

Yes, We Have No Bananas? (Again!)

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In February 2024, regulators in Australia and New Zealand granted approval for the commercial growth of a genetically modified banana. This approval was driven by the ever-expanding threat of a fungal disease that is endangering current banana production and trade, a crisis the industry faced over 50 years ago as well. This EBOT discusses the modern history of banana production, the U.S. market, and attempts to mitigate the effects and spread of the fungal disease.

History of the Banana Market and Fungus: Bananas are the largest fruit crop by volume globally and are widely consumed around the world. There are hundreds of varieties of bananas, but the vast majority of these are not able to be commercialized due to storage and shipping constraints. The first commercially viable banana variety that could meet the constraints of global trade was the Gros Michel (“Big Mike”) in the early 1800s. It was the world’s preferred commercial banana for approximately 150 years. The Gros Michel dominated the market, in part because it was seedless, making it easier to eat. However, the lack of seeds meant that commercial farmers would propagate offshoots from existing plants, resulting in genetic clones of the Gros Michel variety. In the 1940s, the fungus *Fusarium oxysporum* f. sp. *cubense* Tropical Race 1 (TR1), which causes the disease Fusarium Wilt—more commonly known as Panama Disease—infected banana trees on nearly every banana plantation around the world.¹ The decimation of the Gros Michel variety led industry to find and adopt the disease-resistant Cavendish banana that could also be stored for long periods of time and thus shipped around the world.

The advantage of the Cavendish was that not only was it resistant to Panama Disease but it was also a high yielding crop that could stay green for weeks after harvest, and production was able to be scaled up quickly to meet export demand.² Today, Cavendish bananas comprise 99 percent of exported bananas. However, similar to what happened with the Gros Michel variety, the dominance of the Cavendish in commercial plantations and lack of genetic diversity among the plants stemming from the lack of seeds in the fruit (a trait highly valued by consumers) left banana production once again vulnerable to disease. Since the 1990s, Tropical Race 4 (TR4), a strain of TR1 first identified in Taiwan in 1967, has devastated Cavendish banana plantations across Asia, Australia, Africa and the Middle East. With contamination efforts in place it took over 20 years, until the summer of 2019, for TR4 reached the Americas, causing Colombia to declare a national emergency. Despite contamination and eradication efforts, TR4 was detected in Peru in 2021 and Venezuela in 2023.³

Banana Production and Trade: The United States is the largest export market for bananas, importing over \$2 billion (5 million metric tons, MT) of bananas in 2023.⁴ As shown in Figure 1, the vast majority of U.S. banana imports are sourced from Central and South America, and the quantity imported from these countries has remained fairly steady over the past 6 years. By far, Guatemala is consistently the largest

¹ The fungus starved the plants of nutrients and water, ultimately turning the leaves black and lead to the burning of the crop, necessitating moves to new plots of land. Panama Disease was first described in Australia in 1874.

² Bananas are fruits of perennial herbs and can produce commercial harvests around nine months after planting.

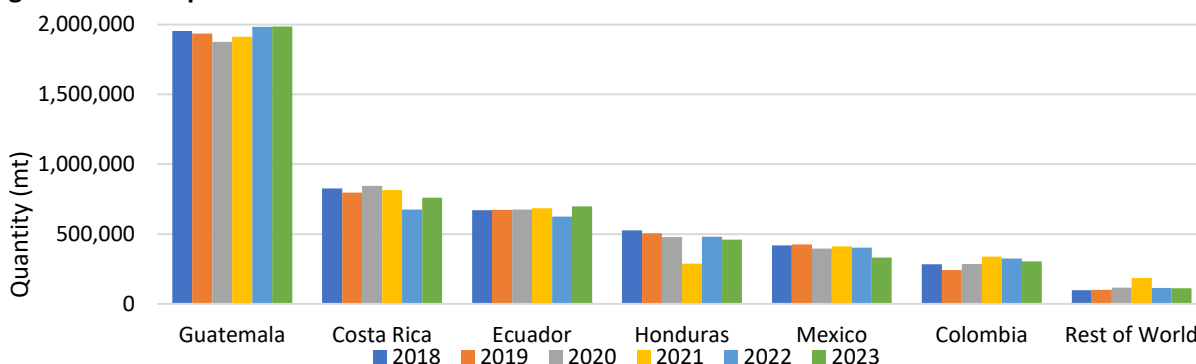
³ Preliminary assessments indicate that TR4 could potentially spread up to 1.6 million ha, approximately 17 percent of current global production area, by 2040 if no significant interventions are instituted.

⁴ The top 3 producers and marketer of fresh bananas are Dole Food Company, Chiquita Brands International and Del Monte Fresh Produce. In 2022 the U.S. imported approximately one-fifth of the world’s bananas. The United States historically has had limited domestic production of bananas.

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source of bananas for the United States.⁵ In 2023, 43 percent (2.0 million MT, \$949 million) of U.S. banana imports were sourced from Guatemala and that share was consistent annually from 2018–22.⁶

Figure 1: U.S. Imports of Bananas



Source: USITC, DataWeb, HTS 0803.90.00, accessed April 2, 2024.

Due in part to the spread of TR4 in the Philippines, which had been the world's second largest supplier of bananas during 2018–21 behind Ecuador, the Philippines fell to third place in 2022 with a 6 percent decline in production from 2021 to 2022.⁷ This decline continued in 2023 with Philippine banana exports also decreasing approximately three percent to 2.2 million MT.⁸ During this time Guatemala, which is not affected by TR4, maintained its place as the world's second largest supplier for the second year in a row.

The Future of Bananas: The spread of TR4 has been slowed through efforts aimed at strengthening plant protection infrastructure and the implementation of risk-mitigation programs. In the first quarter of 2024, a genetically modified banana variety called QCAV-4 was approved for commercial growth and sale in New Zealand.⁹ While QCAV-4 is not on the market yet, it has the advantage of being a modified Cavendish variety with the characteristics (e.g., look and taste) that customers are used to. However, one disadvantage to QCAV-4 is that some consumers are hesitant to buy and eat genetically modified organisms. Gene editing technology is also being used in an attempt to make the Cavendish resistant to specific diseases and pests that threaten banana plants. At the same time, scientists are studying the genetics of TR4 to learn how to stop it. Lastly, there is also a chance that a new banana variety could be identified that can take the place of the Cavendish, much like the Cavendish did to the Gros Michel.

Sources: USITC, [DataWeb](#), accessed April 2, 2024; FAOSTAT, "[Production, Fruit](#)", accessed April 26, 2024; Le Page, "[Genetically Modified Banana Approved](#)," February 16, 2024; Bayer, "[What Is a Banana?](#)," September 8, 2023; Maymon et al., "[The Origin and Current Situation of Fusarium Oxysporum F. Sp. Cubense](#)," January 31, 2020; Kambhampaty, "[What We Can Learn From the Near-Death of the Banana](#)," November 18, 2019; Solly, "[A Banana-Destroying Fungus Has Arrived](#)," August 13, 2019; Nast, "[Fungus Once Decimated the Most Common Bananas](#)," January 23, 2023; FreshPlaza, "[Guatemala Dislodges Philippines](#)," January 30, 2023; International Plant Protection Convention (IPPC), "[IPPC to Support Venezuela in Managing Tropical Race 4](#)," February 20, 2023; IPPC, "[Devastating Banana Disease Reported in Peru](#)," April 28, 2021; Talavera, "[TR4 Disease, Logistics Issues Prune Banana Exports Last Year](#)," January 19, 2024; Equal Exchange Resource Center, "[What's a Farmer to Do?](#)," December 20, 2023; Australian Banana Growers, "[FAQ – GM Bananas](#)," October 27, 2023; Bananalink, "[All About Bananas](#)," accessed August 19, 2024; TradeEconomy, "[Bananas | Imports and Exports | 2022](#)," January 28, 2024; FAO "[The Global Programme on Banana Fusarium Wilt Disease](#)," accessed August 19, 2024 .

⁵ Note that Ecuador is the top exporter but is only the United States third largest supplier.

⁶ In 2023 Guatemala exported 2.5 million MT of bananas with 81 percent of exports going to the United States.

⁷ Reports in April 2023 indicated that approximately 15,000 plantations in the Philippines are affected by TR4.

⁸ Philippines remains as the main banana exporter in the Asian region.

⁹ QCAV-4 variety is Cavendish resistant to TR4 modified with a gene from a wild noncommercial banana variety.

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