



This supercharged tree might help fight climate change

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Part of the issue with catastrophic climate change is that, by some measures, an incredible amount of damage is already done. Even if all the coal-fired power plants were magically turned into wind and solar overnight, and all our cars were electric, all the greenhouse gases that we pumped into our atmosphere for 200 years would still be there.

Trees could, theoretically, help fix that. As they grow, they absorb carbon dioxide from the atmosphere and, long story short, turn it into wood. But many trees only grow a foot or less per year. To not just halt climate change, but actually reverse it, someone would have to invent a tree that can grow much, much faster.

Living Carbon, a San Francisco-based company, says it's done exactly that.

The startup says it's genetically modified hybrid poplar trees to grow faster so they'll absorb more carbon dioxide and help minimize the damage of climate change. Carbon dioxide has grown rapidly in the atmosphere since the beginning of the Industrial Revolution, leading to extreme climate effects.

The startup says it edits the genes of the trees to speed up photosynthesis, the process that plants use to make food from carbon dioxide and water. This enables the trees to grow faster with the extra energy, according to the company.

In one case, a tree it modified accumulated 53% more mass during five months of growth, according to a report Living Carbon published earlier this year. Living Carbon says this translates to about 27% more carbon being captured. The findings are a proof-of-concept, so they will need to be proven to hold up over the long term of a tree's life, and at a scale large enough to have a significant impact on the climate.

Living Carbon plans to plant about 4 million trees by 2023, and it has already done test plantings on abandoned mine lands. Living Carbon says if it doubles its existing acreage of planted trees every year, by 2030 it will have removed 604 million metric tons of carbon. That's 1.66% of global emissions in a typical year, according to Living Carbon.

The startup, which was founded in 2019 and has raised \$15 million, plans to generate revenue from sapling sales and carbon credits it receives for its gene-edited trees.

Living Carbon's cofounders, Maddie Hall and Patrick Mellor, view gene-edited trees as a way not only capture carbon but also restore damaged land. Hall previously worked as an investor focused on climate change and biotechnology. She met Mellor at the Foresight Institute, a non-profit focused on technology, which he was involved with as he focused on climate stabilization.

"About 75% of land worldwide has been degraded due to human activity," Hall told CNN Business.

"How do we develop species that would be able to actually capture carbon on those pieces of land? You need biotechnology to do that."

Brazil saw record Amazon deforestation in the first half of 2022. In the US, the Midwest has seen 150 years of deforestation that impacted forests built over 8,000 years since the Glaciers retreated.

"What took millennia to accumulate took less than two centuries to remove," the university scientists, who were funded by the National Science Foundation, wrote in a study this month.

Another potential benefit of gene-edited trees is that their roots will grow faster, which could help to more quickly address soil erosion in deforested areas.

Living Carbon is among the startups trying to leverage "synthetic biology," in which humans program cells like they have long programmed computer chips and software to complete tasks.

Living Carbon says it chose to work first with hybrid poplar trees because its genome was already sequenced and they're grown in academic and research contexts. Hybrid poplars seemed to be a quicker way to demonstrate their idea could work. They say they're also working with Loblolly pine trees.

But using trees to capture carbon isn't a cure all. Eventually, trees die and their carbon is released as they decompose.

Living Carbon says it's focusing more than half of its research on slowing biomass decomposition to account for this, and its seedlings can also be harvested for durable wood products, which delays decomposition.

Kent H. Redford, a conservationist and consultant who wrote a book, "Strange Natures," about synthetic biology, told CNN Business that modifying trees has potential, but that much remains unknown. There are reasonable concerns, including whether genetically modified trees could become unwelcome, invasive species. Conservationists should engage technology creators to see if there are ways their ideas can work socially and economically, he said.

He added that conservationists are failing at preserving biodiversity, so they must be open to considering new tools, while also avoiding hyperbole.

"They're here and they'll stay," Redford said of tools like synthetic biology. "We must talk to the public without turning it into a litany of either 'this is the world's best solution,' or this is the world's worst idea.' "

Source: <https://edition.cnn.com/2022/07/15/business/living-carbon-gene-edit-trees/index.html>