

Threatened Tree Species

Tree Species (Jay Cude, Steve Barilovits, Kim Steiner, Bill Powell)

<https://globaltrees.org/threatened-trees/#main-content>

Coast Redwood, *Sequoia sempervirens*

Franklin Tree, *Franklinia alatamaha*

Fraser Fir, *Abies fraseri*

Georgia Oak, *Quercus georgiana*

Giant Redwood, *Sequoiadendron giganteum*

Hawaiian Cotton Tree, *Kokia drynarioides*

Seaside Alder, *Alnus maritima*

Stinking Cedar, *Torreya taxifolia*

Whitebark Pine, *Pinus albicaulis*

Critically endangered oaks in US: <https://globaltrees.org/resources/resource-type/red-list/>

Quercus boyntonii Beadle

Quercus graciliformis C.H.Müll.

Quercus hinckleyi C.H.Müll.

Threatened Tree Species

Dr. William Powell, SUNY Comments

(1) Sudden Oak Death: Oaks & Tanoaks in CA and OR and possible oaks all over the US. *P. ramorum*

Good choice. Oak species are super important. If and when we find a gene for PRR in chestnut, it might be applicable to SOD. This would be high on my list.

(2) Pitch Canker: Monterey Pine

Known as Radiata Pine in New Zealand, South Africa, South America (where it is grown as a crop). Fungus. We don't have experience with pines, but maybe Scott Merkle does. This would be low on my list.

(3) Dogwood Blight: Many species of dogwood. Caused by the anthracnose fungus.

A possibility. My understanding is that there is some natural resistance in the population, so a breeding program might be enough. So not as low as pines, but still rather low on my list.

(4) Blister Rust: Western White Pine, and to a lesser extent, Eastern White Pine. Fungus

As above, we don't have experience with pines. This would be low on my list.

(5) Butternut Canker: Butternut. Fungus

We have done a little tissue culture work with butternut in the past. Good candidate for our cloned candidate genes. We will be testing the chestnut baby boom gene on butternut this year to see if we can expedite transformations or gene editing. High on my list.

(6) 1000 Cankers: Black Walnut. Fungus

Interesting disease. If we have success with butternut, we should also work with walnut. High value tree. Our cloned genes are good candidates. So fairly high on my list.

(7) Beech Bark Disease: Beech. Fungus

Complex insect/fungal disease. But an important tree and tissue culture shouldn't be too difficult. A medium priority on my list.

(8) Dutch Elm Disease: American Elm. Fungus, spread by a beetle.

Already working on this tree. DED is already being solved with breeding, but there is still elm yellows. We are focusing on this. High on my list.

(9) Unnamed Decline: Red Bay and Sassafras, among many others in the laurel family. Fungus

Not familiar with this disease. So I don't know it would fall until I do more study.

(10) Hemlock Decline: Eastern Hemlocks (American and Carolina). Insect, woolly adelgid.

Threatened Tree Species

Dr. William Powell, SUNY Comments (Continued)

Very important tree, but we have no tissue culture experience with it, and it is an insect pest. I would put this low to medium priority on my list.

(11) Ash Decline: All species of Ash. Insect, Emerald Ash Borer

Also an insect pests, so getting into different genes. Important tree. For my work, a medium priority only because it would take more work. There was advances at Purdue, but it might have been shelved.

(12) Citrus Greening: All citrus fruit crops. Bacteria, spread by a psyllid insect.

Way too much competition. Many labs are working on this.

Hope this helps. The priorities are only for my lab. Other labs might rank differently.

Cheers,
Bill

Threatened Tree Species

Why focus on other tree species and conservation groups?

One of my (SFF) major talking points is that we need to set the template for restoration of other imperiled species. And I've heard both the ash and hemlock folks say they are following our lead on this.

Documenting the impact and threat to eastern forests:

1. Jim Searing sent me an excellent paper (attached) which covers the influx of exotic pests and diseases into the US. Figure 3 is the most telling – the number of exotic invaders has increased exponentially in the past several decades, and far more than is documented in any other region.



BoydFreer-SmithGill
iganGodfrey2013Sci

2. The other good resource on the threats our forests face is the recent article by Gabriel Popkin: <https://www.nytimes.com/2021/02/06/opinion/epidemic-invasive-species-trees.html>
3. And a recent paper/resource that's making the round is this: https://www.eurekalert.org/pub_releases/2021-04/ufs--nfs040821.php which clearly shows the threat to eastern US forests is far more substantial than any other area of the US.
 - a. *Not an inclusive list, but two good bullets from this pub:*
 - i. The most damaging invasive forest insects in the region include gypsy moth, hemlock woolly adelgid, Asian long-horned beetle, and emerald ash borer.
 - ii. There are many significant invasive diseases of trees, including chestnut blight, white pine blister rust, beech bark disease, Dutch elm disease, butternut canker, and oak wilt.

This problem will not get better anytime soon.

Yes, it is important to save the American chestnut tree by its own right. But we need to succeed so that our other native trees species in peril can also be rescued and restored.

Ah – here's another excellent resource building on the underlying data presented in the 2013 paper Jim sent me:

- Lovett et al 2016 Nonnative forest insects and pathogens in the United States: Impacts and policy options

<https://esajournals.onlinelibrary.wiley.com/doi/full/10.1890/15-1176>

These papers build on a data set accumulated in 2010 in this paper:

- Aukema et al 2010 Historical Accumulation of Nonindigenous Forest Pests in the Continental United States

<https://academic.oup.com/bioscience/article/60/11/886/328949>

The 2016 paper has a good list of the worst invaders to the forest.

It might be worthwhile, and I can help with this, to put these all together and forward back to folks like Jay, Kim, and even include Jim Searing since he seems particularly interested in all this. Would be a good deliverable to come out of the P&O meeting from the other week.

And would probably make for an excellent Chestnut article, too.