

## **AUDIO: "The Fall of the Torreya and What Is Being Done so Save it"**

Episode 237 of "In Defense of Plants" Podcast, 3 Nov 2019

Link to Episode 237: <http://www.indefenseofplants.com/podcast/2019/11/3/ep-237-the-fall-of-the-torreya-amp-what-is-being-done-to-save-it>

JENNIFER CESKA (of the State Botanical Garden of Georgia, and one of the founders of the Georgia Plant Conservation Alliance)

... was interviewed by [Matt Candeias](#)

Matt is a 4th year PhD in NRES (University of Illinois). He works at Dr. Jen Fraterrigo's landscape ecology lab, studying how herbaceous communities are structured in the southern Appalachian Mountains, and how these extremely diverse communities may respond to accelerated climate change, with the aim of improving plant conservation efforts.

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### TIMECODED TOPICS of this hour-long program

(list created by Connie Barlow, with transcriptions of key passages):

13:25 - Torreya discussion begins here

16:53 MC: What happened to the Torreya? Why did it crash?

17:04 JC: ... In early days, the story we told was ... perhaps it was due to changes in the environment... all anecdotal ... In 1995, we thought we were taking the Torreya away from the disease [by planting it ex situ in n. Georgia]. [lists planting sites, including Smithgall Woods State Park] ... It was a big deal taking the species out of its range. ... signed agreement ... we would plant them in cultivated areas, not in wild sites ... we knew so little back then.

20:30 JC: The story changed once we got more science in there. [via the ex situ plantings] we find that it likes afternoon shade, and so we need to ensure that it gets some sunlight in those ravines but definitely afternoon shade. It is remarkably drought tolerant once established.

22:22 JC: So the trees did not cone in the wild or very few did. ... [rooted branchlets from the wild grown ex situ finally were able to show the sex of each of the wild genotypes collected]

23:20 JC: [when seeds were produced, now had to learn how to grow them from seed; used scarification of seeds; metal cages]

24:21 JC: We learned how to make them thrive. [Early clones were all rooted branchlets, so never grew like a tree, but grown from seeds they do take a tree form. ... people tried to direct rooted branchlets into apical dominance "but they just wouldn't"]

28:31 JC: [Recent debates about whether "commercialization of endangered plants" was helpful for the plants] ... Torreya was the godchild; you could grow an endangered tree in your garden and it's a beautiful horticulture tree ... that document never saw the light because we learned from Jason Smith at the University of Florida [what the pathogen was]

30:03 JC: ... We thought we were taking the torreya away from the disease; we thought this was in the soil. We thought it could be introduced or always been there. Well, no. It's in the torreya; it is part of torreya. He named it; it's a fusarium named for torreya. It's in all of its tissues; it's passed from mother to child. And if the tree is healthy, everything's fine; they live together. But if the tree is weak in some way horticulturally, then this fusarium can express and it can spread. And in the lab Jason Smith has learned, he's done inoculations in the lab, that it can jump in the lab to different plant families.

30:48 JC: So we had these conversation in '95, these triple promises that we would track and monitor and check for disease and plant in cultivated areas. But we brought the disease up here. We brought the disease to our botanic gardens. Now, our trees are healthy; that is something we are very careful to track. But that means we brought the disease up here. So, no: The Georgia Plant Conservation Alliance is not going to produce plant material or share plant material for production because we don't know. There's so much we don't know about critically imperilled plants, and torreya is the example that we refer to. So we have been on hold to that for a good fifteen years....

31:44 JC: We've gone back to our partners [like in Gainesville GA] ... and I said, 'You know that collection you planted 18 years ago as a partner and we were so grateful that you planted that grove of torreya, and it is in a cultivated area, but it is next to your woods: you need to know. And so now their board is. They still have them. But they had to go have a conversation about that. And if they decided that they needed to remove those trees, I would have respected that and understood. Because they have a responsibility to the natural areas that they are restoring and protecting as well.

32:21 JC: So, yes, the story changed. And, thank goodness that we did track them everywhere that we planted ... that we know whose who and where, that we know the health of those trees, and if we do see a problem we would remove and burn that material.

33:09 MC: ... The crazy part of this is that it's in the tissue of the plant, all the tissues and it's something that it can coexist with, this fungus, right? But what's it doing in there? I mean, why would you have something that can coexist and then become pathogenic as soon as the tree gets weakened?

33:25 JC: Yeah, how is this adaptive? ... It's fascinating to think through. So you're protecting two organisms when you safeguard them at your botanical garden? I know! It's very strange.

33:48 MC: So you have this potential pathogen living within the tissues, but something has to weaken the tree first which blows up this idea of what was going on around that time period? ... What happened to suddenly flip that switch and all of a sudden those trees were just collapsing like crazy?

34:15 JC: I can only imagine how shocking that must have been... It's like Dr. Seuss wrote the story, you know, I'm the Lorax and I speak for the trees. ... you talk about a red flag in the environment: There's your red flag. Something is terribly wrong here.

36:06 JC: And then there's more: Hurricane Michael. [describes the destruction in Torreya State Park and various institutions that gathered to clear away the debris from the remaining small torreyas.]

38:55 JC: But someday, our partners, we could plant torreya back [into Torreya State Park] because we have that material.

42:18 JC: We could hedgerow these plants. We could grow them as hedgerows. And know that the indexed individuals in that hedgerow, and they grow beautifully.... they want some shade, they want some sun; afternoon shade is merciful, especially in the south ... we like to plant them on slopes because they like to receive water but they want the water to leave; they don't want to be sitting in water; they want quickly draining soils, nice quality soils. We're not planting them in our red clay; we're planting them on good healthy slopes. And they thrive. They thrive on neglect. They just needed someplace to grow. Now, why that can't happen around Chattahoochee Florida, you know, it still boggles; lovely soils there; the slopes are there; the light may have changed. I don't know. The paper mills are since gone. ... That they can't survive in the wild: there's still a piece missing for sure.

50:14 JC: [describes problems of safeguarded torreyas getting too big for their pots or their raised beds] — so we need to figure out a hedgerow system ... we need to locate secure places, appropriate places, cultivated places where we can hedgerow them. ... because they are busting their seams in their collections. They take pruning well. We take cuttings and start another if a specimen gets too large [for maintaining health in its current location/pot]. Finding some places where we could put them in the ground would really help for their care. So we're working on that.

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PREVIOUS TEXT POST BY MATT CANDEIAS ON FLORIDA TORREYA;

- 28 June 2016 (text) - "[Saving the Stinking Cedar](#)"

EXCERPTS: ...We call it a cedar and it looks a lot like a yew but it is neither. *T. taxifolia* belongs to a small family of conifers called Cephalotaxaceae. Most members of this family are restricted to Asia but *T. taxifolia* is native to a very small region of northern Florida and southern Georgia. It was likely pushed that way by the glaciers. Limited seed dispersal kept it from returning to its former distribution. Today, what few trees remain can be found growing in wooded ravines and north-facing slopes. ... This has spurred quite a debate among the conservation minded among us. There are those that feel the only way to save this species is to transplant it to areas outside of its extant range. This has been done in a variety of locations farther north. These plants seem to escape the blight that killed their relatives farther south. Such assisted migration is not a new topic. It is something we have been mulling over for quite some time. With rapid climate change causing accelerated shifts in habitats around the globe, it would seem that for endangered species like *T. taxifolia*, assisted migration is the only hope. Others caution against such logic. Although it is highly unlikely that a species such as *T. taxifolia* would ever become an aggressive invader, many feel that it nonetheless sets a dangerous precedent. There is no way to predict how species are going to behave in a new habitat. An endangered species from one region may very well become an aggressive invader in another. Still, at the rate that we alter our environment, the debate seems to cloud our judgement on this issue of habitat conservation in general. *T. taxifolia* is but one species that is teetering on the edge of extinction.