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UC looks into growing more millet in California

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At the UC Tract Gill Community Farm in Albany, above, Amrita Hazra, foreground left, and Pedro Goncalves plant seedlings of teff, a type of millet often used in Ethiopian cuisine for making injera, a traditional bread.
Photo/Patricia Bubner

At the UC Tract Gill Community Farm in Albany, above, Amrita Hazra, foreground left, and Pedro Goncalves plant seedlings of teff, a type of millet often used in Ethiopian cuisine for making injera, a traditional bread. At right, in the same field last year, these 9-week-old plantings of Japanese barnyard millet were subjected to different irrigation scenarios: The far right row received no

irrigation after germination; the middle row received no irrigation two weeks after germination; the left row was fully watered.
Photo/Patricia Bubner

Millets come in different shapes and sizes. The collection shows various millets used for human consumption, animal fodder and birdseed.
Photo/Amrita Hazra

The seed head of Japanese barnyard millet emerges, here at about 13 weeks of growth.
Photo/Amrita Hazra

Although wheat, rice and corn continue to be the most widely grown cereal grains in the world, University of California researchers are trying to promote a lesser-known grain they say packs a nutritional punch and requires little water to grow.

The UC researchers are in their second year of testing how varieties of millet perform in different California soils and microclimates. Millet refers to a number of small-seeded grasses that have been widely cultivated and consumed in many regions of the world, including Africa and Asia. In this country, the ancient grain has largely been under the radar, used primarily for bird feed.

The UC Millet Project is working to change that, with hopes of expanding farmers' grain portfolio—and diversifying American diets.

Patricia Bubner, a postdoctoral researcher at UC Berkeley and a member of the Millet Project team, described its goals this way: "On the one hand, create a market for it, and on the other hand, have farmers grow it and realize what a great grain it is to grow."

Another team member, Amrita Hazra, first had the idea for the project in 2014 when she was doing her postdoctoral research in plant and microbial biology at UC Berkeley. Ever since moving to the U.S. from India in 2005, she said she was "surprised and saddened" by what she perceived as a lack of diversity in the ingredients of U.S. food products.

California's multi-year drought got her thinking about the millets that were available in India but not here. Many millet varieties, she noted, are known to be drought-tolerant, easy to grow, with low input requirements and decent yields. With farmers looking for alternative crops to grow, "millet makes for a good crop to experiment with, as it has a short growing time and is low maintenance," she said. In addition to being food for humans and birds, millets can be used for grazing or cut for silage, she noted.

A $24,000 grant from the Berkeley Food Institute provided the initial funding for the Millet Project. Last year, researchers experimented with four different types of millet: proso, foxtail, pearl and Japanese barnyard. This year, they've added teff and finger millet to the mix, after learning there is local demand for it from Ethiopian restaurants that use it in making injera, a traditional bread.

Bubner said the market is growing for alternative grains such as millet. She said proso millet is already being grown in other states such as Colorado, the Dakotas and Nebraska, with most of it exported to Europe and Asia, where millet is a more-common staple. Domestically, millet may not be used as much as a main ingredient but can be found in products such as energy bars and cereal mixes, she added.

Fetlework Tefferi, who runs Café Colucci, an Ethiopian restaurant in Oakland, currently imports millet from her home country and said she would love to have a local source for the grain, which she described as good for making a whole host of baked goods and for brewing beer.

"It's very versatile," she said. "I think the market is here. I have no doubt that there's a market for ancient grains."

Because millet is naturally gluten-free, specialty bakers already use it in their products.

Greg Sawicki, general manager of Alameda-based New Bread Co., which makes gluten-free baked goods, buys proso millet from an Oregon mill that acquires it from farmers in the Dakotas. Two of his breads feature millet as a main ingredient. He said he would be "the first in line" to buy California-grown millet if it were available.

"With people discovering ancient grains and asking for more products made of ancient grains, I think this could be a very successful enterprise for California farmers and grain growers," he said.

This summer, further UC trials are underway in Albany, Davis, Bolinas, Healdsburg, Upper Lake and Parlier, building on what was learned last year, which is that "millets can be grown in many different geographical conditions," Hazra said.

At the UC Gill Tract Community Farm in Albany, researchers experimented with different irrigation scenarios, from giving no water to some plants to giving others regular irrigation. In all cases, the plants produced grain, Bubner said, although yield was lower in plants that received little or no irrigation. But compared to the fully-watered crop, plants that had limited watering grew to 80 percent of their full height without a huge difference in yield, she added.

"That was pretty amazing and showed how resilient millet is," Bubner said.

Lake County grain farmer Mai Nguyen, a collaborator in the project, said she appreciates that millet is a short-season crop—able to form grains in 90 to 110 days—allowing farmers to double-crop.

"It grows in the time period when other vegetables can't grow very well," she said. "So it's holding me over in terms of the land use: I get a cover crop, I get to suppress weeds, I get a product from it, and it didn't require a lot of inputs."

One area that could benefit from more research, she said, is in harvesting the tiny seeds, which she did by hand last year. To avoid shattering the seeds in the field, she harvested the crop before it was fully ripe and then cured the seeds indoors.

Yolo County farmer Paul Underhill, who grows millet for the bird-feed market, said using a mechanical harvester would be problematic for the varieties he grows, because the seed heads hang low to the ground. He, too, harvests his millet by hand—and sells the whole seed head intact to bird owners.

Because the plant has a shallow root system and is slow to establish, Underhill said the millet he grows is not particularly drought-tolerant. But he noted he's growing varieties with qualities that appeal to bird owners, and those qualities may not be what researchers are looking for in millet for human consumption.

Whether grown for food or feed, Underhill said farmers want varieties that yield well and are easy to harvest. He said he sees an opportunity for the Millet Project to hybridize different varieties to make them more productive.

"Farmers can use more options," he said. "If you were to grow it as a commodity, you would definitely want to have a more vigorous plant that is easier to grow."

In addition to establishing cultivation of millets in the state, Hazra said the project is working to raise money to buy equipment capable of dehulling and processing the small millet seeds. Providing this infrastructure, she said, would make it easier for California farmers to grow millet.

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