Science Societies

Student-led plant breeding initiative brings African communities in Minnesota a taste of home

By Shea Topel

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Researchers from the University of Minnesota are connecting with African community members to bring better African produce to the North Star State. From left to right: Amaranth, Ethiopian mustard, jute mallow, and spiderwisp. Vegetable photos originally from Figure 2 in Stoll et al. (2025).

A student-led team at the University of Minnesota is working with African diaspora communities to breed traditional African vegetables that can thrive in Minnesota's harsh climate. Through participatory plant breeding and deep community collaboration, the project is helping meet growing demand for culturally significant foods while reshaping how academic research partners with the people it serves.

People of African descent in Minnesota have a taste for leafy greens that aren't quite suited to the North Star State's cold nights and short summers. A student-led plant breeding initiative plans to change that. Founded in 2021, the Community Plant Breeding Team (CPBT) at the University of Minnesota aims to take four popular African vegetables—amaranth, spiderwisp, jute mallow, and Ethiopian mustard—and develop breeds that can better tolerate the local climate. Members of the CPBT laid out what they've learned so far in a *Crop Science* perspective article.

Minnesota has a large and growing African diaspora, with more than 150,000 African-born refugees, immigrants, and their US-born descendants living in the Twin Cities alone. This population has led to an increasing demand for culturally relevant vegetables that Minnesotan growers cannot totally fulfill. The few producers in the Twin Cities that sell African vegetables cannot meet this huge demand. African community members living as far away as Tulsa and Fargo will drive hours to

Minneapolis to find the food of their culture, with lines of cars waiting just for the chance to buy some fresh produce. The vegetables sell out so fast that sellers don't even have time to set up their stands, leaving many consumers to return home without any greens at all.

This huge demand prompted Rex Bernardo to recruit graduate students and postdoctoral researchers to start the CPBT. Bernardo, director of the University of Minnesota Plant Breeding Center, wanted to create special breeds of popular African veggies that could better survive Minnesotan conditions.

Building community

The CPBT integrates community members into the breeding process through *participatory plant breeding*, giving them a say in which vegetables to breed, access to fresh greens and seeds, and knowledge about topics in plant science. All the while, the students and researchers get lessons in community engagement. The fundamental lessons of the project center around the importance of building community, using inclusive language, and protecting the cultural and scientific knowledge about the plants. In just four years, the collaborative program has taught researchers and community members the kinds of lessons they could never learn in a classroom; specifically, five lessons to help its members learn how to breed plants and grow them for their communities.

Lesson 1: Prioritize relationships within the community

The Community Plant Breeding Team started out by focusing solely on the plants but soon shifted to prioritizing people. Despite having extensively researched the biology and production methods of the plants, the team's first plots failed. Most plants didn't even grow, and the researchers realized they just didn't know enough about their

breeds. To fix this, they incorporated the voices, needs, and traditional knowledge of African community leaders into the program.

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The Community Plant Breeding Team sought the help of knowledgeable community members, including small-scale producers and master gardeners, to help set priorities and goals for the team. Chidi Chidozie, chair of the Diversity, Equity, and Inclusion committee of the Hennepin County Master Gardeners, was cited as a key contact to the CPBT and provided the researchers with a wealth of information on African vegetables. Through these relationships, students and postdoctoral researchers have learned more about the traditional growing methods of the plants and their significance.

To connect with the community, the researchers host outreach events. One popular event they hosted was a 2023 open house where the CPBT showcased their research, gave tours of demonstration plots filled with African plant species, and talked with community members about their interests and needs. Today, one of the most integral parts of their outreach efforts is their community garden, where visitors can engage with the garden and take produce home. In just a few years, the gardens have grown several hundred kilograms of produce, letting local African diaspora to get back in touch with their food history, while giving those outside of Minnesota's African

population a chance to get to know these veggies, too.

Community gardens like the one pictured are unique ways to get the public involved in plant science and plant breeding. Photo courtesy of V. Bhatt

Initially, it was a challenge to get community members engaged with the CPBT. The team learned how to work with community members through trial and error. They started with email surveys but received very few responses. Initial visits to farmers markets In the Twin Cities to meet with growers weren't fruitful either. Building trust was the key to building community engagement. Historically, non-white farmers and consumers have been ignored and disenfranchised by university research and extension, which has led to a lack of trust between university officials and African community members in some cases. Listening to the needs of the community, consistent in-person engagement, and taking time to build mutually beneficial relationships has allowed the CPBT to connect more and more with members of the public. Thankfully, their efforts have led to popular events, such as the aforementioned open house, which had about 125 attendees.

Lesson 2: Language matters

The team learned the importance of language through their own name and through the plants they cultivated. The Community Plant Breeding Team originally called themselves "Vegetable Breeding for Immigrant Communities," but the name suggested that they simply served immigrant communities and didn't involve them in the process, while also leaving out natural-born citizens of African diaspora. Their new name better reflects their commitment to serving and actively engaging with all members of a broad diaspora.

Team members also learned the historical context behind many common plant names, which was sometimes problematic. Certain community members perceive the term “cowpea,” for example, as racist: African slaves brought the “African pea” to the Americas, and plantation owners used the plants to feed cows rather than people. Though “cowpea” is still primarily used amongst the scientific community and general public, team members want to raise awareness of the context surrounding its common name and stated that they would switch to using a different name if it were to be accepted by a broader scientific community.

Lesson 3: Focus efforts on a few species

The CPBT initially had a large list of species they wanted to work with but realized that narrowing their list would be a better use of their time and resources. The team is made up of many volunteers, and not all of them can spend large amounts of time working on the breeding program. So, the team picked out a few species that had the most potential for success. In 2021, the team chose spiderwisp, Ethiopian mustard, and jute mallow because they had potential to grow well in Minnesota and were desired by the community. Later, amaranth was included because of its strong demand in both African and South Asian communities.

Lesson 4: Participatory plant breeding programs can work—in the right context

Normally, breeding programs are established to develop plants with certain traits that can grow in farms across a wide variety of environments. They only utilize participatory community input towards their program’s end stages. But when considering smaller farms and communities, you need to address their personal needs and preferences first.

This program started with community input from the very beginning. This worked because it allowed the researchers to quickly identify the needs and wants of the community, which aren't always written down in peer-reviewed research papers. For example, without community input, the researchers would still be assessing the taste of fresh leafy greens when a majority of the dishes using these greens are cooked. Also, community input made the researchers aware of cultural differences within the African community, such as the way that East and West Africans cook spiderwisp differently.

A closer look at the crops

Amaranth is used as an ornamental plant, grain, and vegetable worldwide. Despite the leaves having some anti-nutritional compounds, the plant is found in cuisines all over the world as a cooked or raw vegetable. The researchers are breeding for amaranth plants with green leaves with high yields. Amaranth is also known as doodo, litoto, aleho, or callaloo.

Ethiopian mustard is grown as a leafy vegetable and source of vegetable oil throughout northeast Africa. One reason why university researchers struggle to breed it is that different kinds of Ethiopian mustard vary widely in both flowering time and spice level. Ethiopian mustard is also known as Abyssinian mustard, Ethiopian cabbage, or African cabbage.

Jute mallow is a leafy vegetable grown in Africa and Asia. It is also a major fiber crop. The leaves are often boiled to make a sticky soup or sauce served with balls of fufu or yam flower. In Minnesota, jute mallow needs a longer summer period to flower, which means that sometimes the plants don't seed before they are hit by the season's first

frost. Researchers are also struggling because current jute mallow breeds have a shelf life of only 2-3 days, which makes it hard for commercial sellers to start selling it. Jute mallow is also known as molokhia, ewedu, nalta jute, tossa jute, or Egyptian spinach.

Spiderwisp, a vegetable native to sub-Saharan Africa and Southeast Asia, provides many cultural and culinary services. The leaves and flowers are used as a leafy green side dish or are boiled for stews. Spiderwisp grows in many different habitats but has poor seed quality. In Minnesota, spiderwisp flowers early in the season, which leaves a very short window of time for harvesting. Spiderwisp is also known as spider plant, cat's whiskers, spider flower, chinsaga, or African cabbage.

Lesson 5: Knowledge and breeds can easily be lost

The genetic material of different plant breeds can die off over time due to bad weather, hungry animals, and poor plant growth. Because there aren't many commercial sellers or seed banks of these plants, it becomes incredibly important for the CPBT to keep their seeds stored and safe. In a similar vein, cultural knowledge of these plants can be lost just as easily. Immigrants can often struggle to connect to their culture and traditions when they move to a new country, and agricultural traditions can be lost after even a single generation, especially when resources are limited. But by sharing knowledge and resources, cultural practices are maintained across time.

Community makes us—and research—stronger

A few years after the program started, team members have continuously learned from their mistakes and helped others benefit from their lessons. The program has taught

students and early career plant scientists how to tackle complex problems from different perspectives and learn more about plant breeding, with the most important message being to prioritize people over plants. Community is the richest source of knowledge, and so the community and its ties should be upheld before anything else. The team members are planning to release their first African vegetable breed in the next few years and hope to extend this work to Asian and Latin American communities in Minnesota further down the line. By talking with chefs, home cooks, and consumers as well as growers, they hope to expand their reach throughout the communities they work with. Currently, the CPBT consists of 15 students, one staff member, one faculty member, and many volunteers. 61 total volunteers contributed 408 hours to fieldwork and outreach events in 2024, and the team expects that number to keep growing as the team's work and scope evolves. As demand for culturally relevant foods increases, the possibility of other such teams forming increases, and the CPBT hopes that their work can inspire others to make more programs that build bridges across cultural divides all throughout America.

Dig deeper

Stoll, H., Rebollo, I., Roberts, L. M., Docherty, L., Poudel, K., Bower-Jernigan, L., Singh, L., Ariza-Hernandez, I., Yusuf, M., Chidozie, C., & Bernardo, R. (2025). Lessons from a student-led breeding effort on leafy African vegetables in Minnesota. *Crop Science*, *65*, e70077. https://doi.org/10.1002/csc2.70077

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