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## Virus Ravages Cassava Plants in Africa



Tyler Hicks/The New York Times

A brown streak-infected Cassava.

By DONALD G. McNEIL Jr.  
Published: May 31, 2010

MUKONO, Uganda — Lynet Nalugo dug a cassava tuber out of her field and sliced it open.

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Graphic

Threatening a Staple Crop

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Inside its tan skin, the white flesh was riddled with necrotic brown lumps, as obviously diseased as any tuberculosis lung or cancerous breast.

“Even the pigs refuse this,” she said.

The plant was what she called a “2961,” meaning it was Variant No. 2961, the only local strain bred to resist cassava mosaic virus, a disease that caused a major African famine in the 1920s.

But this was not mosaic disease, which only stunts the plants. Her field had been attacked by a new and more damaging virus named brown streak, for the marks it leaves on stems.

That newcomer, brown streak, is now ravaging cassava crops in a great swath around Lake Victoria, threatening millions of East Africans who grow the tuber as their staple food.

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Tyler Hicks/The New York Times

**UNWANTED** Even pigs won't eat cassava riddled with necrotic brown lumps that was dug up by Lynet Nalugo, top, from a field in Mukono, Uganda.

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Tyler Hicks/The New York Times

**SEEKING SOLUTIONS** At the National Crops Resources Research Institute in Namulonge, Uganda, a researcher studies cassava stricken with brown streak.

Although it has been seen on coastal farms for 70 years, a mutant version emerged in Africa's interior in 2004, "and there has been explosive, pandemic-style spread since then," said Claude M. Fauquet, director of cassava research at the [Donald Danforth Plant Science Center](#) in St. Louis. "The speed is just unprecedented, and the farmers are really desperate."

Two years ago, the [Bill and Melinda Gates Foundation](#) convened cassava experts and realized that brown streak "was alarming quite a few people," said Lawrence Kent, an agriculture program officer at the foundation. It has given \$27 million in grants to aid agencies and plant scientists fighting the disease.

The threat could become global. After rice and wheat, cassava is the world's third-largest source of [calories](#). Under many names, including manioc, tapioca and yuca, it is eaten by 800 million people in Africa, South America and Asia.

The danger has been likened to that of *Phytophthora infestans*, the blight that struck European potatoes in the 1840s, setting off a famine that killed perhaps a million

people in Ireland and forced even more to emigrate.

That event changed the history of all English-speaking countries.

Compared with amber waves of grain or the blond tresses of a field of ripe corn, cassava is an inglorious workhorse of a crop, a few spindly red stems sprouting from a clutch of brown tubers. It is filling but not very nutritious; it even contains trace amounts of cyanide, which must be removed by grinding and fermenting.

But subsistence farmers depend on it because it's "very drought-tolerant and very bad-management-tolerant," said Edward Charles, a team leader for the [Great Lakes Cassava Initiative](#), a six-country consortium based in Kenya and supported by the Gates Foundation. For example, he said, even when farmers are too weak from [malaria](#) to weed, their crops survive.

Also, the tubers can be left underground for up to three years, so if drought kills a corn or bean crop, the farmer's family can still fend off starvation. But the plant falls prey to more than 20 pests and diseases.

Dr. Fauquet fears brown streak will cross the Congo Basin to Nigeria, the world's biggest grower, because farmers sell cuttings to one another and border controls are nonexistent or can be evaded with bribes.

He is optimistic it will not cross the ocean into Thailand, Brazil, Indonesia or China because there is no world trade in the cuttings and few direct flights to Asia or South America. (Whiteflies, which are thought to spread the virus, have been known to stow aboard planes.)

However, he noted, mosaic virus did spread to India from Africa somehow. And Dai Peters, the Cassava Initiative's director, noted that a mealybug that damages Brazilian cassavas has leapfrogged the globe to infect Thai fields, too.

Even if the brown streak virus is contained in Africa, Dr. Fauquet said, donors may eventually be forced to spend billions of dollars on [food aid](#) to prevent starving populations from going on the move, which could set off ethnic fighting.

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Donations by the Gates Foundation, the [United States Agency for International Development](#) and a foundation run by Monsanto, the crop technology company, have totaled about \$50 million thus far, but compared with the threat, "that's a droplet in the ocean," Dr. Fauquet said.

The largest Gates grant, \$22 million, went to Dr. Peters's initiative, which is overseen by Catholic Relief Services, an American charity. Working with the national agricultural laboratories of six countries, it combines American computer technology, African rural self-help initiatives and research started a century ago by British colonialists.

Right now, there is no cassava strain in Africa immune to brown streak, so the initiative is essentially buying time, teaching farmers to recognize diseased crops, asking them to burn them and offering them clean cuttings so they can get one or two harvests before the virus strikes again.

They are hoping for a lucky break, like the success they are finally having against banana wilt, another virus that attacked a different East African staple food.

In that case, the solution was relatively simple, said Chris A. Omongo, an entomologist at the [National Crops Resources Research Institute](#) in Namulonge, Uganda.

Since bees and dirt spread the virus, farmers were taught to nip the purple male flower buds off each stalk and to clean their tools and boots before entering their banana patches.

(The virus was jokingly called "banana AIDS," because it, too, spread along the Uganda-Tanzania highways and rivers. Banana beer was shipped in jerry cans with the fat purple flowers used as stoppers.)

Some wild and some foreign cassava strains do appear resistant to brown streak, Dr. Fauquet said, but they lack the taste and consistency that Africans like. (Some cassava strains are grown just for flour, for industrial paste or for the food enhancer MSG.)

Dr. Fauquet's lab is trying to splice genes from them into African varieties. Because of the extensive safety testing required for new plants produced that way, the process will take at least five years, he estimated.

Here in Uganda, because there are so few government agricultural agents, the Cassava Initiative is building its own parallel network. Its agents have no power to destroy a crop or seize a truckful of diseased cuttings. But they do have rugged minicomputers with software to help them teach farmers to recognize the disease. They can also pinpoint a suspect field's GPS location, take photographs and send them from any Internet cafe.

To help farmers work together, the initiative also helps them form savings clubs, giving everyone a steel cash box and guidance.

Members put in a few dollars each week, and offer loans of \$50 or \$100 for money-generating projects like buying a flock of hens or brick-making molds. At year's end, they divide the profit, which can be hefty since the interest rate is 120 percent.

Mrs. Nalugo keeps the cash box for her local savings club, and she may have to borrow from it this year. If her cassava crop had been healthy, she estimated, she could have sold it for \$500.

Instead, she said, "the loss is pushing us back — we will have to buy food."

However, she is a smart farmer. She had learned the symptoms of brown streak from Elijah Kajubi, the initiative's local agent.

When her plants were only knee-high, she said, "I became suspicious, so I planted beans, too."

A version of this article appeared in print on June 1, 2010, on page D1 of the New York edition.

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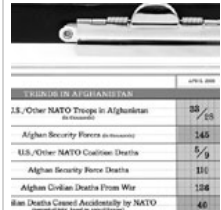
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