

## Loess Hills plot may be butternut trees' salvation

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At several sodden plots in western Iowa's Loess Hills, hundreds of ordinary-looking saplings, gangly and naked in the winter, stick up from the ground.

Their only noticeable attribute is the plastic tubing that protects them from foraging rabbits and deer.

A genetic treasure doesn't have to look impressive.

The saplings in these plots, some 750 butternuts, are being preserved in the Loess Hills State Forest as a hedge against the species' extinction. A fungus known as the butternut canker is steadily eliminating the tree from its natural habitat, the eastern United States. Butternut has become one of that region's most endangered hardwoods.

Eastern Iowa, the butternut's westernmost range, has seen its population decline by 90 percent over the past 20 years, according to the Iowa Department of Natural Resources.

"Your little plot of land in Iowa matters hugely," said Jeanne Romero-Severson, a quantitative geneticist and associate professor of biology at the University of Notre Dame in Indiana. "It is saving the gene pool from becoming extinct."

Romero-Severson and her students at Notre Dame conducted DNA testing to be sure each sapling planted in the Loess Hills is authentically native to the United States.

The saplings in the Iowa orchard come from trees in Iowa or in the Northeast, said Aron Flickinger, special projects forester for the Iowa Department of Natural Resources.

The Loess Hill butternuts were selected from parent trees that appear resistant to the fungus, Flickinger said last week while packaging branches from Iowa to send to Romero-Severson for molecular analysis.

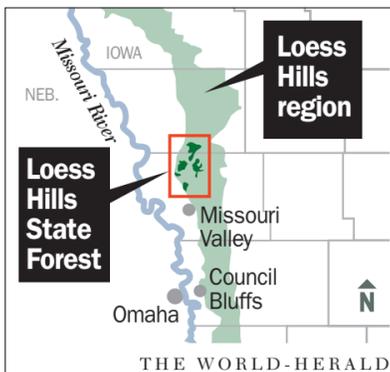
"I just hate to see us lose a tree," Flickinger said. "And the butternut is an underdog. This is kind of like conserving trees from extinction."

The effort to preserve the butternut is the result of hard-won lessons from the virtual loss of other species of trees and the potential afforded by genetic research, Romero-Severson said.

Chief among those lessons was the potential importance of isolating and growing specimens from whichever trees appear hardiest.

That's one reason the saplings in the Loess Hills State Forest's orchard come from several states across the country. No one yet knows what genetic research will yield.

This butternut program, she said, likely will serve as a template for protecting other



species sure to be under threat in the future. Of immediate concern is the economically important black walnut under assault from a different type of fungus.

The research is being undertaken by several states and the federal government.

A cousin of the black walnut, the butternut is also known as the white walnut. Like the black walnut, its wood is prized for carpentry and its nuts are edible, though more buttery tasting than the black walnut.

The fungus killing the butternut appears to be an exotic, although no one is certain where it came from, Romero-Severson said. It was discovered in the United States in 1967.

Sandra Anagnostakis, an agricultural scientist at the Connecticut Agricultural Experiment Station, said the canker acts much like a cancer.

"It kills a tree by expanding itself," she said of the disease. "The tree fights against it just like humans' natural defenses fight against cancer. Sometimes that works, sometimes it doesn't."

The canker is spread through spores typically transported from one tree to the next by rain splashes or insects.

Butternut is but one example of native tree species under assault.

"It's extremely important that we maintain diversity, that's the thing that people lose sight of," said Anagnostakis. "They will say 'Oh, well, we don't need that tree, it's not an important tree.' Pretty soon something will come along and it will turn out that that tree is the resistant one."

Anagnostakis has worked since the late 1960s to preserve tree species and is an expert in the effort to protect the chestnut.

She is searching for a natural way to slow the fungus, much as ladybugs are a natural control for aphids. She said a natural control



These 3-year-old butternuts are among the 750 or so being cultivated and preserved at the Loess Hills State Forest.

has been found for chestnut blight, and the hope is that something similar can be found for the butternut.

"It's not perfect, but it allows us to keep trees alive. They can't compete in a forest, but we can keep them alive in an orchard, where we can do breeding experiments," she said. The goal is to develop a tree resistant enough that it can survive on its own.

The Loess Hills orchard is tended by area forester Brent Olson and his staff.

Olson said he can envision a day when the Loess Hills becomes an orchard for other at-risk species. The butternut trees share the orchard with black walnut offspring selected from prized specimens.

Romero-Severson, the geneticist, said saving the butternut or other species will require commitment. Research to unlock the secret of why some trees are resistant, and then to breed that resistance into a larger population, takes time.

"If we have the political will to fund the effort, those native butternuts will be there in western Iowa," she said. "If this effort hadn't been done, they might have gone extinct. Then there isn't anything we can do. Extinction is forever."