

Scientists breed hazelnuts as the next cash crop for Midwest farmers

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From a hill surrounded by the thawing mud of empty cornfields, farmer Chris Gamer leaned over a 1-year-old hazelnut bush.

"This makes me really happy," he said, holding a catkin—a cluster of pollen no bigger than the tip of his thumb—dangling off an otherwise barren branch. "A year-old plant and it's showing catkins."

One of dozens in a row of identical knee-high 1-year olds, the hazelnut bush on the southern Minnesota farm is the product of untold generations of breeding. It's a cross designed to produce a nut that replicates the size and taste of hazelnuts honed over the centuries by ancient peasant farmers of eastern Europe while retaining the hardiness of a wild and resilient American cousin.

And it's the subject of an ambitious effort to convince farmers to plant one million of the hybrid hazelnut bushes across the Upper Midwest, using the plant's deep roots to prevent the runoff of soil and farm chemicals while giving farmers a new source of income.

Are the hazelnuts ready?

Gamer, who is leading an effort called the Million Hazelnut Campaign, is betting they are.

Unlike soybean farming, which often leaves vast fields bare during some of the wettest times of year, wild hazelnut bushes—which are native to the area—have deep roots that could end much of the erosion and fertilizer runoff flowing into streams, lakes and rivers.

Hazelnuts can also be raised among other crops or wild grasses, offering acres of habitat for bumblebees and other key pollinators brought to the brink of extinction by intense use of pesticides and loss of grass, clovers and flowers.

They also have the potential to make a lot of money.

The Million Hazelnut Campaign, primarily in Minnesota and Wisconsin, is part fundraiser and part publicity effort. For every \$7 raised, the Main Street Project and a handful of other environmental nonprofits will buy a seedling, plant it on any farm that signs up and provide weed control for the first year.

"To me, this is all about soil health," Gamer said. "I'm a father and grandfather so I'm worried about this."

Gamer is hardly alone in recognizing the environmental and economic potential of hazelnuts, and the growing desire to replace soybeans as a major crop of the northern Midwest.

The Universities of Minnesota and Wisconsin have been researching the elusive replacement crop for years. They teamed up in 2007 to create the Upper Midwest Hazelnut Development Initiative—funding research to breed and clone hybrid hazelnuts and scale up a market to make them financially feasible for farmers.

Hazelnuts remain one of the most popular nuts and flavoring ingredients in Europe but they've never been readily available in the United States, said Jason Fischbach of the University of Wisconsin, who co-leads the development initiative.

"Worldwide demand for hazelnuts is expected to double in the next 10 years," he said. "Some of that is because of almond fatigue. You find almonds everywhere, but hazelnuts can be hard to find here."

A VERSATILE CROP

Some of that expected growth comes from the versatility of the nuts. With their high protein and oil contents, hazelnuts make for a better animal feed and biofuel ingredient than soybeans, and most soybeans

grown in Minnesota end up in livestock troughs or ethanol. The high oil content makes them valuable for cooking oils and hand lotions.

The more potential uses a crop has, the better its potential market for farmers, Fischbach said.

The U and UW estimated in 2017 that a fully mature hedgerow of hazelnuts would net between \$3,400 and \$4,200 an acre, with whole nuts at a market rate of \$2 per pound.

The average net return over the last 10 years for soybeans in southern Minnesota is just under \$71 an acre, according to the U's Center for Farm Financial Management.

That hazelnut price would be expected to fall the more they are introduced to the market. The larger problem is getting the hazelnuts to full maturity. It takes about four years for the plants to even start producing nuts and start-up costs can be significant, Fischbach said.

That could present a major challenge for the campaign. Farmers tend to be conservative: Before they will gamble the family farm and hundreds of thousands of dollars of expensive equipment, they usually want to know they'll have a dependable return on their investment.

Plus, hazelnuts can be a headache to grow.

Just about every hazelnut now sold or wrapped up in a candy bar—99 percent of them—are grown in Turkey. They grow taller there than in North America, with larger nuts, more nuts and a flavor much of the world has grown to expect. Turkish farmers let hazelnuts fall naturally to the ground where they're vacuumed up, then cleaned and processed.

The European plants can't handle a tough Minnesota winter or survive a

North American fungal disease known as Eastern Filbert Blight. North American hazelnut bushes are immune to the blight and survive winter.

But unlike the European bushes, the North American hazelnuts don't produce the consistent sizes, numbers and quality needed to be processed by machines.

Enter the breeders.

Efforts to crossbreed the hazelnuts, mostly led by retired or hobby farmers, have been ongoing since the early 1900s. These farmers essentially did what trained chefs and architects have been trying to do here for generations: blend Midwestern hardiness with European taste.

They produced a plant that has North American fungal resistance and grows a European nut. The problem is, the nuts can still be of various sizes and qualities. Even cloned hazelnut bushes, with identical genetics, can grow up as differently as branches on a tree, said the U's Lois Braun, co-leader of the development initiative. Braun has spent the past 12 years selectively breeding and trying to clone the hazelnut bushes to get consistent production, a process she equates to trying to lock down the entire genetic history of a feral cat.

Her work is complicated by the fact that it can take five years to figure out if a new hybrid plant is an improvement or not. And then another five years to see if the next generation is getting better. She's trying to speed things up through a process called micropropagation, which has worked well for growing blueberries on a commercial scale.

Still, hazelnuts are resisting.

"There are eight steps to it and there are problems at all eight steps," she said.

It could be another year before advanced hazelnuts are ready, Braun said. Or 10 years.

She was a little worried when the Million Hazelnut Campaign started—that it might raise expectations and then sour farmers for a long time if the hazelnuts don't immediately produce the yields they expect. But time is running out, she said, and the environmental benefits are needed.

ENVIRONMENTAL BENEFITS

Gamer, who is growing hazelnuts on small farms in Northfield and Faribault, is also focused on the environmental benefits.

Tall, thin and soft-spoken, he drives a pencil yellow Ford Focus that has "only 175,000 miles" on it. He spent 20 years selling and installing solar panels, at a time when it was almost prohibitively expensive for most people and businesses to switch to them without subsidies.

But he's watched those costs come down drastically and now the solar industry has taken off to a point where Gamer thinks he is no longer needed.

There is a darker, more frightening reason that Gamer and scientists like Braun are interested in cultivating the hazelnut:

Unlike almonds and most other crops grown in the United States, hazelnuts do not need pollinators. If butterflies and bees continue to die away, hazelnuts can survive—their catkins carried by the wind.

"It's hard saying 'wait, wait,' with all these problems the world is facing," Braun said.

"Eventually, the only way to succeed is to try."

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