Two new varieties of Orange Sweet Potatoes show promise in South Africa

by Madeline Fisher

Orange and red sweet potatoes are a common sight in grocery stores and farmer’s markets across North America. But in South Africa—where health officials want to enlist these beta-carotene-rich varieties in the fight against vitamin A deficiency—they remain rare.

That could soon change. In the July–August 2015 issue of Crop Science, lead authors Maryke Labuschagne of South Africa’s University of the Free State and Sunette Laurie of the Agricultural Research Council, describe two promising, orange varieties of sweet potato that are especially suited to the country’s environmental conditions. Registered under the names ‘Impilo’ and ‘Purple Sunset’, they’re expected to outperform orange sweet potatoes imported from the United States to combat the health problems caused by lack of vitamin A.

These include blindness and premature death, and young children and pregnant women are the hardest hit. In South Africa, a national survey indicated that 44% of children younger than five are vitamin A deficient. Across the African continent as a whole the number is estimated at 42%. The situation has led to extensive efforts to enrich widely cultivated, staple food crops in vitamin A, either through traditional plant breeding or molecular methods.

The approach is known as biofortification, and sweet potato is an excellent candidate for it. White and cream-colored sweet potatoes are already widely grown across Africa, for one. Levels of provitamin A carotenoids, such as beta-carotene, are highly heritable in sweet potato and easily screened for visually. And orange-fleshed sweet potato is one of the best natural sources of beta-carotene, which is converted to vitamin A in the body.

In a randomized, controlled study in South Africa from 2005, for example, primary school children who ate just a half cup (125 g) each day of a beta-carotene-rich sweet potato from the U.S., called ‘Resisto’, had higher vitamin A stores than a control group that ate a local, white-fleshed variety.

When cultivated in South Africa, however, Resisto, ‘Beauregard’, and other U.S. varieties suffer from low yields, low dry biomass, and other problems, prompting the country to launch its own orange sweet potato breeding program in 1996. Since then, the program has identified promising locally bred varieties, imported varieties, and elite lines and used these to breed new varieties specifically for South Africa.

The next step was to test the varieties and lines in a range of environments, which is where the current study comes in. Compared with other major food crops like maize and wheat, relatively little is known about the gene x environment interaction in sweet potato, explain the study’s authors. So, they conducted tests with 12 genotypes in experimental sites representing three climatic areas of sweet potato production across South Africa. These production areas differ substantially in climate, altitude, and other characteristics, making it crucial to conduct multi-environmental trials.

The best variety identified in the trials was Impilo, which exhibits wide adaptability to different conditions and stable, high yields in the range of the commercial variety, Beauregard. It also had average dry mass, good taste, and produced the highest number of marketable roots of any of the tested sweet potatoes. It could do well, the researchers say, in several parts of South Africa, including the Eastern Cape and Roodeplaat areas.

Second best was an elite line 2001_5_2 (now registered as Purple Sunset). The line is less adaptable than Impilo, being best suited to the country’s Owen Sithole area. But it has healthy yields, good taste, and is darker orange in color than Impilo—suggesting it also has more beta-carotene. And, in fact, previous research found that a 125-g portion of boiled Purple Sunset roots could supply 261% of the daily vitamin A requirement of four- to eight-year-olds, with Impilo delivering 113%.

Thanks to efforts such as VITAA (Vitamin A for Africa) and the Sweetpotato for Profit and Health Initiative (SPHI), orange sweet potatoes are already seeing an upswing—and vitamin A deficiency a downswing—in other parts of Africa. Now, if Impilo and Purple Sunset enjoy large-scale production, Labuschagne and Laurie believe the sweet potato will cut vitamin A deficiency in South Africa, too.

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