specific species of tumbleweed. It was this gentleman by Dirk V. Baker, his graduate work through Colorado State University. And they were looking at tumbleweed seed dispersal and trying to quantify, you know, just how far these tumbleweed seeds could possibly be spread. And Baker has a few different publications, but I wanted to focus on one specifically looking at diffuse knapweed, which is a specific species of tumbleweed. And his team did experience both in the field by collecting these tumbleweeds after they naturally tumbled a certain distance, and also by putting the plants in a wind tunnel and letting them tumble that way. Super cool and kind of ingenious, because, you know, in a wind tunnel, everything is as controlled as it can be. There's a constant wind speed. It's always tumbling over the same kind of surface. So it's not going to give you an exact replication of what you might see in the wild, but it kind of gives you this idea, you know, under ideal circumstances, how far can this tumbleweed tumble before it's completely out of seeds.

Rachel - Wow.

Nicole - Yeah.

Rachel - What a crazy effective way to reproduce. This would not be effective in a tall grass prairie though. So I imagine it's like a shorter grass area.

Nicole - Yes. Most tumbleweeds are in fairly arid or dry environments. They can be found in deserts, but most commonly are kind of in short grass environments. And there are some species that can be found almost all over the world. And we will get to that one, cause it's insane.

Rachel - Okay. That's so cool. And my brain is already whirling, trying to decide if I think it's because of humans or just because of the power of tumbleweed.

Nicole- We will find out.

Rachel - Oh boy.

Nicole - But back to Baker's wind tunnel. So they found that these wind tunnel experiments suggested, so in science, we never say that, yes, this is proven, yes, this is disproven. We say that it is suggested because it's just one

experiment. Maybe a later experiment will disprove this. Maybe it will support it. Who knows? It was suggested that there was a linear model of dispersion. So seeds regularly fell off the plant as it tumbled until few or no seeds were left, which is different than most other methods of seed dispersal, like more commonly wind dispersal and things like that, will see lots of seeds being dropped really close to the plant with fewer and fewer making it farther away.

Rachel - Oh yeah, that's interesting.

Nicole - Yeah. So these guys are really, really good at what they do.

Rachel - Yeah, and like very weirdly controlled about how they drop their seeds as they tumble, huh?

Nicole - Yes, yeah, like just the shape of the plant ensures that like, you know, if it hits like a rock or something, it'll probably lose a couple extra seeds there. But for the most part, you know, the shape of this plant and how it curls in on itself keeps too many seeds from falling out, you know, as it first starts getting going, which is super cool. I love tumbleweeds, they're so fascinating. They also found, you know, in the field that these diffuse napweeds can retain their seeds for at least 1800 meters, which is about 5,900 feet, which is just shy of one mile. Oh, I'm sorry, which is just over one mile. I forget, my conversions are hard, okay? I will try my best.

Rachel - Yeah, you're doing great.

Nicole - Thank you.

Rachel - That's a lot. And also it's like making me readjust how I think tumbleweeds can get to every continent.

Nicole - And I found another piece of research that looked at a different species. This research looked at Russian thistle. It's called Plant Movement and Seed Dispersal of Russian thistle. I love when names are just easy and not 20 or 30 words long. I love it. And this one was by George P. Stallings, as well as a few others, and was published in Weed Science Magazine, which is like, again, what an amazing publication. I need to look into them more.

Rachel - Weed Science Magazine, oh my God.

Nicole - Weed Science, yeah. Weed Science, I love it. It's so good. And it's not, you know, that kind of weed. It's all about plant weeds, but you know.

Rachel - Mm-hmm. We had the same issue when we were trying to name our organization and we were like, but we have to be careful using the word grass. Yeah. In weird or questionable contexts.

Nicole - But yeah, weed science, I just love it. But like I said, they were looking at Russian thistle and they did this by literally just throwing these tumbleweeds into a field in Washington state and tracking their movement with GPS. Again, such a simple experiment, but something that at the time, because this was back in 1991 and 92, had never really been done on this scale, as far as I could tell. They actually had 48 different plants that were free to just tumble about and spread their seeds. And as I said earlier, some, you know, maybe they get stuck in a drainage ditch or they get stuck on a larger plant. So some ended up not moving very far, but others did move quite a lot, quite a ways. The farthest that one of the plants moved was 4,069 meters, which is about two and a half miles in only six weeks.

Rachel - Wow.

Nicole - Yeah. And Russian thistle is a larger thistle compared to the diffuse knapweed that Baker looked at, but that's still, I mean, it's two and a half times farther and not like a super long amount of time. Like it's not like they just left these guys out for years and they're like, oh, yep, sure did move a lot. Like it was just six weeks that they did this experiment.

Rachel - Yeah. I'm also having to wrap my head around the fact that so many different types of plants, like thistle, are considered tumbleweeds. And have that dispersal technique, like Russian thistle.

Nicole - Yeah. And Russian thistle is a bit of a misnomer. It's not actually a thistle. It's just really spiky like a thistle. So, yeah, sorry. I should have clarified a little bit.

Rachel - No worries. Wow. Okay.

Nicole - Yeah. And the Russian thistle, which again, this is kind of, the Russian thistle is going to make up the bulk of this episode. It's one that I really want to dive into really deeply and we'll come back to him, I promise. Because it's kind of the king of all thistles. Or the king of, I'm sorry. It's kind of the king of all tumbleweed. See now, I don't even know what's a thistle and what's a tumbleweed anymore. People need to work on their names for plants.

Rachel - Yeah, come on, botany people, get it together. Okay, the king of all tumbleweeds.

Nicole - Yes, the king of all tumbleweeds.

Rachel - That's a bold claim.

Nicole - It is a bold claim, but it is absolutely true. And back to this seed dispersal of Russian thistle paper. So like I said, they did this two years in a row, 1991 and 1992. And in the first year, the average seed loss per plant was about 48% and about 66% for the second year's plant. So it's not like after tumbling and tumbling and tumbling, these plants are running out of seeds. They still have more that could possibly be dispersed, which is insane.

Rachel - No way.

Nicole - Yeah. And it is possible that maybe those seeds would have never been dispersed, maybe for whatever reason, you know, they weren't viable, they weren't ready. There's a lot of different, you know, things going on when it comes to seed dispersal, but it's still just wild to think about.

Rachel - Yeah.

Nicole - And I really, really liked this quote in this paper. They were talking about, you know, how these plants moved and all that stuff. And they said, "Tumbling plants hurdled fence lines and field equipment, crossed roadside ditches, bounced over the top of stubble, and scaled elevations of more than a hundred meters."

Rachel - What?

Nicole - So these things just go absolutely everywhere. Because again, they have, they really do have like a bouncing movement to them as they roll because of the physical makeup of the branches.

Rachel - Wow. They're better at getting over some barriers than some animals are.

Nicole - Right?

Rachel - What?

Nicole - Right. I love them. I love tumbleweeds. I never knew until I started learning more about them.

Rachel - Same. My respect for them is growing exponentially or linearly just so I can be like in one with the tumbleweed.

Nicole -Yes.Yes. I love it.

Rachel - And their linear dispersal method. They are linearly dispersing reasons to love them as well as seeds.

Nicole - Amazing. I love it. So I kind of want to talk about some famous tumbleweeds, if that makes sense.

Rachel - Species are like individuals.

Nicole - Species. I wish there was like, okay, you know, like the Great Ball of Twine. I wish that that existed for the tumbleweed. There was just like this beautiful giant tumbleweed that was forever preserved that like people drove miles to go look at. Oh my gosh, I would die. I would go see it.

Rachel - Yeah, no, absolutely. I feel like we could definitely find backers for a Hall of Fame tumbleweed museum, too. There's people out there who would donate to that.

Nicole - Oh yeah, definitely. If someone else does it, I'll donate to it, like 100%.

Rachel - Okay, so what are these famous tumbleweed species?

Nicole - So like I said earlier, there are some that are used in garden plantings, including a few onion varieties. So those Allian species, where they grow up on really big stalks and they have that flower up top. Do you know what I'm talking about?

Rachel - Yeah.

Nicole - So some of these are actually tumbleweeds. That little oniony flower up top will just pop off and tumble around to spread its seeds. Super cool.

Rachel - No.

Nicole - And then there's those weird little beautiful bushes that people plant that are actually tumbleweeds and will pop off and tumble around. Like I don't know. It just blows my mind to think about this. And these are highly illegal in some places to plant them. So definitely check your local laws or just don't do it because again, as they're tumbling, they're spreading those seeds and then you have these garden variety plants that are, you know, becoming invasive to their local environment. So be very careful if you use tumbleweeds in gardens.

Rachel - Oh man.

Nicole - Also, they're so cool. Another really, really famous tumbleweed that I had no idea was a tumbleweed is the resurrection plant aka resurrection moss aka dinosaur plant. Have you heard of these guys?

Rachel - Yeah, I had some in a crab tank once it died. It didn't resurrect like the fifth time.

Nicole - Oh no. Yes, these are sold as novelty items. Like you get this little dried up husk of a moss looking guy, because they're really, really short. They're like half an inch tall. And you put it in water and it is just like uncurls, but they curl up like that so that they can tumble around and spread their seeds and also just to survive the extreme environments in which they live. And these guys are native to the Chihuahuan desert.

Rachel - Oh, okay.

Nicole - Specifically, a lot of the grassland areas.

Rachel - So yeah, yeah, I don't know.

Nicole - It's fascinating. And they really like this specific species and really like rocky areas. And they have, like I said, just like a single taproot in the middle and just kind of spread out from that taproot almost indefinitely. A lot of them are pretty small. They stay, you know, maybe five inches in diameter, maybe up to like a dinner plate. But theoretically, if left alone, they can get really big before, you know, the hot desert takes them and they turn into tumbleweeds and tumble away. Yeah, and they can survive years in this tumbleweed form and, you know, come back to life. And there's a lot of really cool, like, stories around these plants. They are sometimes used in medicine, they're used to, like, predict whether or not a birth is going to be difficult or easy, like, it's, there's a lot of really cool, you know, I don't know, what's the word, folklore, kind of?

Rachel - No.

Nicole - I don't know, just like, just stories that people have around these plants because they've been there forever, and they're probably never going away because they're just so good at surviving. I love them. It's so cool.

Rachel - Oh, man. Are there, like, this is my brain is just going all over the place, I'm so sorry. But are there botany terms for things that are like, I don't know, plant torpor or I don't, what am I trying to say? I don't understand what I'm saying, it doesn't matter.

Nicole - I understand what you're saying. I think, I mean, dormancy. Oh, dormancy! Yeah, they can go dormant for years and years to survive drought, which is very common in the Chihuahuan Desert, hence why it's called a desert. So yeah.

Rachel - Super cool.

Nicole - Or, you know, being years in a bag, so it can be sold as a novelty item, so.

Rachel - Man, that's so cool. And, for the record, for our listeners who haven't dived into all of these grassland ecosystems, the Chihuahuan Desert has a really significant Chihuahuan Desert grassland area, and it's specifically a type of desert grassland. So it's a really cool, eye-opening thing to take these plants and landscapes that we associate so much with just a pure desert, and we totally erase their grassland components. Like, come on, it doesn't have to be a desert to be cool. It can be a grassland and still be freaking cool.

Nicole - Yes, yes, absolutely.

Rachel - Get out of here with that.

Nicole - And the Chihuahuan Desert in particular, which I'm sure we will do plenty of episodes in the future on it, but like 90% of our grassland birds in the US that we love to have in the summer, like they spend the winter in the Chihuahuan Desert grassland. Like we have to have this grassland to have any of our prairie birds that we have in the US. Like it's so integral to all sorts of animals and plants. We wouldn't have the dinosaur plant without the Chihuahuan Desert, so, you know.

Rachel - I didn't even realize that's where it came from. It seems like it's such an exotic plant, but no, local North American arid regions birthed this thing. Like, yeah.

Nicole - I love it. I had no idea until I looked it up, and I was like, oh my gosh, and like, just the fact that when it's not in tumbleweed form, it just looks like some

moss. So there's so many different plants that utilize this tumbleweed method of seed dispersal, and that's just really, really cool.

Rachel - I have a weird question.

Nicole - Yes?

Rachel - Do you think it could be recommended to just keep tumbleweeds in your yard, but attach a leash to them so they can't escape?

Nicole - Oh, a lot of... Oh my gosh. There's actually... So I think that both of the papers that I mentioned earlier, I know at the very least, the Stallings paper, they actually did like part of the experiment was not leashing, but you know, trapping these plants down to the ground and staking them down to the ground. That's a better word than trapping. They didn't put a cage over them. They staked them to the ground to see how their seed dispersal changed and since they had to then rely on wind, their seeds didn't go as far, but they still did a pretty good job of dispersing seeds. So

Nicole - Oh, no, okay. That's really good to know. I imagine if you put it on a leash, it would be even less effective because it would still bounce around.

Nicole - It's just going to go in a circle. Just bouncing. Gosh.

Rachel - God, now I want to pet tumbleweed in my yard. I don't have a yard. Nicole, can we stay? Never mind. This is going out of hand. Please continue.

Nicole - After doing all my research on tumbleweeds, I do not want to pet tumbleweed except for maybe a dinosaur plant because, and now we're going to come back to that Russian thistle.

Rachel - Oh, good. Okay, let's go. Okay.

Nicole - So this magnificent not thistle, definitely at the tumbleweed, it's in the amaranth family. It's not even a thistle. I don't know. It's just sharp, like a thistle. So they call it a thistle. But anyways, not only does it have about a hundred different common names, it even has different scientific names in the literature.

Rachel - You're kidding me. Are they still in use?

Nicole - That is still in use. It's honestly kind of hard to research this thing because different people call it different things, even though they're talking about the same plant. And not only that, it's also hybridized with a lot of other different kinds of thistles. So then it's like, is this even a Russian thistle? Is it a hybrid? Is it just like a weird subspecies? Like who knows? This plant is out of this world. It just does whatever it wants and no one can control what it does. It is the king of tumbleweeds. I'm so inspired by this plant right now. Yes. So two of the most common scientific names for it are *Kali tragus* or *Salosa tragus*. *Salosa* is more commonly used, but sometimes I've also seen *Salosa cali*. So like, I don't know. I don't know anymore. I tried really hard to try to pinpoint the correct scientific name, but it literally just depends on what organization you're getting your information from. I tend to use the USDA's, I think it's [plants.usda.gov](https://plants.usda.gov). I use that website a lot to kind of figure out not only the range of plants, because they have really, really nice range maps, but also like where is it native to versus not native, stuff like that. But it is obviously very US-centered, so USDA, US Department of Agriculture.

Rachel - What did they say?

Nicole - They said. They call it the *Salosa tragus*. For now, that's what we're calling it. Apparently, in 2017, the International Botanical Congress, which I didn't know existed. Again, I just learned so much when I was researching these guys. But they voted to change it from *Collie* to *Salosa*. And so we're just going to go with them because it was more than one person that voted and decided that this is what it should be. So we'll just say it's *Salosa tragus*. Maybe it's *Salosa cali*. Maybe it's *Collie tragus*. Maybe it doesn't even have *Salosa* in the name. Who knows? It doesn't matter. But this plant, if you look at Russian thistle, you'll find it. This tumbleweed can be three feet tall and up to six feet wide, which is like a meter tall and two meters wide.

Rachel - Wow. Okay.

Nicole - It's absolutely gigantic. And they can produce anywhere from a few thousand seeds and smaller plants to over 150, maybe 250,000 seeds. And

these seeds will start growing when the weather is warm. Because again, this, or maybe I'd even say it, but it's in the name, Russian thistle. This plant is from Russia. It's from the Eurasian steppe. So it is from a very harsh, very cold, very dry environment with a very short growing season. So this plant is kind of as tough as they come. And it's so good at what it does. And when it drops off these seeds, you know, those seeds will, if they have to, wait until the weather is a little bit warmer so they can wait out a winter and start growing in the spring, if need be. But they need as little as 0.1 inches, or 0.25 millimeters of rain to start growing.

Rachel - Wow, that's nothing.

Nicole - It's literally nothing. And they can even start growing within minutes of contact with proper soil.

Rachel - What? What does that...

Nicole - I don't know. That just blew my mind. Whenever you do experiments in high school and you're growing little bean sprouts, you have to wait two or three days before you see that seed doing anything. But they can literally start germinating and start growing within minutes. Within minutes of contact with soil. It's proper soil, but they don't need very good soil to start with to even start growing. They're so good at what they do. It's insane. This Russian thistle is extremely well studied because it's highly invasive. Again, this is the one that's kind of found absolutely everywhere in the United States. It's found in every single state except Alaska and Florida, which is kind of ironic that it's not found in Florida because Florida has every invasive ever. It's found in all southern provinces of Canada. As long as it's not literally just snow on the ground all the time, it's doing great. They're invasive in pretty much every grassland and desert that exists in South America, Africa, and possibly even Australia, but then that comes... Australia has its own tumbleweeds that look a lot like the Russian thistle, so it's like, is it actually the Russian thistle? Is it a hybrid? Is it its own thing? Nobody really knows, so that one, that's a little bit disputed. But they're found just absolutely everywhere.

Rachel - How long has it been absolutely everywhere? Is this a recent thing or has it been a long time?

Nicole - I'm not 100% sure. I know in the U.S., we know the exact year that it got started. It was shipped over as a contaminant, a flaxseed in South Dakota in 1873. By the turn of the century, within 20 years, it had spread all the way to the coast, the West Coast and on into Canada.

Rachel - Oh my gosh. It's too good.

Nicole - It's too good. And so I don't know. And again, because a lot of the resources that I could find were very US centered. So I don't know if it spread to other places when that happened. But judging by how fast it spread in the United States, I'm sure that it did very similar things in other places.

Rachel - Yeah. And probably was doing a good job of colonizing its neighbors. Oh, yeah. From the time it existed.

Nicole - For sure. And like I said, it was brought over in flaxseed shipments. And people were finding this giant thistle along railroad tracks in the US. So it was very much humans that spread it. And once it was established, there was nothing we could do to stop it. It's just too good. In its native range, Russian thistle is actually considered to be useful for grazing opportunities before the plant matures. So before it becomes this spiky, crazy giant tumbleweed that's just going everywhere, it's actually pretty soft and pretty palatable to sheep and cattle and things like that. And prairie dogs love them too. Those don't live in Russia, but I can't help it. And it is actually a really good shelter to a lot of small animals. Birds will eat the seeds, wild herbivores like deer and antelope will eat the plant as well. So it's not horrible. It has a lot of economic value both as a crop plant but also just natural value to wild animals as well. And since it is so valuable in other parts of the world, there has been some research in the US on it being used as a crop plant. But of course, since it is such a pesky plant and disperses so well, there's been a lot of pushback against that.

Nicole - And it's kind of controversial as far as whether or not this is a good idea. In the US, during the Dust Bowl, where crops were failing, everything was horrible, there was nothing to eat, Russian thistle was actually a really important hay that was produced that is thought to have saved the cattle industry in the United States.

Rachel - What?

Nicole- And in Kansas alone, 400,000 tons of thistle hay was produced just in 1934.

Rachel - No. Oh my God. That's insane, Nicole.I had no idea.

Nicole - And it wasn't just the cattle that were eating these, it was the people as well. Because again, there was nothing to eat. Like this was a horrible time in Midwest history where there was literally nothing to eat. People were dying and they would eat these and they thought of all sorts of really unique ways to eat them from just cooking the leaves and eating it almost like a salad or even pickling it. And I will warn people, though it is edible, it is really high in oxalates, especially as it matures, which can lead to development of kidney stones. And you always want to make sure that you 1,000% know what the plant is before you eat it, so please do not eat something and get sick and yell at me. But there are still people today that eat them. There's this really cool website called [eattheweeds.com](http://eattheweeds.com). It's run by Green Dean, and he has a really cool article on Russian thistle. And some of the people in the comments on the article were talking about how it's a really important part of their culture. So in New Mexico, the seeds are known as desert caviar, and their leaves are also steamed, and they taste like spinach. So, like, this weed...Because it is very much a weed where it is not native, has a lot of really cool positive things that it can still do.

Rachel - Wow. That's so cool. And you know what makes it even cooler, I think, is that it's an invasive species, but not because we already recognized its value and wanted to bring it here or something, you know? It's like, we accidentally brought it here. It's really good at what it does. And since it's here, well, at least it's not toxic and killing our cattle or, you know, like, there's so many horrible things it could be doing. And I guess you haven't touched at all on whether it outcompetes native plants and that kind of, you know, ecological element of it. But like, I don't know, if you're going to have an invasive species, at least it saved the cattle industry?

Nicole - Yeah, and a lot of people's lives probably, because people were eating it too, like, wild.

Rachel - Man, that's so cool.

Nicole - Yeah. Also, like, just full disclosure, apparently some people are allergic to it. So, like, if you do want to eat it, maybe eat, like, a little bit, and then go from there. And that's true for, like, any wild edible. You should always assume that you are allergic to it and or that it might not be good for you. So eat, like, a little bit of it and see how your body reacts first.

Rachel - Good advice.

Nicole - Yes. And, like I said, they're so, so good at what they do that they can absolutely compete with other plants and managing them is extremely difficult. Yeah. Because these guys love disturbances, and so do grasslands. So anything that you do to try to keep the grassland healthy, if there's already Russian thistle established there, it could very much just make the Russian thistle take over. Yeah.

Rachel - Yeah, that makes a lot of sense since it's from the steppe in particular. Like it's from those environments, and it's used to or benefits from many of the things that it mirrors in other grassland environments.

Nicole - Yes. The USDA does have some recommendations, like planting competing plants and minimizing those disturbances as much as possible. But the places that it establishes and that it becomes an issue in, like I said, are grasslands, but they're also rangelands where people are trying to graze cattle or they're trying to grow crops. So no matter where it establishes, it's places that need disturbances to stay healthy. And so it's so hard to control. And fire is also a really poor management strategy for tumbleweeds for a lot of different reasons. We'll kind of get into it a little bit later. But yeah, don't use fire with them. Mowing is a bad idea because it disturbs them. And even if they haven't produced seeds yet, all that mowing, if you mow constantly, can lead to really low growing and easy to miss plants that are still producing seeds, but you just don't see them anymore. Then when you mow again, you're tossing those seeds everywhere. So if you have an infestation, good luck. That's all I have for you.

Rachel - Yeah, I was going to say you've pretty much checked off every single management strategy I've heard of for invasive plants in grasslands.

Nicole - They're so hard to keep track of. They recommended, well, manual pulling of young plants is a really effective way to do it. And it's like, well, yeah, if you remove the plant, then it's not going to be there anymore. But who has time to go out into a field and just take out hundreds of plants? That's just not feasible.

Rachel - And I imagine grazing isn't a good strategy for management either because they're used to that, and it's not more effective than mowing would be. Yeah. I mean, can you train goats to just eat tumbleweed so you don't have to go manually pick them all up or something?

Nicole - There has been a little bit of success with selective grazing because goats and sheep really do love Russian thistle when it's young. So if you can manage to block it off with a fence and just put a ton of goats on that piece of land, they will selectively eat the thistle before they eat other stuff. Prairie dogs will as well, but we don't have any prairie dogs anymore, so can't use them as a management strategy.

Rachel - No, use them as a management strategy. Reestablish prairie dogs.

Nicole - Get rid of that thistle that's not a thistle. But yeah, it's kind of... It's hard to do because like I said, these plants are really high in oxalates, so they can make the animal sick if that's a large portion of their diet. No matter what, every management strategy has a downside for these guys,

Rachel - Dang it. That's kind of impressive though. I am really proud of them.

Nicole - I know, right? Part of me is like oh no. Part of me is like wow, good job plant like I am so impressed.

Rachel - It is doing its plant thing. So how mad can you be? You can be mad. It's fine to be made.

Nicole - I have a lot of plants that I don't like. It's, yeah, it's fine. Let's dive a little bit more into just how harmful these plants can be, as interesting as they are.

Like I said, they can invade crop fields, leading to quite large yield reductions. They can cause damage to fences as they get stuck on them, and even clogging irrigation ditches, things like that. They are a huge fire hazard, because if you think of a 6 foot by 3 foot tall plant that's just a dried up husk, they catch really, really quickly when fire is involved. And if you have this giant thing that's rolling across the grassland that's on fire, it's also really good at spreading that fire. And even if it's a controlled fire, they can tumble and bounce into places that you were trying not to burn.

Rachel - No. Oh my god.

Nicole - So, they're just chaos, given physical form.

Rachel - I don't know why that's so delightful to me. I'm so delighted to know this about them in a weird, chaotic, destructive sort of way.

Nicole - I know, me too. They're so crazy, and I just love them. And I'm going to send you a video real quick, Rachel. And I want you to watch this.

Rachel - Oh no. Oh, boy.

Nicole - And it's not one on fire. I wish I could have found one like that. Maybe you can. I didn't look for it, because it's just too much chaos. I can't handle it. But I will post this on the website so everybody can see it. The title of this video is Attack of the Tumbleweed. It's so good. Attack of the Tumbleweed by Tin Tower. It's a swarm of tumbleweeds taking over this road. According to the description, this was just after a snowplow had made its way through. These tumbleweeds can be a huge nuisance to the average Joe Snow. It's not just the farmers that are having problems with them. There's literally these swarms of tumbleweeds that as far as you can see are tumbleweeds. Are you watching this video?

Rachel - Oh, there's so many of them. Are these Russian thistle tumbleweeds?

I believe so.

Rachel - This music.

Nicole - The music's so good.

Rachel - It's so good. It's very like a haunted mansion.

Nicole - I know.

Rachel - Oh, they're so bouncy. Look at them just leaping. It's like a flock of gazelle.

Nicole - Yes.

Rachel - I think those are called herds. That's my bad.

Nicole - Eh.

Rachel - Oh.

Nicole - A little bird brain.

Rachel - Oh, no.

Nicole - Yeah. And as you guys look at this video either because you're googling it right now or because you found it on our website, give it a couple seconds because the first couple seconds you're like, oh, there's some tumbleweeds, no big deal. But 15 seconds in, it's literally all you can see is tumbleweeds. And not only do they take over highways, causing highways to be shut down for hours, there's one in, I think it was Washington State, yes, in Washington State on December 31st, 2019, so New Year's Eve, Tumblegeddon happened.

Rachel - I'm sorry, say that again.

Rachel and Nicole - Tumblegeddon.

Nicole - This is an actual hashtag they took over the internet when this happened.

Rachel - Oh no, I love it so much.

Nicole - It was so good. But it wasn't, like, it was worse in this video that I'm showing you now. There were drifts of tumbleweeds on this highway that were 15 feet deep. Five meters, right? Yeah, about five meters deep. Just, I mean, how do you, you can't drive through that. Like, people just had to stop on the highway and wait for snowplows and emergency vehicles to, like, dig them out. It completely shut down this highway. It's absolutely insane. And since it happened, like, overnight, it made it even more difficult because everybody's working it, you know, at night. And they actually found in the morning a car that was abandoned. And it was, like, it was empty. Like, they found this car and they're like, oh, gosh, did somebody have to spend the night in their car? But, like, it was abandoned. They just, they were like, I'm out. And they just left. Or maybe they got in someone else's car. I don't know. But, like, I don't know. I can just, like, imagine being the emergency personnel, like, digging through all these tumbleweeds, thousands and thousands of tumbleweeds, and you find a car and you're like, oh, no. And then it's empty. Like, I can't even imagine. I'm so glad that we don't have tumbleweed swarms where we live. That's all I'm gonna say.

Rachel - Seriously.

Nicole - And there was this really great quote by Chris Thorson, a state trooper that helped with this event, and he said, to have it happen on New Year's Eve and into the new year, I'm not exactly sure what that bodes for 2020.

Rachel - Oh no, I don't think it was caused, but maybe the tumbleweeds were just trying to warn us. They seem like they've got a lot of powerful attributes and the prediction of impending disasters on a global scale. Maybe that's just a part of their nature. That's fair. That's fair. That's so, so ridiculous. I'm so weirdly delighted still. People, oh no, what is this tweet you just sent me in the Southern California's high desert?

Nicole - Yes.

Rachel - People are calling 911 for help because of an invasion of tumbleweeds.

Nicole - Yeah, so I like, and I hate to laugh, but like... What else can you do? They've buried people's houses.

Nicole - So on April 18th, I know it's like, it's so bizarre that you can't help but laugh. This is a real issue that people have to deal with fairly regularly where they literally cannot get out of their house because there's piles of tumbleweeds blocking them inside their house and they have to wait to get dug out by like their neighbors or, you know, first responders. So this particular tumbleweed invasion happened on April 18th, 2018, and it was Victorville, California, literally buried people inside their homes. Some people were trapped inside for hours as safety officials worked to dig them out. And this wasn't just like an isolated event. This was like 100 to 150 houses that were trapped under the swarm. And the tumbleweeds were like literally piling up to their roofs and people were climbing out of the second story windows to get out of their house or just were trapped. It was just strong winds moving in all these tumbleweeds and as they were being removed, more and more tumbleweeds would come in. You're just fighting a losing battle with these guys. And it's not just the US that has seen things like this.

Nicole - There was an Australian city of Wagonrata, maybe? There was an Australian city in Victoria that had a very similar invasion. And this was February 18th, 2016, and they were really worried about the fire risk. Because like I said, these things catch fire so quickly. And if it's just pushed up against the side of your house, you're going to lose your home if they catch on fire. No ifs, ands, or buts about it. But luckily nothing really happened. And this particular species of tumbleweed, because this was not the Russian Thistle, it actually causes a slight skin irritation when you touch it. So yeah, people couldn't even dig themselves out if they didn't have something to protect themselves with. So it's not just fire and the tumbleweed's burning down your house, it's also just touching them will give you an allergic reaction. Plus they're spiky. These tumbleweeds are too powerful.

Rachel - What a unique hellscape.

Nicole - I know that's Australia for you though.

Rachel - Oh gosh. Well, and to be fair, wait, are these tumbleweeds Australian? Did you say that?

Nicole - This particular species that causes skin irritation is.

Rachel - So that's a native plant. Okay.

Nicole - Yes. It's called hairy panic.

Rachel - Oh, Australia. I'm so sorry. Wow.

Nicole - Australia is a fascinating place.

Rachel - Wait, does this kind of stuff happen? Okay, with the Russian thistle, does this happen in its native range in Russia or is there some kind of natural check that's evolved over the years for this crazy hellscape of a plant in those native environments?

Nicole - That is a really good question. I'm really not sure. Again, a lot of their sources are very US centered, but I imagine that since, one, the Eurasian steppe is just a huge place, it's not going to be blowing into cities like we see a lot in the US. And the fact that it is naturally grazed by a lot of animals and people will use it to graze their own livestock, I imagine that that helps prevent huge swarms like we see in parts of the US and apparently Australia as well. But I am not 100% sure of that.

Rachel - Fascinating. So what I'm hearing is that the US needs more prairie dogs.

Nicole - Yes. Always

Rachel - And Australia is Australia. They don't need anything new. They just exist.

Nicole - Yeah. I don't know, I just love tumbleweeds and I love that so many different kinds of plants use this. Like, they're just such a fascinating plant with an amazing adaptation for survival and seed dispersal. And even though these great adaptations make them a really good invasive pest plant as well, they still have so many good things that they do for not only the natural environment, but you

know, people as well throughout history. And I can't help but feel a kind of pride, like we were talking about earlier, for this plant that is so good at what it does.

Rachel - Yeah, it's found a way to make a name for itself in the world. And boy, has it excelled in doing that.

Nicole - To say the least. Yeah, like literally they're found just the Russian thistle, like that particular species, which like, who even knows if people are even talking about the same species considering how many different scientific names it has and how many different common names it has. But we'll just assume that science kind of has its stuff together and we are talking about the same species. It's just found absolutely everywhere and there's nothing that we can do about it. So we just have to manage it as best as we can, but not through fire, grazing, mowing or any kind of disturbance.

Rachel - But we can stake them to the ground.

Nicole - I suppose, but if you're going to stake them to the ground, you might as well just take them out.

Rachel - That's probably more effective.

Nicole - Probably.

Rachel - Wow. Well, thanks, Tumbleweeds, for saving Kansas during the Dust Bowl, I guess. And thanks to all of the emergency responders who are working tirelessly in times of tumbleweed-induced crisis. And thanks, Nicole, for that amazing episode. I learned so much and I never knew that I needed to know more about tumbleweeds. But now I kind of want one just as a pet.

Nicole - That's fair. I'm so glad that I could force my love of tumbleweeds on you.

Rachel - Before we end, can I ask you just one question?

Nicole - Absolutely.

Rachel - When people are studying the dispersal of tumbleweeds, do they get like little radio collars or something?

Nicole - Yes, did I not mention that? Yeah, they get little GPS things that they put on the plant so they can monitor it. Some studies, they will just kind of paint the tumbleweed fluorescent hot pink so they could find it again. But some of them do use GPS, which is obviously expensive, but it's also really useful because then you can monitor it long term and you don't have to be out in the field watching this tumbleweed tumble and sweating just profusely because everywhere they live is very hot and arid and dry.

Rachel - Hey, hey, hey, I was going to say, that's not true. They live in Canada.

Nicole - That's true. You're right.

Rachel - Thank you.

Nicole - It's very arid and dry, but maybe not hot. But yeah, so yeah, they do use GPS to monitor these guys, which is super cool. The paper by Stallings used GPS to monitor these guys. The paper by Stallings did specifically use GPS monitoring to help monitor these guys long term. And that paper is actually really fascinating. Just the way that they did it, they actually grew the plants indoors and very carefully had them in little bags so that they wouldn't drop seeds as they were growing and they would transplant them to bigger and bigger pots and then eventually threw them out in this field in Washington state. What a weird but fascinating and useful study.

Rachel - And it makes me weirdly happy to think about them having little radio trackers as if they're prairie chickens or something.

Nicole - Yes, yes, me too.

Rachel - Okay, well, again, thanks Nicole and thanks everybody for listening to The Best Biome. As always, if you enjoyed this episode as much as we did, do us a favor and share it with a friend and maybe even consider leaving us a review on Podchaser or Apple Podcasts. Either way, it really helps. Give us a follow on social media and you can even leave us a voice message if you want.

All the links are in the description along with Nicole's notes and links to all of those Hellscape videos. We'll even give you a shout out for all that love.

Rachel - That's it. So we will be seeing you guys again next week.

Nicole - Please don't use them in your landscaping. I was trying to be coy about it in the beginning. After all this other kind of bad stuff that they do, hopefully you realize that that's a bad idea.

Rachel - Put them on leashes.

Nicole - Oh, okay. Yeah. There we go. I forgot about the leashes.

Rachel - Yeah. Stake them to the ground or put them on leashes. Just tie them in place with a stake.

Nicole - Okay.

Rachel - It'll be fine. There we go.

Nicole - They really are beautiful though. They have such tiny little flowers. Anyways. Okay.

Rachel - But also, this is the end. I swear. Imagine if just for the fun aesthetics and a conversation starter with your neighbors, you did just put your tumbleweeds in cages.

Nicole - It would definitely be a statement. That's for sure.

Rachel - It'd be really fun on Halloween too. What do those tumbleweeds do? Oh, you don't even know.

Nicole - This is the Russian thistle. It's a menace. That'll get ya.