

PLANT PEOPLE Season One Episode Four ‘Invasive Plants’ Transcript

JENNIFER BERNSTEIN: Have you ever played whack-a-mole?

It’s a fun game of speed and reflexes! Now imagine you hit one on the head and it disappears and another two pop up. You swing your mallet to hit those two, and ten more pop up. Sooner than you can blink there are moles everywhere and it doesn’t matter how many you hit, they just continue to pop up all around you. Doesn’t sound so fun anymore... does it?

Invasive plant species are non-native plants that spread rapidly and aggressively in a new environment, often causing harm to local ecosystems, biodiversity, and sometimes even the economy -- kind of like a never-ending game of whack-a-mole. These species outcompete native plants for resources like sunlight, water, and nutrients.

Invasive plants are also among the leading threats to *animal* biodiversity, because they degrade habitats.

Now the question is: Are we doomed to lose against them?

This is Plant People from NYBG. I’m your host Jennifer Bernstein, CEO & The William C. Steere, Sr. President at the New York Botanical Garden.

This episode, my guest is Dr. Evelyn Beury. She’s an ecologist studying invasive plants who believes that public awareness is crucial in the battle against invasives, and that we still have a chance.

JENNIFER: Eve, it's so wonderful to be with you. So let's start at the beginning. Can you tell me why and how did you become a plant person?

EVE BEAURY: My name is Eve Beury. I am an incoming Assistant Curator joining the New York Botanical Garden in September.

I've always been a nature person. I've always been an animal and plant person, but actually, I think when I was younger, I was more of an animal person. I was dragging my parents to the zoo on every trip we went to and just wanted to be in nature and around animals and plants.

And I didn't realize I was a plant person until late in high school, actually. I took a botany class on a whim, a botany and zoology class thinking I was going to be the zoology person, and the first day of botany, I was fascinated. I couldn't believe how amazing the plant world was and something I hadn't learned about really at all prior to that.

And I had an amazing teacher who had her Ph.D. in botany and chose to teach high school classes out of the goodness of her heart. And it really resonated with me. And since then, I wanted to be an ecologist and pursue plant science. And since then I've always been a plant person.

JENNIFER: That's wonderful. What I love about that story is that you were taking a botany and zoology class in high school, which I think is a sort of rare thing. So Eve, you're going to be joining us at NYBG as an Assistant Curator in our Center for Conservation and Restoration Ecology this fall, which is incredibly exciting.

Can you tell us a little bit about what you'll be working on when you're here?

EVE: Yeah, so, I would consider myself a biogeographer and invasion ecologist. And so I've always been really interested in the diversity of life across space and across time.

What I hope I'm going to do at the Botanical Garden is think strategically about how we can better predict and forecast the spread of invasive plants in particular, and understand the impacts that they have across scales and across time and space.

So a lot of my work is thinking about regional to continental to global scales and the movement of invasive plants and how they're brought to new places, and how successfully they establish, and what their impacts on other species are once they're there. And so my hope is that, I'm going to be using some of the resources at the Botanical Garden to think about past spread of invasive plants back through time in the United States, and how we can think about sort of preventing the introduction of species that have potentially really negative effects on the environment. So, really trying to look ahead to what's not here yet and what could be coming down the road. And making sure that we're not accidentally introducing species that could have a lot of harm.

JENNIFER: Yeah, it is such an important topic and fits in so well with everything that we do here. And of course we see on the ground the impact of invasive species

in the local environment, as do many of our Members who are gardeners. They're seeing it in their own backyards.

What defines an invasive species? How do they differ from native species or non-native or naturalized species that are not invasive?

EVE: Yes, great question. And terminology is something that people argue about constantly in the invasion world. And so my definition of an invasive species, or at least the one I use most often, is a species that's been introduced to a new environment, so it doesn't naturally occur there, by some human activity it's arrived to a new place where it is considered non-native to the region.

And it is able to spread rapidly, and that's often associated with some negative impact to the environment or some socioeconomic factor that we care about.

JENNIFER: Right. That makes sense because so many non-native species have been introduced that you really do have to look at the impact to understand the degree to which it's something to grapple with in a more intentional way. Can you share some examples of invasive plant species that are currently posing threats in the U.S. ecosystems?

EVE: Sure, yes, so kudzu is the one that probably most people are familiar with. It's known as 'The Vine that Ate the South', and it's become sort of the poster child for invasive plants, I think, just because the sort of visual impact it has is crazy.

This is a vine that's from Asia that was imported here in the late 1800s through the ornamental plant trade, so it was brought here as a garden plant, and then in the early 1900s, it was planted by government agencies as a way to control soil erosion. And so it was really widely planted. It's this spreading vine that just grows really quickly and has a really easy time, showing up in new places. And then there was sort of a lag-time between when we planted it like crazy and realized that it was really spreading out of control and difficult to manage.

And so since then, I think in the southeast United States, it's just completely overtaken roadsides and forest edges where it basically climbs up to the top of the canopy of a forest and completely smothers out the native vegetation. And so that's one that is actually on its way to New York and New Jersey.

I think there's been early sightings of it in the northeast U.S. Just given the pace that it spreads, it's something I think we're really concerned about in the northeast. Cheatgrass is another one that's talked about a lot as a fire-prone invasive grass. And so this is very common in the western United States.

It's a small, really dry, really fast-growing grass. And so it's also an early colonizer. So oftentimes if there's a wildfire, it's the first thing to re-sprout and show up. And then there's sort of this positive feedback loop where the more fire there is, the more cheatgrass there is.

And it's actually been found to increase fire size and fire frequency in the western United States. And so that's a really scary one because, we know that wildfire obviously has huge negative effects on biodiversity, and people, and livelihoods and it's becoming an increasing concern with climate change, and invasive grasses are really a huge part in that.

Knotweed is another one that I'm always very concerned about in the northeast at least. It invades stream sides and so it's really hard to control because if it gets in the water, it will spread to a new place and it can spread from these small fragments of its roots and leaves and sort of stems. It will re-sprout like crazy. And so it's really hard to prevent it from spreading to new places because obviously we can't control the stream flow and sort of filter it out.

JENNIFER: Yeah, I mean it's interesting you talk about the grass is contributing to wildfires and you really see how these things become a vicious cycle and, as I'm sure you have seen, we have the Bronx River flowing through the heart of the Garden. Through our 50-acre, never-been-cut forest, the Thane Family Forest.

And of course we have been doing riparian restoration in the Forest for a long time and knotweed has become a persistent problem for us. And as you say, the sort of some of the traditional approaches that you would take--manual removal and things like that--only exacerbate the problems with knotweed. So having as much insight as we can about how to control these new invasive species becomes really important for all sorts of reasons.

Can you talk about the biological factors that allow an invasive species to gain a competitive edge over native plants and animals? How do they do it?

EVE: That's something that I think is still an ongoing question. There's a lot of hypotheses for why these species are able to be so successful in new environments. Some examples of the more common hypotheses are that they face something called enemy release. So when you show up to a new environment and you're a new plant, there's not a lot of diseases or herbivores that you're familiar with.

And so you're sort of protected from being eaten by other things or infected by other diseases because you're novel to the environment. So this novelty aspect can sometimes lend species an advantage. So if you're not spending all this time or energy re-growing after something's chewed on your leaves, you can spend more of that energy reproducing.

They have traits that lend them to be very highly reproducing: huge densities of seeds, or fast vegetative growth. And so some work by colleagues of mine have actually showed that relative to the native plants, if you're new to an environment and you co-occur with a bunch of native species, the species that are successful invaders tend to have these traits that confer these fast growth rate advantages.

JENNIFER: It makes sense because we've degraded so much land and we've, maybe made way for some of these plants that are most able to re-establish quickly because they're fast growing. Some of your work has focused on the horticulture trade and the way in which the horticulture trade contributes to the spreading of invasive species. Can you talk a bit about that?

EVE: Yes, so this is something I think a lot of people don't know about. The plant trade industry is the number one pathway for invasive species into new areas. And it's not just plants, it's insects and diseases as well. About 60 percent of the plant species we have in the United States that are considered invasive, were originally imported to the U.S. through the horticultural industry. So, garden plants, plantation trees, things like that. And so it's a huge problem and it's an ongoing problem. So some of my work has shown that most of the species we have that are considered invasive in the United States, we know that they have impacts on other species and sort of socioeconomic factors and things like that, they're still spread through the gardening industry. And so a lot of the species like kudzu and a few others, you can actually buy online and ship to your house and plant it in your backyard.

This is something we've known about for a couple of decades, and there have been a lot of interventions at the state and sort of federal level to try to reduce the

potential that we're spreading harmful species, and so a lot of my work has basically done a reality check of how effective are those regulations?

Are we actually taking things off the market that have this high potential to spread? Do people know this is a problem? Does the gardening industry know this is a problem? And, what my work has shown is that there's just, I think, a complete lack of awareness about where things are invasive and how they got there.

You asked previously why some of these plants are so successful and good at growing. And the gardening industry is also playing a huge role in that. We're selecting for species that are easy to propagate, don't take a lot of maintenance, are drought resistant, can grow in any soil type. And when you select for all those traits, because they're easy to propagate, you're going to make a lot of money on them in the gardening industry. Those are the same traits that allow these species to be really successful outside of cultivation.

JENNIFER: So do you think that the answer is sort of beefing up the enforcement mechanisms within the regulatory environment, or do you think it's more a function of creating consumer awareness and changing the demand patterns?

EVE: I think we need both. But for me, as a researcher, it's a lot easier to talk to a handful of state managers than it is to talk to everybody who has a garden and is buying gardening plants. And so, the route that I've taken most often is to work with the people who are responsible for prohibited plant lists.

So each state has a list of plants that are considered prohibited in trade. And the level of enforcement of that list varies a lot by state, and the species that show up on that list vary a lot by state. And so some of my work has shown that we have major inconsistencies in how these prohibited plant lists are used, and the transparency associated with these lists across states in the U.S., including in the northeast where we have really similar ecosystem types, you'd think we'd have sort of shared priorities in terms of the species that we're looking at from a policy standpoint, and that's just not the case. The lists vary incredibly, and so it's hard, I think, if you're a grower to get transparent, up to date information on what's considered invasive, and it's really easy to bypass what's on those lists.

And so, for example, a lot of the horticultural species that are planted in New England, are coming from New Jersey, which is where I'm based right now. So, New Jersey growers are sending truckloads of plants across state borders every

week, and the New England prohibited plant lists are only really focused on what's going on or being sold within New England state borders.

And so there's just this breakdown in the way that we're approaching the policy and the regulations and how the gardening industry is actually functioning. And so I think that we could be doing a much better job sort of aligning the way the policy and the regulations work to actually help the growers be aware of what's considered invasive where.

JENNIFER: It's so typical of all of the environmental problems that we're facing, which is that nature doesn't have these kinds of borders. These borders are entirely human in their construction and so, it's not surprising that we see these problems bleeding over across these human-constructed lines.

Can you talk a little bit about the economic impact of invasive species on agriculture, forestry, and maybe other sectors?

EVE: So I think the most obvious impact on agriculture and on forestry is coming from invasive pests, which is not necessarily my specialty, but it's a huge problem, and a lot of the pests we have here were brought here by invasive plants being imported through horticulture. And so it's sort of a chain reaction that I think about quite a lot. Farmers are spending tons of money trying to manage species that they don't want in their croplands.

And for forestry as well, if you have an invasive pest that's a defoliating insect, for example, which just means that they eat the leaves off of trees and there's an outbreak, your stock can kill trees in a couple of years. And so that has a huge impact on our forests and on the timber industry.

JENNIFER: Some of the effects from the spotted lanternfly are primarily in the built environment, right?

EVE: Absolutely, and knotweed, I think, is a really good example, which is a species we talked about earlier. I've seen that plant growing up through concrete near my house when I was living in Massachusetts, and so there's huge infrastructure impacts. There's been studies that have shown that it can decrease your property value if you have a really bad invasive species problem.

A lot of these species will take years of repeated management to remove, and so if you have a property that's just completely overtaken by something that's difficult to remove and manage then that can majorly decrease your property value.

And so, the approach we typically take in the United States for managing invasive species is very reactive. Once something has really taken hold and had the potential to spread is when we're coming in to deal with it...

JENNIFER: Maybe the hardest time to come in and deal with it, you know?

EVE: Yeah, definitely not the ideal time to deal with it. It's much easier to be reactive than it is to be proactive. But the consequence is that it's a lot more time intensive and resource intensive to deal with something once it's already had the potential to spread.

And so this is something that we're working really hard to try to shift in the sort of invasive species research and management landscape is to try to think more proactively about how we can forecast and get at things early.

Knotweed, again, is a species that causes a lot of erosion in stream beds, and so, it costs a lot of money to restore those areas once knotweed's had a chance to take hold. So there's a lot of, I think, economic impacts associated with the management, but they're completely outweighed by the costs of damage to infrastructure and recreation and things like that.

JENNIFER: Invasive plants are not just a problem in the U.S. What happens when these invasives spread unchecked across the globe? After the break, we'll dive into the startling consequences and unexpected impacts that invasive plants are having worldwide. You'll be surprised to learn what we uncover next!

[BREAK]

JENNIFER: This is Plant People from NYBG. I'm Jennifer Bernstein. I've been talking with ecologist and biogeographer Dr. Evelyn Beaury about the dangers posed by invasive species of plants. Now that we understand the threat, Eve has some solutions for how we can fight back.

JENNIFER: You talked about scale and can you talk about the long term environmental consequences of unchecked invasive species, maybe at the global scale?

EVE: There's major regions of the world where we don't even know the status of what species are there, how abundant they are, and what sort of stage of invasion that they're in. And so I think there's some major knowledge gaps in terms of sort of collating global information about invasive species. And related to that, there's been some sort of more theoretical work that's suggested that we haven't saturated the pool of species that could become invasive.

So there's lots of species that haven't been introduced to new areas yet that could become invasive, and we don't know what those species are and where they're coming from. And so there's a lot of work that we need to do to sort of get a sense for where we're headed. And the sort of global scale of impact is totally related to how many more invasions we're likely to face.

JENNIFER: Right. It seems like in this, I think we're in the UN Decade of Ecosystem Restoration. And of course, restoration ecology is an area of growing importance. And we will learn through some of those efforts what areas have been subject to some of these invasive species. And we may also learn how to restore in the context of that.

So it's an interesting time at the global level.

EVE: Sure, and maybe I'll just add to what we were talking about for your previous question, that the Intergovernmental Panel on Biodiversity and Ecosystem Services have now cited five causes of global biodiversity declines that are the major drivers of biodiversity declines. One of those is the spread of invasive species.

So at the global scale, we're seeing these major losses of population abundance and diversity of species pretty much everywhere across the globe. And the spread of invasions has been cited now as one of the, one of five leading causes along with pollution, poaching, climate change, and land use change.

JENNIFER: And for a gardener who's grappling with knotweed or whatever it is in their landscape, they are experiencing something that really is, a global scale challenge for us. And that is challenging the biodiversity of the planet, and it's

contributing to biodiversity loss, which is, of course, the dual crisis, along with the climate crisis.

So on the biodiversity front, what's the interaction between biodiversity and susceptibility to invasion?

EVE: Yes it's a great question and it's something that invasion ecologists have been arguing about for the entirety of the history of the field. Some research has shown that if you have an area that has higher biodiversity, so more species, higher abundance of different species, in general, that those areas are less susceptible to invasion.

So because all of these species are sort of taking up all the space and all the resources in an environment, there's not a lot of room, basically, for new species to come in and take over. And so without some kind of disturbance or without some kind of intervention or perturbation of the environment, it's really hard for new species to just muscle their way in.

JENNIFER: So preserving biodiversity is a sort of bulwark against invasion. What's the other side of this argument?

EVE: The other side of the argument is, that it's a lovely idea, and it's been shown quite well in experimental settings, but outside of experimental settings, using observational data sets, and especially data sets that sort of span ecosystem types. So if you're looking at data that is not just recorded in one site, but it's really looking at broad scales, that the evidence for this idea, which we call biotic resistance, is pretty weak.

And so there's been a lot of people that have argued that actually our biodiversity hotspots are more susceptible to invasion. So there's something about the environment that, it's more resource abundant, it's a cushier place to live, and so that's actually attractive to invasive species, or they have an easier time taking hold in areas that have high richness of other species or high diversity of other species.

I would argue that that's an issue in the way that we're sort of measuring biodiversity across scales and across space and across time.

When you're looking at really big data sets and you're looking across really different ecosystem types, you need to be really careful in the way you sort of treat

and analyze that data, because it's really hard to make a comparison between a forest in Maine and a swamp in Florida.

And so my research has argued that we need to be developing methods and using quantitative tools and data sets in a very strategic way if we're going to make inferences about these really big biodiversity patterns. And so by tweaking the models and the approach we've used to study these big data sets, my work has shown that there is resistance to invasion.

So diverse areas are more resistant to invasion, but that was not really shown in these big data sets before, and so there's been this sort of battle between experimentalists and broad scale people that I've been trying to rewrite a little bit with the way that we think about data and we think about quantitative tools and the way we use models to think about biodiversity.

And so that's something that is ongoing work, I think, trying to reconcile what we see in our backyards at the local scale with these broader patterns that occur across the full U. S. or across the globe, because sometimes those different scales don't align in the way we're thinking about invasions and we're thinking about biodiversity.

JENNIFER: So the jury is out, but maybe big data will help. Is that what I'm hearing?

EVE: That's what I would argue at least.

JENNIFER: And you're joining NYBG at the same time as a new bioinformatician, so these tools that we're bringing into the fore will allow us to grapple with questions in new ways, that will hopefully help us to solve some of these debates on many levels. So it's an exciting time.

You know, people are afraid of AI for lots of very legitimate reasons. And I think there are real challenges there. But there's a lot of opportunity in these emerging technologies to learn about the natural world and to help solve some of the environmental challenges that we're facing.

So what are some of the effective strategies for managing invasive species population? You said that we're spending a lot of money on it, so what have we learned about what works?

EVE: Do it early. That's the biggest thing. Is if you see something and it hasn't spread rapidly yet, or it hasn't reached this high population abundance or density, get in there early. So the earlier on in the process, the better. And that's, I think, the number one thing. This idea is called early detection and rapid response.

JENNIFER: What if you didn't catch it? What do you do then?

EVE: Yeah, if you didn't catch it, there are really effective methods for physical removal. So mechanical control, weeding, mowing, there's been a lot of research into the timing of these management strategies is really important. So for example, if a plant spreads by seed, obviously the best time to mow is when it's the tallest it gets but prior to setting seed and so, other species that spread vegetatively, the timing doesn't matter as much, and then, pairing that with chemical control.

I know a lot of people are very hesitant about herbicides, when and where you spray herbicides, but there are a lot of really effective herbicide techniques that you can use in sort of moderation that are really effective for removing invasive species. I saw a really cool talk recently where they were using water, superheated water, as a basically a new invasive species management strategy.

JENNIFER: We've been piloting that here in our Native Plant Garden and in the riparian zone around the river. We've been piloting steaming, and it's working. It's amazing. You know, it's small scale at this site, but it has real potential down the line.

EVE: That's really cool. And yeah, I think the one of the biggest barriers to successful management totally depends on where the plant's coming from. And that's not something a lot of people are thinking about, right? If it's in your yard, it's on your property, you're really just focused on getting it off your property and maybe not thinking so much about why it's there in the first place.

JENNIFER: And whether it will come back.

EVE: Exactly, and it takes time and it takes effort, but what I've been pushing for is trying to get more people to think about why it's there in the first place and what are the mechanisms for bringing it there.

So the gardening example is a perfect one. If we're going to keep importing introduced plants that have a high risk of spreading and spending all these

resources pulling them out of the ground down the road, that's just really not an effective way to be thinking about this. We need to be thinking about the supply chain.

The knotweed example again is a good one. If it's moving through the water, it's really hard to stop it from showing up in new places. And so, this idea of the connectivity between populations of invasive species is hard to manage because people are really focused on what's going on at one single site. But if we're not thinking about the connectivity across sites, across states, across regions, I think this bigger picture is often missing in the way that we approach management.

So again, the horticulture example is a really good one where most states are really focused on what's going on within their borders, but the movement of plants is exceeding state borders.

JENNIFER: Nature doesn't care about our borders.

EVE: And neither does the nursery industry. People are shipping things. And neither does the person who is buying seeds on Amazon.

JENNIFER: Yeah, I think starting to understand each of us as individuals, gardeners, consumers, that we are operating within an ecosystem, and the effect of our actions will be felt within that ecosystem, is the part of the mind shift that needs to happen. You know, we've been working on our little part of the river for a long time, but recently we've started this new Bronx River Watershed Program, which is in coalition with a number of wonderful groups that have been working on the health of the river for a long time, including, of course, the Bronx River Alliance and other organizations.

But the health of the river is part of a much broader question about the health of the watershed. I think 20 percent of our Membership lives within the watershed. And so the actions that they're taking in their gardens can affect the health of the river, can affect the flow of invasive species down the river, can affect all sorts of things.

So this, the shift that you're encouraging within the nursery trade or, among regulators, is also something that needs to happen at the sort of human level.

Are there unsung heroes in the battle against invasive species? Are there people or efforts that we can learn from?

EVE: Well, so one example that I think is really amazing is actually thinking about aquatic invasive species. And so lakes are easier to manage in some ways because they're a closed system, right? And most of the introductions of invasive species into lakes are coming through boats and recreation.

And so, in New York actually, up by Lake George, they've done a really incredible job keeping some of their lakes invasives-free because they have a really rigorous inspection and public campaign for awareness of invasive species. So if you're bringing a boat into the lake, it's heavily inspected, you're getting a pamphlet about invasive species, you're making sure you leave with information and knowing that your boat wasn't responsible for an introduction.

And so I think that's a really cool example of a proactive effort to prevent species from being introduced accidentally through things like boats and swimmers and stuff like that.

JENNIFER: It's a beautiful example, too, of the sort of regulatory framework also improving public education about these issues, because I think we do need both.

Are there things that make you optimistic about our ability to manage, reduce the impact of these invasive species?

EVE: I think that this push for native plant gardening and thinking about how your gardens affect wildlife and other biodiversity, outside of just what's going on in your backyard is really inspiring to me.

So I spend quite a bit of time traveling around talking to garden clubs and working with people to try to think about what should be planted in your backyard if you want to have this sort of ecological benefit and reduce the spread of invasive species. And so, people's individual passion and excitement about that as a sort of new gardening practice I think is really exciting.

There's been some work by other people who've shown if you have 70 percent of your garden is native species, you're going to reap major ecological benefits. You're going to help sustain pollinator groups. You're going to help plant populations outside of your backyard and things like that.

And I think this idea of thinking bigger about what your garden could do is something I'm really excited about, and has this dual benefit of providing services

to native wildlife, but also reducing the spread of invasive species. So reducing the chance that we're accidentally introducing something that could become invasive if we really emphasize this landscaping and gardening with native species.

So that's something that I'm really optimistic about and I think that I'm seeing very slowly the horticultural industry shift towards supporting that mission and making sure that native plants are labeled at their garden center and that people are asking for native species when they show up and look for plants.

And so that's something that I think is changing, slowly but surely. I think the other thing we haven't talked about much is the interaction between invasive species and climate change and also restoration and climate change. So an example of successful or at least exciting and I think boundary-pushing restoration is a Nature Conservancy property in New York, in which they're experimenting with planting climate resilient native trees.

And so, they're starting to think about the movement of species across these broad scales. So, invasive species are certainly moving and responding to climate change, but our native species are as well. And so, when we're restoring ecosystems, we need to make sure that we're planting species or encouraging the growth of species that are going to be resilient to all of these environmental changes that we're seeing in the future.

Biocontrol is something to be really optimistic about as well. Trying to manage invasive pests by introducing something that will sort of maintain their population levels to an abundance level that's not going to kill trees, but they're going to function basically like a native species, and there's been some really successful examples of that including in the northeast.

Again, there's, winter moth is an invasive pest that's been sort of successfully controlled by biocontrol. They're working on biocontrol for a bunch of other insect pests that vary in degrees of success, but trying to figure out how to sort of manage forests in a way that if there is a pest outbreak, it's not going to completely kill all the trees, right?

So I'm making sure that we're planting diverse assemblages of trees so that if there's an oak pest, you know, we lose some oak species, but we're not going to lose a whole forest. And so I think that there's a lot of effort now to be more

strategic in the way that we're sort of adapting to these changes that I'm excited about.

And I also think the information sharing is huge for the types of things that I do where I really need people to be contributing and willing to share data so that we can take this broader look at the spread of invasive species. And there's just been an amazing effort to share information across borders, across neighbors, across, you know, countries to, to try to do a better job, making sure that we have all the resources we need to be thinking about invasive species at this broader level.

And so that's something that I'm really optimistic about. And even in my brief career thus far, I've seen, I think, some really positive change in the way that people are very receptive to new information and trying to change the way that they've approached things in the past. And so I think the momentum is there, but we still have a lot of work to do.

JENNIFER: Lots of reasons to be optimistic.

EVE: Lots of reasons to be!

JENNIFER: There is great momentum around these issues. And I think people want to do right by nature. They want to do the right thing. And, you know, one simple thing that I think people can do is when they go to purchase plants at a nursery, ask where their selection of native plants are.

You know, create that consumer demand. That's a big part of starting to shift things within that trade. You know, since you're going to be joining NYBG this year, can you talk for a moment about the relationship between botanical gardens and invasive species? What role can botanical gardens play in identifying, managing, sharing information about invasive species?

EVE: Yes, absolutely. Some other folks have written a paper recently calling botanical gardens the sentinels of change. So botanical gardens as these entities that are on the forefront of the way that people are interacting with plants and the way that plant communities are changing, and being sort of a hub and a place with information and resources that can really help us get on the leading edge of the way that we're thinking about what our plant communities are going to look like in

the future. And already what they look like now, and especially for gardeners thinking about what plants should we be planting?

I think that botanical gardens are a great way to ask some of these questions in a really unique setting and like you said, the Forest at the Botanical Garden is a cool place to think about what invasive species management strategies are most effective.

What are these climate resilient species that are showing up and what's persisting as we've sort of changed the landscape based on human activity and climate change and all these other things? Also, just the wealth of the collections research; the records back through time. So something I'm really interested in looking at more is how we can use sort of past trajectories of invasive plants to think about the future.

So we have, based on the Botanical Garden collections, information about horticultural trade that goes back 100, 200 years. Where species were planted, where they were sold, and how that sort of relates to what we have now in terms of our understanding of their distribution. So thinking about those relationships back through time using resources at the Botanical Garden I think can be a really powerful tool for looking forward into the future.

And then also just thinking about botanical gardens as a network of sites with similar priorities in terms of helping people understand the diversity of the plant world and interact with that, I think is a place where people can learn about their impact and their garden's role in, in nature and biodiversity.

And I think it's just the perfect setting to have that impact on what our ecosystems could look like moving forward and the role that gardeners in particular can have in sort of shaping that. Which historically hasn't always been positive when you think about the spread of invasive species, but like I said, I think there's a lot of momentum for sort of rewriting that narrative and taking this sort of proactive role in contributing positively to the biodiversity that's outside of our managed landscapes.

JENNIFER: I love that idea of botanical gardens as sentinels for change. It's wonderful. It's wonderful. And Eve, it's been wonderful speaking to you. We're thrilled that you're joining us here at the New York Botanical Garden, and I look forward to working with you.

EVE: Thank you so much. It was a pleasure chatting with you.

JENNIFER: To identify invasive plant species where you live, the free iNaturalist app is a great resource. Listeners in New York can use the app to join the New York City EcoFlora Project to help document and protect native flora and fauna. We'll have a link in our show notes on how to get involved. Not in New York City? Searching online for a local citizen science project is a great way to find out what's happening in your area.

In our next episode, my guest will be Marc Hachadourian, Director of Glasshouse Horticulture and Senior Curator of Orchids at NYBG. He'll talk with us about plant care and elevate our understanding of houseplants, including how their cultivation impacts the environment.

Thanks for listening to Plant People. We're excited to bring you more stories about plants and the people who love, study, and care for them in new episodes dropping every two weeks.

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