



the TROPICAL GARDEN

SPRING 2016

Blooms abound in
colorful abundance
this Spring at Fairchild



PUBLISHED BY FAIRCHILD TROPICAL BOTANIC GARDEN

The Demise of the Banana—Again

By Kenneth Setzer [@KennethSetzer](#)



Most all bananas consumed today are of a single variety, the Cavendish. The Cavendish banana supplanted a previous variety for export because it was under attack from a plant pathogen. And now history seems to be repeating itself.

The common supermarket banana wasn't always as it is now. In the past, up until about the 1950s, the common export banana was known as the Gros Michel. It had, according to author Dan Koeppel in "Banana: The Fate of the Fruit that Changed the World," "a creamier texture, and a more intense, fruity taste." It was also tough, produced a lot of fruit and endured well the packing and shipping process, particularly important before refrigeration and modern transportation.

Gros Michel was also very susceptible to a pathogenic soil fungus, *Fusarium*, resulting in what's called Panama disease—fatal to the banana plant. Though first reported in Southeast Asia, Panama was among the first nations with a major outbreak. *Fusarium* could survive in soil for decades. Its spread is nearly impossible to stop, as it can travel in plants, soil, water, even the mud on one's shoes. Gros Michel was the first banana variety to travel the world; with it came the disease.

One aspect of the banana that makes it profitable is its ability to reproduce by suckers, sending up shoots from the corm. Once the mother plant fruits and goes into decline, suckers are already shooting up through the soil and can be grown in place or transplanted. A banana infected with Panama disease may send up suckers that appear healthy, but they are also infected and must be destroyed.

Though it's more delicate, the push for Cavendish began in the early 1960s; by 1970 it was established as the supermarket banana. Sellers complained of its easily bruised skin, but it was entirely immune to the *Fusarium* fungus.

Until it wasn't. In the mid 1980s, an outbreak of a new variant of *Fusarium*, since termed Tropical Race Four, appeared in and quickly decimated Cavendish banana plantations in Sumatra and Malaysia. It has since spread to China, the Philippines, and parts of Australia and the Middle East.

Monoculture—the use of a single crop or type of plant—is a serious threat to food security. If a disease or insect comes along and directs its attack to that plant, crops can be entirely wiped out. In this case, variety is not just the spice of life, but the custodian of it.

The Cavendish banana's consistency, a plus for growers, is also its downfall. They ripen at about the same rate, are about all the same size and are in general predictable. This is because they are all seedless clones grown from suckers. Clones lack genetic variation, so if a disease can kill one Cavendish plant, it can kill them all. This is monoculture in

the extreme—not simply growing the same variety, but essentially the same individual!

Tropical Race Four has decimated the Cavendish (and some plantain varieties) across Asia. As with the Gros Michel infection, fungicides failed and are often toxic. The only somewhat effective treatment was flood fallowing, requiring an infected field to be flooded for many months to eradicate the fungus, not very practical or profitable. Uninfected areas of soil are planted in an attempt to outrun the fungus, but it eventually arrives. And virgin territory often comes at the expense of tropical rainforest.

There are a handful of researchers working on breeding a *Fusarium*-resistant banana. Some are looking to natural hybrids, utilizing the more than 1,000 cultivars in 50 different subgroups that exist. The seedlessness of so many banana varieties makes this ever more difficult. Genetic engineering is also adding to the effort, though a final product may encounter resistance, given the controversial nature of GMOs.

For now, Tropical America has been spared, but Panama disease has the potential to cause unemployment and increases in poverty in countries that depend heavily on banana exports. According to [panamadisease.org](#), the global industry generates about five billion dollars a year.

Let's hope we learn a lesson this time, and, if a resistant variety is discovered, growers include some genetic diversity in future banana crops. 