## **BEDFORD + BOWERY** Reviving the American Chestnut From a New York City Terrace



*Eight American chestnut seedlings await planting at Woodlawn Cemetery in the Bronx. When mature, they will be cross-pollinated with transgenic pollen to create blight-resistant nuts. (Photo: Meg Duff)* 

For a number of years, New York City's largest concentration of "functionally extinct" American chestnut trees grew on the 16th-floor terrace of an apartment in Manhattan. Early each spring, Dale Travis cut the tops off orange juice cartons, filled them with potting soil, trimmed the corners for drainage, and planted 12 to 20 chestnuts from doomed trees across New York state.

Most American chestnut growers have acres; Travis had a few square feet. Still, his terrace had advantages. "This high up, there are no squirrels," Travis says.

Nearly four billion American chestnuts died a century ago from blight. If they are lucky, Travis' seedlings' seedlings may be some of the first blight-resistant trees to grow in the wild.



Travis fills containers with topsoil and peat moss. He later planted chestnuts in these containers and kept them on his apartment terrace in Manhattan while the chestnuts germinated. (Photo credit: Dale Travis)

Travis, 83, belongs to the New York chapter of the American Chestnut Foundation, which is working to bring chestnuts back to Eastern forests. Once known as the redwoods of the East, American chestnuts were perfect lumber trees: quick growing, tall and fire-resistant. Their nuts fed squirrels in winter, fattened pigs, and became "shoe money" for farmers, who sold them to street vendors in New York City. Then, the blight came.

Chestnut blight, which was first discovered at the Bronx Zoo in 1904, is caused by a fungus native to Asia that likely arrived in the U.S. with imported trees. It spread quickly on the wind, making its way down the spine of the Appalachian Mountains.

By the time Travis was born in 1937, billions of trees were dead—or at least, mostly dead. At first, shoots around stumps seemed to signal a comeback. Some lived long enough to produce nuts, which people can plant.

Within a few years, though, most chestnut shoots die of blight, even if the roots survive. Because the fungus can live in other trees, it eventually finds all but the most isolated chestnuts. American chestnuts are "functionally" extinct because they can no longer play their typical role in ecosystems.

Travis studied forestry at SUNY College of Environmental Science and Forestry in the 1950s, when chestnuts were already fading into history. He graduated in 1959, went to work in paper and plywood sales, and eventually started his own sign company.

His firm, Dale Travis Associates, keeps history alive. It installed granite stripes in sidewalks commemorating each New York City ticker-tape parade since 1886. It also carved the World Trade Center cornerstone. "We're very honored to have done that," Travis says.

Three decades into his career, Travis learned that his upstate alma mater was also keeping history alive. The school hoped to bring chestnuts back with genetic engineering. Travis pulled an old textbook off his shelf and saw that as a college student, he had underlined the section about chestnuts and blight. "So that kind of made me smile," he says. He decided to get involved.

**Bill Powell**, who leads SUNY's chestnut research, says the enthusiasm of supporters like Travis has been key. "That's kind of what we run on; enthusiasm most times," Powell says. His team has been trying to make a blight-resistant chestnut since 1989. They hit plenty of dead ends before a breakthrough. If all goes smoothly, the "Darling" tree, named after early chestnut champion Herb Darling, will get all of the required federal agency approvals as soon as 2023. It would be the first transgenic tree approved for conservation in the United States.



A transgenic chestnut tree at the New York Botanical Garden is carefully pruned to keep its pollen from spreading. Federal regulatory approvals for the tree are expected by 2023. (Photo: Meg Duff)

Previous tree experiments were also named for early supporters, says Allen Nichols, who heads the New York chapter of the American Chestnut Foundation. "We had the Hinchee tree and the Henry tree," Nichols adds. "The trouble with Dale is, if we named a tree after Dale, it would be the Travis-tree."

It's a travesty of a dad joke. Still, it's one that hits close to home in the chestnut community. Dictionary.com defines "travesty" as a grotesque likeness: for years, chestnut enthusiasts have been debating which is worse, transgenic chestnuts or hybrid ones.

Soon after the blight hit, scientists started to create hybrids, breeding American chestnuts with more blight-resistant Chinese chestnuts. Their goal was to add blight resistance while keeping the American tree's prized characteristics, like its lumber quality and height.

"The American chestnut was a tall, stately tree," says Travis. "It's a very versatile species and deserves the effort to be restored." Hybridization efforts seem to have failed, however. Due to the many genes involved, hybrids that look more American are **consistently** less blight resistant, according to 2019 genetic research. While people still plant hybrids ("against my better judgement," Travis says), Travis instead recommends planting pure American chestnuts. When Powell's transgenic tree is approved, they can be pollinated with blight-resistant transgenic pollen to create blight-resistant seeds.

The transgenic "Darling 58" tree is identical to the American chestnut with the addition of just two genes. Oxalate oxidase, an enzyme found in everything from wheat to bananas, renders the blight's oxalic acid harmless.



Island Park Alliance horticulture manager EunYoung Sabazco with a small American chestnut tree. It germinated three years ago on Dale Travis' 16th floor Manhattan terrace. (Photo: Meg Duff)

Years ago, Travis says, there actually was a "Travis tree"—an early experiment that never made it out of the lab. The Darling tree, in contrast, represents years of learning. Testing found that it did not harm native ecosystems, and the Sierra Club signaled its support earlier this year.

Still, some people remain opposed. First, opponents worry that mutations or negative effects could appear over the lifetime of the trees. From this perspective, though, Powell says hybrids have a higher risk: their genetic changes are greater, like "crossing a lion and a tiger."

Even if the trees are successful, opponents worry that transgenic pollen could blow into orchards or across tribal borders to contaminate wild trees or "non-GMO" hybrids. Those concerns echo decades of activism against companies like Monsanto (now Bayer).

Monsanto's transgenic seeds, activists say, contaminate nearby fields, force reliance on pesticides, and threaten seed diversity.

The Darling tree is not intended for profit, and Powell decided not to patent it. He says contamination is preventable, since chestnuts only cross-pollinate within 1,000 feet. If approved, he hopes the tree will encourage similar conservation efforts.

"We need all the tools, including [genetic engineering], to maintain the health of our forests," Powell says, citing growing threats from pests and pathogens, exacerbated by climate change.

Opponents fear the transgenic chestnut could instead set a precedent for transgenic timber, not yet approved in the United States. Companies that supported the chestnut are also engineering timber trees to grow more efficiently in tree plantations. From above, tree plantations look like forests, but they don't support similar biodiversity—a true travesty. Activists expect that by making them more profitable, transgenic trees will help tree plantations expand. Ironically in this case, planting trees may actually speed deforestation.

The Darling tree is designed to withstand blight, not pesticides or life as a row crop. If this transgenic tree is approved, the plan is to breed it with natural American chestnuts to add blight resistance while maintaining genetic diversity. That's where Travis' seedlings come in.



A chestnut tree

that Dale Travis planted in the Thain Forest at the New York Botanical Garden is now around six years old. It will likely die of chestnut blight but is blight-free at present. (Photo: Meg Duff)

Before Travis stopped growing trees (so that he could travel, though the pandemic foiled those plans) he gave seedlings to anyone who asked, from the woman who cleaned his building to the New York City Parks Department. He hopes these seedlings will eventually be crossed with the transgenics.

"It's exciting to me," Travis says, "to have people that call me because they want to get involved, they want to plant a chestnut."

Now that Travis isn't growing trees anymore, the largest concentration of American chestnuts in New York City is in a former horse barn at Woodlawn Cemetery in the Bronx. There, Herb Landmann is growing eight seedlings, each in a gallon pot, in front of a cracked window pane.

Most surviving American chestnuts grow in suburban and rural areas. Nichols, of the American Chestnut Foundation's New York chapter, estimates he's mailed out 7,000 seeds this year. His orchard, near Oneonta, has hundreds of pure American chestnut trees.

The Thain Forest at the New York Botanical Garden, one of the city's largest urban forests, has just four American chestnuts. Three are transgenic, planted under strict pruning guidelines so they don't spread transgenic pollen.

The other is a pure American chestnut that Travis planted five years ago. It is one of two of his seedlings still growing in New York City; the other is on Randall's Island.

"Reaching for the sky to get a share of the sunlight," he wrote in an email. "The blight has yet to find it."